Social categorisation, distraction, and intergroup discrimination

KAKIMOTO, Toshikatsu

Institute of Social and Applied Psychology

University of Kent at Canterbury

Thesis submitted in partial fulfilment of the requirements for the degree of Doctor of Philosophy in the Faculty of Social Sciences, University of Kent at Canterbury. February 1994.

Contents

Contents	ii
List of tables	v
List of figures	ix
Abstract	xi
Memorandum	xii
Acknowledgements	xiii
Introduction	xv

Page

Chapter 1 The scope of the thesis — Review of relevant areas of research — 1

1.1 Overview of social identity research 1
1.2 The two sources of intergroup biases 19
1.3 Related areas 39
1.4 Automaticity in social cognition research 48
1.5 Conclusion 59

Chapter 2 Research questions, assumptions, and hypotheses 61

2.1 The effect of distraction on ingroup bias: a contradiction 62
2.2 De-individuation and distraction 65
2.3 Distraction and ingroup bias 66
2.4 Group membership salience and ingroup bias 73
2.5 Assumptions and hypotheses 75

Chapter 3 Study 1. Distraction, group membership salience, and ingroup bias — Pilot study 1 and Experiment 1 — 78

3.1 Background 79
3.2 Pilot study 1 85
3.3 Experiment 1: Method 99
3.4 Experiment 1: Results 105
3.5 Discussion 125

Chapter 4 **Study 2. The degree of distraction and ingroup bias — A report of Experiment 2 —** 138

4.1 Background 138
4.2 Method 141
4.3 Results 143
4.4 Discussion 156

Chapter 5 **Study 3. Digits rehearsal task and the colour band scales — Reports of Pilot study 2 and Experiment 3 —** 168

5.1 Purposes of Study 3 169
5.2 Pilot study 2 172
5.3 Experiment 3: Method 175
5.4 Experiment 3: Results 179
5.5 Discussion 189

Chapter 6 **Study 4. The noise hypothesis: digit rehearsal and colour band scales — A report of Experiment 4 —** 193

6.1 Aims 193
6.2 Method 196
6.3 Results 201
6.4 Discussion 212

Chapter 7 **Study 5. Causal relationship between category differentiation and allocation bias — A report of Pilot study 3 —** 223

7.1 Aims 223
7.2 Method 227
7.3 Results 231
7.4 Discussion 234

Chapter 8 **Study 6. Social orientations and the effects of distraction on intergroup biases — A report of Experiment 5 —** 238

8.1 Background 239
8.2 Method 241
8.3 Results 247
8.4 Discussion 257

Chapter 9 **Study 7. Social values and the effects of distraction on ingroup bias — A report of Experiment 6 —** 263

9.1 Background 264
9.2 Method 267
9.3 Results 270
9.4 Discussion 282

Chapter 10 **General discussion — Research findings, conclusion, and implications —** 290

10.1 Summary of the studies 291
10.2 Validity of the hypotheses and measurement assumptions 303
10.3 Conclusion, unresolved problems, and future research 323
10.4 Theoretical and applied implications 335
10.5 Summary of the thesis 338

References 340

Appendices 360

List of Tables

Chapter 1

Table 1.1 A typology of distraction operationalisations 48

Chapter 3

Table 3.1 Mean scores on check items for group membership salience 92

Table 3.2 Mean scores on check items for distraction 93

Table 3.3 Mean total points given to ingroup and outgroup members 94

Table 3.4 Rating bias on the differential and non-differential dimensions 95

Table 3.5 Ingroup bias in preference of the person as a friend 95

Table 3.6 Correlations between dependent variables and salience 97

Table 3.7 Mean score on group membership salience manipulation checks 108

Table 3.8 Mean Collective Self-Regard (CSR) scale score 109

Table 3.9 The mean "pull" scores of each strategy 112

Table 3.10 Mean rating bias on each dimension 114

Table 3.11 Mean sum score of ingroup bias in ratings 114

Table 3.12 Rating bias on the most differential dimension and the others 115

Table 3.13 Ingroup bias in preference of the person as a friend 115

Table 3.14 Factor loadings of the "pull" scores 118

Table 3.15 Factor loadings of ingroup bias score in ratings 118

Table 3.16 Mean factor scores for allocation bias and rating bias 119

Table 3.17 Self-reported strategies in point allocation 122

Table 3.18 Correlations between Collective Self-Regard (CSR) scale score and the allocation and the rating indices for ingroup bias 123

Table 3.19 Correlations between thinking-about-group-membership and the allocation and the rating indices for ingroup bias 123

Table 3.20 Correspondence between point allocation strategies and subjects' awareness of them 124

Table 3.21 Ingroup bias by self-reported level of distraction 130

Chapter 4

Table 4.1 Versions of the dependent measure booklet 144

Table 4.2 Manipulation checks 144

Table 4.3 The mean pull scores of each strategy 147

Table 4.4 The mean rating bias on each dimension 149

Table 4.5 The mean sum score of ingroup bias in ratings 149

Table 4.6 Rating bias on the most differential dimension and the others 150

Table 4.7 Ingroup bias in preference of the person as a friend 150

Table 4.8 The factor loadings of the pull scores 152

Table 4.9 The factor loadings of ingroup bias score in ratings 152

Table 4.10 Correlations between group membership salience and ingroup bias in allocation and rating indices 155

Table 4.11 Self-reported strategies in point allocation 156

Chapter 5

Table 5.1 Manipulation checks 181

Table 5.2 Total points in point allocation tasks 182

Table 5.3 The mean pull scores of each strategy 182

Table 5.4 The mean rating bias on each dimension 184

Table 5.5 Rating bias on the most differential dimension and the others 184

Table 5.6 Ingroup bias in preference of the person as a friend 184

Table 5.7 Pearson's correlation coefficients between the colour band scale indices and other variables 186

Table 5.8	The factor loadings of the differentiation/similarity scales	188
Table 5.9	Correlations coefficients involving differentiation/ similarity factors	188
Table 5.10	Differentiation factor scores by condition	188

Chapter 6

Table 6.1	Manipulation checks	204
Table 6.2	Total points in point allocation tasks	205
Table 6.3	The mean pull scores of allocation strategies	205
Table 6.4	The mean rating bias on each dimension	206
Table 6.5	Colour band scale indices by distraction and category salience	207
Table 6.6	The factor loadings of self-reported allocation strategies	210
Table 6.7	Indices of ingroup bias among subjects with low self-reported Fairness/Joint Profit intentions	210
Table 6.8	Indices of ingroup bias among subjects with low self-reported self-presentational allocation strategy	211
Table 6.9	The mean total points allocated to ingroup and outgroup members by subjects with ingroup/self-interest intentions	220
Table 6.10	The mean "pull" scores of each strategy among subjects with ingroup/self-interest intentions	220
Table 6.11	The mean rating bias on each dimension among subjects with ingroup/self-interest intentions	221

Chapter 7

Table 7.1	Difficulty judgements on rating, point allocation, and colour band tasks	234

Chapter 8

Table 8.1	Manipulation checks	249
Table 8.2	Total points in point allocation tasks	252
Table 8.3	The mean pull scores of each strategy	253

Table 8.4	The mean rating bias on each dimension	254
Table 8.5	Colour band measures (distance between the groups)	255
Table 8.6	Intentions in allocations	256
Table 8.7	Correlation between self-reported and actual point allocation strategies ("pull" scores)	257

Chapter 9

Table 9.1	Manipulation checks	272
Table 9.2	Total points in point allocation tasks	274
Table 9.3	The mean pull scores of each strategy	275
Table 9.4	The mean rating bias on each dimension	276
Table 9.5	Colour band measures (distance between the groups)	276
Table 9.6	Mean pull scores and ingroup bias in total points by distraction and social value orientations	280
Table 9.7	Rating bias and colour band differentiation indices by distraction and social value orientations	281
Table 9.8	Self-reported allocation strategies	281

Chapter 10

Table 10.1	Correlation between actual and self-reported point allocation strategy pulls	311
Table 10.2	Pearson's correlation coefficients between different types of measures	315
Table 10.3	A summary of predictions of and results regarding the multiple-resource model	318

List of Figures

Chapter 3

Fig. 3.1 Total points to ingroup and outgroup members by salience and distraction 110

Fig. 3.2 The average raw scores for the rating bias and the allocation bias indices 119

Chapter 4

Fig. 4.1 Total points to ingroup and outgroup members by distraction 146

Fig. 4.2 The allocation and the rating indices of ingroup bias by distraction condition 153

Fig. 4.3 Allocation bias as a function of distraction (a conceptual model) 163

Chapter 5

Fig. 5.1 An example of the colour gradation bands 178

Chapter 7

Fig. 7.1 Causal relationship between colour band and allocation indices 233

Chapter 8

Fig. 8.1 Allocation strategies: composite discriminatory pulls index and others by social orientation and distraction 251

Fig. 8.2 Frequencies of written rehearsal numbers against the experimental instruction 260

Chapter 9

Fig. 9.1 The pulls of MD (against MJP•MIP) by distraction and social value orientation 282

Chapter 10

Fig. 10.1	The intentional component of ingroup bias as a function of distraction and group membership salience across the studies	302
Fig. 10.2	Rating bias as a function of distraction and group membership salience across the studies	302
Fig. 10.3	Locations of experimental conditions in the studies as a function of distraction and group membership salience	303

Abstract

This thesis reports an investigation of the phenomenon of intergroup discrimination and its underlying psychological processes, using cognitive distraction as a conceptual tool. It has been claimed theoretically that cognitive and motivational elements are both involved in intergroup discrimination. On the basis of social identity theory, it was pointed out that discrimination is based on the category differentiation process as a cognitive component and the social identity process as a motivational component. The category differentiation process is an accentuation mechanism of inter-class differences based on perceptual categorisation. The social identity process is a goal-oriented process to maintain and enhance ingroup-esteem by favourable intergroup comparison. It was further suggested that the category differentiation process is less intentional and more automatic than the social identity process.

By employing this qualitative difference, it was aimed to demonstrate empirically the distinct functioning of the two hypothetical processes. Namely, because distraction is thought to obstruct intentional processes in general, it was hypothesised that the social identity process would be hindered by distraction whereas the category differentiation process would be unaffected. However, it was proposed that the above proposition holds only when group membership is salient.

Three pilot studies and six "minimal group" experiments (involving 581, 12-14 year olds) were conducted to examine these general propositions, using different operationalisations, measures, and procedures. In short, the hypotheses were generally supported with some modifications. For the social identity process, distraction was likely to reduce ingroup bias in point allocation, a form of intergroup discrimination in a minimal group situation. However, it was also found that the *degree* of distraction needs to be taken into account. Thus, it was proposed and demonstrated that noise from other intentions such as fairness and self-presentation, also interferes with the social identity process under no or weak distraction. As a result, intergroup discrimination in point allocation was strongest when moderate distraction eliminated noise from these other intentions, and weakest when strong distraction hindered the social identity process. For the category differentiation process, distraction hardly affected evaluative ratings and perceptual differentiation measured on new colour band scales. Theoretical and empirical implications are discussed.

Memorandum

The research for this dissertation was conducted whilst the author was a postgraduate research student at the Institute of Social and Applied Psychology, University of Kent at Canterbury (from October 1990 to September 1993). The major part of the work was conducted and written whilst the author was financially supported by the Rotary Foundation of Rotary International (from October 1990 to September 1991), the Overseas Research Students Awards Scheme from the Committee of Vice-Chancellors and Principals of the United Kingdom (from October 1991 to September 1993), and the Japanese Scholarship Foundation (from October 1992 to December 1993).

The theoretical and empirical work herein is the independent work of the author. Intellectual debts are acknowledged in the text. The execution of the studies reported required the physical assistance of other people, but their role was limited to assisting in aspects of the procedure, such as administering questionnaires.

The author has not been awarded a degree by this or any other university for work included in this thesis.

Acknowledgements

I would first like to thank Professor Dominic Abrams for his supervision. His patience with my poor spoken English in the beginning, should be specially noted. Also, I would like to thank him for his generous practical support in administering some of the experimental sessions, and most importantly, for his continuous spiritual support to my research programme. Thanks also go to his wife Dr. Diane Houston for liaising with a local school.

To be specially noted here is the "groups" group, which was set up coincidentally at the start of my PhD work. This informal workshop has been an opportunity to discuss issues in group processes. I thank Professor Rupert Brown who leads the workshop and all the other members for their contributions to the discussions.

Thanks go to my friends who helped me administering experimental sessions. To note, they are David Chesham, Pam Maras, Janet Robertson, and Jonathan Sigger. Among them, I thank Pam also for her liaising with a local school, and Jonathan for a number of theoretical discussions we shared. I also thank Sarah Battersby, Phil Baxter, Mike Forrester, Katy Greenland, Donal Kelly, Barbara Masser, Neo Morojele, Danuta Orlowska, for proof reading the manuscripts.

I would also like to express my thanks to the headmasters, teachers, and support staff of the schools. Those include Mr M. Yamada, Mr J. W. E. Blackford, Mr N. Slater, Mrs A. Cosgrove, Mrs P. Winston, Mr J. Charlesworth, and Mr D. Gahan. I would also like to thank those children who participated in the studies. The research would not have been possible without their help.

Thanks must go to Mr Gary Samson who assisted in computing on many occasions, and Ms Jan Lloyd who supported me through the departmental administration always in a considerate manner.

I would like to thank Professors E. Hamaguchi, J. Misumi, and S. Shirakashi, as well as Ms Y. Arima and Mr H. Furukawa, for their administrative support and encouragement from Japan. Their help has been invaluable at various stages of my research in this country.

My thanks also go to family in Japan: to Mother Etsuko, for liaising with a local school; again to her and to Sister Masako, for their help in preparing the sessions and coding data; and to Father Tatsuo, and Brother Hiroyoshi, for their spiritual support.

Finally, I would like to express my thanks to my friends for their encouragement. Those friends include Jim and Doroles Clements, Nick Donnely, June Edmund, Claudia Eichholz, Lily Eurwilaichitr, Sue Leekam, Lorella Lepore, Peggy Mormori, Dessy Natalia, Steve Rocher and Vasimon Ruanglek.

Introduction

This thesis presents a series of studies on intergroup discrimination, primarily using minimal groups in laboratory settings. The reasons of the use of laboratory experiments are related to the multifold purpose of the thesis. Because the author had had a theoretical concern about the intergroup processes, and because these processes are easily confounded by various theoretically uninteresting factors, it was firstly felt that a high degree of control of independent variables was necessary. Secondly, since this theoretical concern was felt to be satisfied by investigating a variable that would reveal the nature of the hypothesised processes, it was necessary to manipulate this variable experimentally. Thirdly, since there had been a fairly large amount of accumulated experimental work, it was felt convenient to start with utilising the experimental framework of the minimal group paradigm (Tajfel, Flament, Billig & Bundy, 1971) to be based on.

There are three principal aspects of the thesis. The first is a theoretical interest in intergroup phenomena and their hypothesised underlying processes. To note just briefly, a prime focus of this interest in the thesis is on the relative contributions and the characteristics of motivational and cognitive processes in intergroup biases, especially in ingroup bias (ingroup favouritism and its accentuation). Equally of theoretical importance, and examined simultaneously in the thesis is the role of group membership salience and its relationship to the motivational and cognitive aspects of intergroup biases. These issues are set out mainly in the first and the second chapters. A second aspect of the thesis is a methodological concern. The thesis takes an empirical approach to the theoretical issues noted above. Therefore, efforts are made to develop a methodology to examine hypotheses based on the theoretical considerations. Distraction is conceptualised as the operationalisation of attentional levels which should differentially affect the

motivational and cognitive processes. At the same time, it is aimed to improve the methodology through the series of studies. In this connection, the conceptual relevance of several related areas of research is discussed, including social cognition research. A third aspect of the thesis concerns the empirical issue regarding the effect of distraction. Clarifying the role of distraction in intergroup discrimination is thought to have an important implication in real world problems. While this subject has recently been studied in related areas in psychology and sociology, intergroup research has scarcely devoted empirical efforts to this problem. In this sense, this thesis can be seen as one of the few data sources on this subject although the studies described in the thesis are all laboratory based. It is hoped that these empirical studies will help facilitate the design of field, preferably action, research in the near future.

To introduce the chapters briefly, Chapter 1 reviews previous research that provides a basis and a background for the present studies. First, studies of intergroup relations, particularly social identity research, is presented. Cognitive and motivational aspects in the theoretical perspectives, and their characteristics are then pointed out, followed by overviews of the related areas of studies. In Chapter 2, research questions are raised concerning the predicted effects of distraction on ingroup bias, examination of which is assumed to disentangle the theoretical issues suggested in Chapter 1. A model is put forward to integrate the contradictory predictions, utilising ideas from other psychological studies including those on behavioural control hierarchy. Chapters 3 to 9 report empirical studies according to the development of the research. Chapter 3 reports the first set of the empirical studies (Pilot study 1 and Experiment 1), which revealed opposing directions of the distraction effects. A modification of the model with a concept of the *degree* of distraction is set forth to accommodate the contradiction. Chapter 4 reports Experiment 2 which tests the modified model. Chapters 5 to 9 report

studies which employ new measurement procedures, different operationalisations of distraction, social categorisation and group membership salience, and improved procedures to validate the model (Pilot studies 2 and 3; Experiments 3, 4, 5 and 6). Finally in Chapter 10, the research findings are summarised and discussed. Limitations of the studies and directions for future research are suggested, together with theoretical and empirical implications of the present research.

Chapter 1

The scope of the present thesis

— Review of relevant areas of research —

Contents

1.1 Overview of social identity research

1.2 The two sources of intergroup biases

1.3 Related areas

1.4 Automaticity in social cognition research

1.5 Conclusion

The purpose of this chapter is to identify and limit the scope of the present thesis. The first section introduces and reviews the underlying framework for the research: the social identity approach, and particularly the minimal group paradigm. The second part concentrates on a particular aspect of the studies: the sources of intergroup biases and related psychological processes. In the third section, topics from different lines of social psychological research are presented, providing a basis for the development of new hypotheses. Finally, some studies in current social cognition research are discussed with reference to the basic assumption of the present thesis — that it is necessary to distinguish between automatic and intentional processes in intergroup behaviour.

1.1 Overview of social identity research

Introduction

According to Sherif, intergroup behaviour is a kind of human behaviour which is conducted by members of a group, whether individually

or collectively, towards (members of) another group "in terms of their group identification" (Sherif, 1966, p. 12). This behaviour constitutes a considerable and important part of our social life, thus, its understanding is critical to the understanding of human beings. If psychology is a study of human behaviour which, in its explanation, assumes and uses some form of mental processes, when approached through psychology, intergroup behaviour should also be explained by mental processes.

The processes that are assumed by theorists to be responsible for intergroup behaviour may differ depending on the traditions within psychology. Those traditions include the social cognition approach and psychodynamic approach. The former tries to explain social phenomena entirely through the functioning of cognitive mechanisms represented as information processing (as can be seen in reviews by Hogg & Abrams, 1988, Messick & Mackie, 1989, and Stephan, 1985). The psychodynamic approach includes as its subsets the authoritarian personality research and the research regarding the frustration-aggression hypothesis (see Aronson, 1980, for review). These two differ in that the authoritarian personality research assumes intergroup hostility to be abnormal behaviour, whereas the frustration-aggression hypothesis explains it as a normal phenomenon in which anyone can be involved under certain circumstances. However, both of them share a common psychodynamic feature: the notion that intergroup hostility stems from some kind of tension which accumulates within the individual, either chronically or temporarily, and which needs to be released.

There is also another type of explanation for intergroup behaviour often quoted in social psychological literature: realistic conflict theory (Sherif, 1962). It emphasises the role of functional relationship between groups concerning material or symbolic interests, rather than that of the elements at an individual group-member level. While this type of explanation has a theoretical advantage in potentially explaining phenomena at a societal level

of analysis, it is rather too sociological and thus, does not necessarily specify the particular psychological processes involved. Roles of individuals tend to be unclear in this type of approach.

A more recently developed approach to intergroup relations is the direct concern of this thesis: the social identity approach. Starting from a psychological framework, the social identity approach has been a theoretical development that provides the kind of apparatus which essentially is still psychological, yet can be applied to a social group level of analysis, by incorporating into its framework the ideas of social identity, social categorisation, and so on. The purpose of this section is, first, to give a brief overview of social identity research, picking up theoretically important issues, then to illuminate the nature of basic components of intergroup relations that are incorporated in the theory.

Social identity

Social identity is defined as "those aspects of an individual's self-concept based upon their social group or category memberships together with their emotional, evaluative and other psychological correlates ..." (Turner, Hogg, Oakes, Reicher & Wetherell, 1987, p. 29). In other words, those group- or category- memberships are incorporated into one's identity as its social part.[1] This concept is the basis on which intergroup behaviour is explained. This concept, with some related assumptions, comprises the core of social identity theory (Tajfel & Turner, 1979).

Hogg & Abrams (1988) argue, however, that the term social identity now refers also to "a *perspective* and an *approach* in that it is a particular *type* of theory, a particular way of approaching social psychology" (p. 13; original emphasis) because of the development of the research. According to them, common features of this approach are: firstly, that people seek, by

[1] See Deschamps (1982) for a brief review of other related concepts regarding "identity".

categorising the environment, meaningful order in the world; secondly, from a general assumption that one tries to enhance or maintain one's self-concept, one is hypothesised to strive to achieve or maintain also one's group- or category-esteem. Positive social identity is assumed to be based largely on favourable comparison between one's ingroup and outgroups. So, it is hypothesised that people try to make a favourable comparison between ingroup and outgroups whenever it is possible.

Intergroup macro analysis: social identity theory

Social identity theory, as "a theory of intergroup conflict" (Tajfel & Turner, 1979, p. 33) in its origin, deals with dynamic societal processes between social groups and among the members of the groups on the basis of these assumptions. Briefly, status difference among social groups, its legitimacy and stability are additionally introduced as the framework of the analysis. Within this framework, conditions of social mobility and varieties of social change (conceptual "social creativity" and realistic "social competition") are deduced (Tajfel, 1978; Tajfel & Turner, 1979).

The theory has provided a framework for social surveys, as well as for laboratory experiments. For example, in industrial settings, Brown, Condor, Mathews, Wade & Williams (1986) measured intergroup perceptions among five different work groups in a paper factory, examining the relationship between group identification and intergroup differentiation (see also Brown, 1978; Brown & Williams, 1984). For larger scale social groups, Hagendoorn & Henke (1991), for instance, examined religious and social status differentiation in Northern India, and Abrams (1989) surveyed political attitudes in the context of Scottish nationalism.

Minimal group paradigm However, a considerable amount of empirical data related to this theory has been provided from "minimal group" experiments (see Tajfel, 1978; also Tajfel, Flament, Billig & Bundy,

1971). In this experimental paradigm, the effects of mere group membership are measured typically by point or reward allocation tasks and/or evaluative ratings on ingroup and outgroup members.[2] Following Tajfel (1978), the detail of the experimental paradigm and a brief account of the later developments are described below.

The often cited first minimal group experiments were conducted by Tajfel *et al.* (1971) (but see also Rabbie & Horwitz, 1969). Their aim was "to eliminate from the experimental situations all the variables that normally lead to ingroup favouritism or discrimination against the outgroup" (Tajfel, 1978, p. 77). These variables included: face-to-face interaction; previous hostility or contemporary conflict of interests between the groups; instrumental utility of the subjects' response and their self-interest. To achieve this aim, they created a situation where subjects were assigned to *ad hoc* groups on the basis of a preceding trivial task, and engaged in allocation of points worth money to two people, about whom they knew nothing other than their group affiliation and personal code numbers. No interaction between or within groups was allowed. This experimental paradigm was later called the "minimal group paradigm" because even with this maximum possible elimination of the related variables, it still produced results that showed intergroup discriminatory behaviour. Specifically, subjects distributed points in such a way that their ingroup members should receive more points than the outgroup members, even at the cost of absolute ingroup profit. In other words, the knowledge of subjects' own and recipients' group membership —

---

[2] However, various kinds of experimental methods have also been used. For example, Wright, Taylor, & Moghaddam (1990) recently simulated, in a laboratory, intergroup relations. Investigating responses to membership in a lower status group, they manipulated the "openness" of the higher status group (interpreted here as a kind of legitimacy), and personal expectation to upgrade to the higher status group. Every subject was assigned to the lower status group. When the status difference was the most illegitimate (or a closed membership), a disruptive collective protest was favoured, whereas an individual normative action was favoured when the status difference was the most legitimate (or an open membership). These results are congruent with the social identity analysis when the experimental situation is considered as unstable. See also Hirose & Okuda (1992) for the use of SIMSOC.

the minimal condition of an intergroup situation — was studied, and found to lead to intergroup discrimination. Later, several conceptual problems in interpreting the results in terms of intergroup behaviour (group membership) were examined. Billig & Tajfel (1973), for example, explored similarity as a confounding factor in a minimal group situation, and showed that it had only a non-significant and unimportant effect. St Claire & Turner (1982) refuted the long-standing demand characteristics criticism by showing that non-categorised subjects predicted only the fairness allocation strategy among categorised subjects, and that "demanded" subjects' ingroup bias did not differ from that of ordinarily categorised subjects.[3]

This experimental paradigm and its findings have inspired many other studies. Some of the studies concern theoretical issues, and have suggested alternative or supplemental explanations [e.g. work by Rabbie and his colleagues,[4] Branthwaite, Doyle and Lightbown (1979), and Ng (1981)].[5] Others are related to methodological controversies (e.g. Aschenbrenner & Schaefer, 1980; Bornstein, Crum, Wittenbraker, Harring, Insko & Thibaut,

---

[3] If not the experimenter effect, the structure of the situation itself may induce subjects to exhibit ingroup favouritism by, for example, evoking the norm of competition. Billig (1973) as well as St Claire & Turner (1982), however, gave counter-evidence that subjects were not aware of the norm. While evidence about norms may not be strong enough to refute the criticism, this type of demand characteristic explanation shares the same problem with normative explanations: it does not explain why that particular norm was adopted. See Farsides (1993) for recent discussion regarding the issue of demand characteristics in a minimal group situation.

[4] They claim that sense of common fate (Horwitz & Rabbie, 1982), sense of entitativity (Rabbie & Horwitz, 1969), and perceived interdependence structure (Rabbie, Schot & Visser, 1989) may respectively be the reasons for ingroup bias. The first two can be seen as the subjective description of the knowledge of group membership, and these aspects are also important in view of the definition of the concept of social identity. Thus, their claims are valid to the extent that they describe the same concept at a different level. The third claim, however, may not be so because it claims that ingroup favouritism is due to an expected future interaction that serves their own economic self-interest. This is not congruent with the typical results of the pull of MD (against MIP•MJP). See also Kakimoto (1989) and Gagnon & Bourhis (1992) for evidence that ingroup favouritism is independent of perceived interdependence.

[5] Branthwaite *et al.* (1979) emphasised the importance of fairness whereas Ng (1981) introduced an equity theory viewpoint. See Hyland (1979) and Turner (1980) for rejoinders to the former.

1983; Mummendey & Schreiber, 1983).[6] These on the whole have formed the central literature concerning experimental studies on intergroup relations. The origin of this literature, the minimal group paradigm, is useful and important for the present thesis for the following two reasons. First, this is the original situation used to test and formulate much of social identity theory. Therefore, it would be worthwhile to take another critical look at it, which may allow further development of the research. Second, as it claims, this is the situation where other factors which cause intergroup discrimination are excluded. Thus, it makes it easier to consider the essential or basic elements at work in intergroup relations, uncontaminated, and free from complex interaction with other factors.[7] It is clear that this experimental paradigm and results from it, greatly facilitated development of the theory. In fact, it provided "data in search of a theory" (cited in Brown, Tajfel & Turner, 1980).

Turner *et al.*'s (1987) contribution to analysing group phenomena

Recently, self-categorisation theory (Turner, 1985; Turner *et al.*, 1987) has come to encompass *intra*-group behaviour by elaborating the idea of the intergroup-interpersonal continuum which had been already depicted in social identity theory. Self-categorisation theory consists of a series of assumptions and hypotheses concerning the mechanism by which an individual is integrated into a psychological group, together with hypotheses regarding its antecedents and consequences. In brief, on the basis of assumptions about the structure of self-concept and the general nature of the categorisation process, *depersonalization* is maintained to be the basic process

---

[6] See Brown, Tajfel & Turner (1980) and Turner (1983) for rejoinders to the first and the second respectively.

[7] One limitation of the experimental paradigm may be that for the very reason of the minimality of groups, which does not allow interaction among subjects, it cannot deal with sequential interaction in intra- and inter- group settings such as decision making, coalition formation and so on.

underlying such group processes as group polarisation, conformity, stereotyping, crowd behaviour, and so on.[8]

Self-categorisation theory is very much a cognitive theory in that it regards the self-concept as a system of categories. One's self-image, when among other people, is considered to follow self-categorisation — the cognitive process of categorising oneself as a group member. It claims that the general rule for categorisation applies also to the self-concept (Turner *et al.*, 1987, p. 44). Thus, self-conceptualisation "depends upon the comparison of stimuli and follows the *principle of meta-contrast*" (*ibid.*, p. 46).[9] Additionally, the theory incorporates the idea of category salience. Oakes (1987) posited that salience is defined by our relative readiness to perceive a given category and its fit to a psychological environment.[10] This idea of salience is important for the social identity approach in general because salient group membership provides the basis of social identity analysis in that it determines the self-image at a particular moment, thus regulating one's behaviour at the particular time; moreover, it accentuates the similarities to ingroup members and the differences from outgroup members. Salience of group membership, in other words, determines psychologically the intergroup situation (See also Chapter 2). Applications of these ideas can be seen, for example, in the studies of referent informational influence and of self-stereotyping. See Appendix 1.2 for a related discussion.

---

[8] According to Turner, "depersonalization refers to the process of 'self-stereotyping' whereby people come to perceive themselves more as the interchangeable exemplars of a social category than as unique personalities defined by their individual differences from others." (Turner *et al.*, 1987, p. 50)

[9] The *principle of meta-contrast* means that "within any given frame of reference ..., any collection of stimuli is more likely to be categorized as an entity (i.e., grouped as identical) to the degree that the differences between those stimuli on relevant dimensions of comparison (intra-class differences) are perceived as less than the differences between that collection and other stimuli (inter-class differences)." (Turner *et al.*, 1987, pp. 46-47)

[10] More precisely, salience is defined as a product of the relative accessibility of a given category (compared with those of other categories), and fit between actual stimulus characteristics and category specifications (Oakes, 1987, p. 128). Fit is also claimed to follow the principle of meta-contrast. In other word, "it comprises the degree to which observed similarities and differences between people (or their actions) are perceived to correlate in a stereotype-consistent manner with a division into social categories." (*ibid.*, p. 131)

Current issues in the social identity approach

Social identity theory and self-categorisation theory are thought to be the two representative theoretical standpoints in the social identity approach. The former gave a theoretical basis for the studies on intergroup relations and mainly deals with intergroup phenomena while the latter extended it to intra-group phenomena with a cognitive emphasis. While these theories have been formulated for some time, there remain many issues where conceptual and empirical investigations should be, and are in fact being directed. Described below are some of these current issues or controversies in the approach, that seem important to the present thesis.

Group membership salience It was argued briefly that the concept of salience is important for the social identity approach in general. Whereas this concept needs more theoretical and empirical clarification, there have been many studies which adopted it as an independent variable with various manipulations. For example, Gerald & Hoyt (1974) varied distinctiveness of ingroup membership by changing the relative size of the ingroup. Assuming that a relatively small ingroup size makes ingroup membership salient, they hypothesised that ingroup bias increases as relative ingroup size decreases. The results supported the hypothesis by and large. The smaller the relative ingroup size was, the more subjects favoured ingroup members. This experiment simply manipulated the relative ingroup size to operationalise ingroup salience.

However, Oakes & Turner (1986) showed that if subjects were asked to judge ingroup members as a whole, the effect of salience, measured by stereotypic ratings, was most pronounced when the ingroup size was equal to outgroup size. To make matters even more confusing, Abrams, Thomas & Hogg (1990) recently demonstrated that salience, tapped by spontaneous mention of the category, did not differ among the conditions with different relative ingroup sizes, as long as at least one ingroup member was present.

Apparently, these studies show that no agreement has been reached so far among researchers regarding what leads to category salience and what indices can measure it best.

Nonetheless, the importance of group membership salience itself is also acknowledged in another line of research. Using the Prisoner's Dilemma Game (PDG), Insko and his colleagues explore the conditions which create individual-group discontinuity in competitiveness. In an intergroup interaction setting, subjects were instructed either that members of their own side should reach a consensus about the choices, or that they should simply discuss any aspect of the PDG. Competitive choices were significantly more likely in the former condition in spite of the fact that the intergroup interaction was between individuals (Insko, Hoyle, Pinkley, Hong, Slim, Dalton, Lin, Ruffin, Dardis & Bernthal, 1988). They interpreted the results to mean that the consensus rule created entitativity; the aggregate of people had become a real psychological group. In the present context, this is an illustration of the importance of group membership salience, in that subjects' awareness of membership, thus its salience, was reflected in their behaviour. As pointed out earlier, however, it is clear that more empirical and theoretical research is needed for the construct of (group membership) salience. The concept of salience will be discussed again later in this chapter.

Self-esteem As mentioned earlier, social identity theory posits that "[since] individuals strive to maintain or enhance their self-esteem ...", and because self-esteem partly comes from affiliated groups and their memberships, "individuals strive to achieve or to maintain positive social identity [in intergroup situations]" (Tajfel & Turner, 1979, p. 40; words in parentheses mine). This is assumed to be achieved largely through favourable intergroup comparisons for the ingroup and against the outgroup.[11] In other

[11] Recently, it has been suggested that intergroup comparison as a way of achieving positive self-esteem, may apply only to a certain type of groups (see Hinkle & Brown, 1990; also Brown, Hinkle, Ely, Fox-Cardamone, Maras & Taylor, 1992).

words, self-esteem maintenance/enhancement is assumed to be an origin of intergroup discrimination. One proposition derived from this assumption is that (successful) intergroup discrimination will lead to enhanced self-esteem. This proposition is important because the existence of social identity, the central assumption of the social identity approach, can be tested by examining this hypothesis, as it is a logical consequence of the alleged motivational process of social identity.

To test this hypothesis, Oakes & Turner (1980) created a minimal group situation where subjects did not engage in the usual point allocation tasks. Self-esteem in this condition was lower than in a condition where subjects discriminated, using the usual point allocation tasks. Lemyre & Smith (1985) further investigated this hypothesis and found that simply engaging in allocation tasks did not result in higher self-esteem unless subjects could exert discrimination. From this, they ruled out possible other interpretations: a) that engaging in the allocation task itself might strengthen categorisation (rather than fulfilling the desire for positive self-esteem), and hence salience of the group membership, thus leading to increased self-esteem; and b) that the fact of having completed a significant experimental task might give subjects high self-esteem. Judging from the results of these studies, the proposition that intergroup discrimination leads to higher self-esteem appears to be correct.

Meanwhile, Abrams & Hogg (1988) reviewed literature on motivational sources of intergroup differentiation in the social identity approach, and labelled the formerly stated notion that a need for positive self-esteem is the motivational origin of intergroup discrimination, as "the self-esteem hypothesis". Apart from the above proposition that intergroup discrimination will lead to enhanced self-esteem, they identified another proposition as a corollary of the self-esteem hypothesis: "low or threatened self-esteem will promote intergroup discrimination ..." (p. 320). However,

they reported a number of studies that disconfirm mainly the latter proposition (e.g. Crocker, Thomson, McGraw & Ingerman, 1987). Abrams and Hogg concluded that: "taken together, ... It is people with high self-esteem, particularly those whose status is under threat or at risk, who indulge in discrimination" (Abrams & Hogg, 1988, p. 322). Abrams & Hogg (1988) also claim that the self-esteem hypothesis suffers from a general shortcoming that "it over-implicates self-esteem in intergroup behaviour; self-esteem can, under some conditions, be incidental or even irrelevant. The posited 'need for positive self-esteem' has no more *logical* link with manifest intergroup behaviour ..." (p. 322).

This claim may be rather hasty since as they themselves argued, the inconsistency of the results concerning the self-esteem hypothesis comes partly from deficiency in its measurement, and partly from conceptual ambiguity in the hypothesis (see also Messick & Mackie, 1989, p. 59). Because of this very fact, however, these problems should be solved in order for self-esteem to be a useful tool to explain intergroup relations as Abrams & Hogg (1988) suggested. This issue is acknowledged also among some researchers and improvements are being attempted. There seems to be a move in the social identity research to articulate the concept of, and to refine the methodology for measuring self-esteem: at the appropriate level of self-esteem, and more specific to the situation (Crocker & Luhtanen, 1990; Sigger, 1992).

Focus of attention and salience Another related topic is the distinction between focus of attention and salience. In the area of social cognition, whereas "attention ... is the amount of selective cognitive work you do", salience is a "stimulus propert[y] that typically but not necessarily attract[s] attention ... A stimulus is *salient* relative to its context" (Fiske & Taylor, 1984, pp. 184-185; emphasis original, letters in parentheses mine). However, the usage of salience in the social identity approach does not

necessarily follow that in the research of social cognition. Self-categorisation theory posits that salience is a combination of relative readiness of a given category and its fit to a psychological environment. Thus, salience in self-categorisation theory is not a stimulus property, but rather a temporal property of a construct in one's mind. In other words, it is a combination of attention and salience in Fiske & Taylor's (1984) sense. This view of salience seems to be dominant in the social identity research. Abrams (1990), however, pointed out that salience of group membership and attention to it should be distinguished. By doing so, intergroup behaviour can be viewed from the self-regulatory perspective (Carver & Scheier, 1981), independent of salience of a particular social identity.

The earliest work pointing to this may be that of Abrams (1985). In a minimal group situation, he manipulated subjects' attention to social categorisation at three levels: distracted, standard (control condition), and enhanced attention. The results confirmed the hypotheses that enhanced attention would increase intergroup discrimination (*i.e.* discriminatory allocation strategies), and intra-individual consistency (*i.e.* lower intra-subject variance in the response). Moreover, those who were dispositionally self-attentive to private self-images, showed more ingroup pride and sense of belongingness [see also Abrams & Brown (1989), for another use of dispositional differences in self-consciousness]. This seems to illustrate that attention regulates at least some aspects of intergroup behaviour.

In yet another line of research, unique predictions are drawn from this self-regulatory viewpoint for crowd behaviour, different from those in traditional theoretical perspectives. This issue will be discussed in a later section under the rubric of de-individuation. To anticipate this just briefly, however, it is argued that attention to idiosyncratic aspects of one's self-concept leads to behaviour regulation in terms of personal beliefs and other personal correlates; attention to one's group membership leads to regulating

one's behaviour in terms of group norms and other group related characteristics given salience of the group membership. Therefore, some types of crowd behaviour can be seen as being controlled in terms of a particular social identity of the participants, rather than as uncontrolled primitive acts (Reicher, 1984a, 1984b; Abrams, 1990).

These examples illustrate the importance of the theoretical distinction between focus of attention and salience in the research on intergroup relations. Attention supplements the function of group membership salience by allowing one to regulate one's behaviour on the basis of the group membership. It should also be noted that these arguments are based on an assumption explicit in the social identity approach: group memberships are incorporated into one's self-concept, and behaviour is regulated by self-concept.

The basic elements in intergroup biases in the minimal group situation[12]

The very first and the most intriguing finding in the social identity approach, which emerged in minimal group experiments, was that when categorised into two groups, people engage in discrimination against people in the other category. Although there seems to be a certain agreement among researchers, it is not in fact entirely clear how this is generated. In the following exploration of its account, let us limit ourselves to the minimal group situation and concentrate on the theoretical explanations accorded to this phenomenon, rather than taking account of applied settings.[13]

---

[12] Intergroup biases are defined in the present study as any kind of phenomena caused by intergroup distinctions, such as illusory correlations, homogeneity effect, and so on. However, by intergroup biases, ingroup bias as opposed to outgroup bias is specially denoted in most cases. Ingroup bias includes evaluative bias in favour of ingroup members and its behavioural expression. This behavioural expression may be called intergroup discrimination. Ingroup bias and ingroup favouritism refer to the same phenomena. However, the former connotes unjustified deviation, whereas the latter implies more the direction of the bias. In theory, intergroup biases include outgroup bias. However, the term intergroup biases is used to signify ingroup bias unless it is specified otherwise.

[13] As discussed earlier, group homogeneity effects can be conceived of as resultant phenomena of intergroup relations. For simplicity, however, these phenomena will be

For revision, we can recall that the minimal group situation is the setting where the effects of mere category membership are measured typically by means of behavioural indices (point allocations) and/or evaluative ratings. The important findings can be divided into two. The first is that in point allocation, subjects tend to adopt the strategy, among others, of maximising the difference between the groups in favour of their own group. The other finding is that subjects favour members of their own group both in point allocation and in evaluation. These two consequences can be referred to generally as ingroup bias. Two different components in these phenomena have been pointed out: the accentuation effect, and its directionality (e.g. Brewer & Kramer, 1985, p. 224; Brown, 1988, p. 238). First, the difference between the groups is emphasised, by the choice of the maximum difference strategy even at the cost of own group's profit, and for evaluative ratings, by the shift of rating to the extremes (category differentiation); second, *direction* of the difference is somehow determined, before the accentuation, in favour of the ingroup (ingroup favouritism). These two components can be seen as the expression of underlying psychological mechanisms. We now turn to the mechanisms which are assumed to have influence on intergroup biases, especially on ingroup bias.

The mechanism for the accentuation effect What seems to occur in point allocations and evaluative ratings is the accentuation of the difference between groups. This accentuation effect can be explained as a part of the general effect of categorisation. This accentuation mechanism will be referred to in this thesis as the *category differentiation process*, after Doise (1978).

Tajfel & Wilkes (1963; also Tajfel, 1959) hypothesised and found, in their experiments on labelling and perception, that when the actual length of lines and their labels were correlated, the difference in the length of the lines

---

mentioned only when necessary because it is thought that they are explained with the framework of the thesis for ingroup bias.

was exaggerated between different sets of lines under different labels, and reduced (though non-significantly) within the sets under the same label. The effects of categorisation — accentuation of inter-class differences and intra-class similarities — found with objective stimuli have also been studied using social stimuli including social stereotypes (e.g. Tajfel, Sheikh & Gardner, 1964; see Taylor, 1981, for review), and attitude statements (e.g. Eiser, 1971).

Doise & Sinclair (1973) extended this categorisation principle to intergroup phenomena.

> "... however, ... the categorization process has wider interpretative value. [First, Tajfel *et al.* (1971)] shows that ingroup members, when asked to distribute points (...), systematically adopt a strategy that results in a positive difference between them and the outgroup members, even if, by doing so, they reduce gain. ... The group tries to establish a difference in its favour. ... ... The second group of experiments (Rabbie & Horwitz, 1969, [etc.]) shows that when ingroup members have to rate themselves as well as outgroup members, they quasi-spontaneously rate themselves more favourably than the outgroup members. ... ... Furthermore, [Doise *et al.* (1972)] seems to show that the behavioural and evaluative phenomena are related: although discrimination on an evaluative level occurs very easily, it becomes significantly stronger when ingroup members expect the possibility of discriminations at a behavioural level." (Doise & Sinclair, 1973, pp. 147-148; words in square brackets modified)

In other words, they suggested that separate findings in behavioural measures (point allocations) and evaluative ratings in intergroup relations could be seen as consequences of the same categorisation effect. By doing so, they maintained that category differentiation occurs not only at perceptual and judgemental, but also behavioural levels. They proposed, moreover, that differences on one level correspond (generalise to) differences on other levels, and that these levels include perceptual (representational), judgemental (evaluative), and also (social) behavioural levels. (For a complete discussion of the category differentiation process, see Doise, 1978, pp. 122-159).

In brief, on the basis of the (objective) categorisation effect (e.g. Tajfel & Wilkes, 1963), the category differentiation process was proposed as an underlying mechanism for the accentuation effect of social categorisation (e.g. Doise, 1978). This category differentiation process is thought to be a most thorough description of the accentuation effect of social categorisation.

The mechanisms for directionality The second component of ingroup bias is the directionality of the bias: ingroup favouritism. Generally, three types of explanations have been given for the directionality of the intergroup discrimination in the minimal group situation: cognitive consistency, social identity, and social norms. Below are brief accounts of these explanations, partly based on Wilder's (1986) review.

Cognitive consistency Cognitive consistency could be defined as the social psychological principle that a certain number of cognitive elements tend to converge so that they do not contradict each other. According to Wilder (1986), this principle would apply to ingroup favouritism in the following way: "In general, persons should experience a sentiment toward the ingroup as a result of their association with it (Heider, 1958). Consequently, ... persons should favor the ingroup over the outgroup in order to maintain cognitive consistency" (Wilder, 1986, p. 313; see also Horwitz & Rabbie, 1982). Thus according to this explanation, the direction of intergroup differentiation is determined to be consistent with their knowledge of their belongingness.

A rather ambiguous notion of familiarity may be included as a variation of the cognitive consistency explanation. That is, it is suggested that one prefers ingroup members because they are familiar to oneself because they share the same group membership. Two anecdotal sources of support can be supplied. Firstly, it is a known fact in consumer behaviour research that consumers choose a familiar item when there are no other obvious criteria. Secondly, suppose you are given a choice between two cards to turn

over or pick up — the same two but on one of which are the letters that happen to be your initials. It seems likely that you would choose the latter when you have no other criteria. This idea is quite vague, but probably relevant to ingroup bias and is classified as a cognitive consistency explanation.

Social identity theory: social comparison As mentioned earlier, the explanation given in social identity theory is related to social comparison between ingroup and outgroup. Positive social identity is assumed to rely on favourable comparison between one's ingroup and outgroups. Therefore, it is hypothesised that a person is motivated to make a favourable comparison between ingroup and outgroups. As already pointed out, this hypothesis involves the controversial issue of self-esteem.

Social norms Finally, the direction of the differentiation between the groups is also explained in terms of norms. That is, it is suggested that because of a universal norm of ingroup favouritism, subjects follow the norm of intergroup discrimination in the experimental situation. Tajfel and his colleagues initially adopted this type of explanation (Tajfel, 1970; Tajfel *et al.*, 1971). It is "a script ... that advocates ingroup favouritism" (Wilder, 1986, p. 314), where the learning process of the script is regarded important. "Script" means a well-learned, thus semi-automatic, sequence of actions in a typical situation (e.g. Abelson, 1976). In reality, however, it is difficult to explain intergroup discrimination with this idea alone. As Wilder (1986) pointed out, one's script in intergroup behaviour may also contain such norms as equality, fairness, and so on. Therefore, Wilder (1986) was bound to say that "intergroup bias observed in minimal group experiments is a compromise of two tendencies: to be superior and to be fair (p. 312). Meanwhile, Hogg & Abrams (1988) are more suspicious. They commented that "a series of studies has shown that minimal group discrimination is not produced by generic norms, ..." (p. 50). From the findings and arguments by Billig (1973) and St

Claire & Turner (1982), it seems clear that the normative explanation cannot give a complete account of the directionality of intergroup differentiation in a minimal group situation.

Lastly, it may be beneficial to note the relationships among these three explanations. Wilder (1986) commented that "none [of these explanations] excludes the others. ... ... Each explanation addresses a different function — organization of social cognitions (consistency), definition of self (social identity), and presentation of self to others (social script)" (*ibid.*, pp. 315-316; words in square brackets modified). Thus, it may also be reasonable to assume that each process should operate, whether dependently or independently, at each level in a minimal group situation.

1.2 The two sources of intergroup biases

In the above overview of the social identity approach, we have seen the basic concepts, two particular theories, some of the current issues, and theoretical explanations accorded to the mechanisms of intergroup biases. This section explores two broad theoretical perspectives concerning the underlying psychological mechanisms of intergroup biases. It is suggested that both perspectives are necessary in order to explain the existing data. Finally, an attempt is made to clarify characteristics of the psychological processes hypothesised in the perspectives.

Two sources: cognitive and motivational perspectives

> "that part of the individuals' self-concept which derives from their knowledge of their membership of a social group (or groups) together with the value and emotional significance attached to that membership." (Tajfel, 1981, p. 255).

In this definition of the concept of social identity, it is already evident that the social identity approach to intergroup relations must entail two

sources of intergroup phenomena. Namely, it is assumed that there are cognitive and motivational aspects in social identity. In their review of psychological studies on intergroup relations, Brewer & Kramer (1985) also pointed out that "Social identity theory ... ... explicitly recognizes the need to consider both basic motivational and cognitive processes in order to explain intergroup perceptions and behaviour" (p. 224). Let us take another example from Turner (1982). Although Turner later put forward a theory of group processes with a highly cognitive emphasis, one of his earliest descriptions of the theory was expressed in a somewhat more motivational tone:

> "[For behavioural regulation by social identity], ... There are at least two general principles at work. Firstly, there are the relatively automatic cognitive processes associated with social categorizations and, secondly, there are the motivational processes which seem to characterize self-description." (Turner, 1982, p. 21, words in square brackets supplemented)

Then he goes on to explain both the cognitive and the motivational perspectives for behavioural regulation. For the cognitive perspective:

> "... Under conditions where individuals' social category memberships are salient, they tend to be assigned all the characteristics perceived to define their category. This fact is the basis for what we can call Tajfel's (categorization) law that, as category memberships become salient, there will be a tendency to exaggerate the differences on criterial dimensions between individuals falling into distinct categories, and to minimize these differences within each of these categories. ..." (p. 28).

In other words, he regards the categorisation effect as the underlying cognitive process which is responsible for (inter)group perception, hence behaviour. For the motivational perspective:

> "The other major way (so far researched) in which social identity regulates social behaviour is through extending the sphere of operation of motivational processes

> associated with self-conception. Perhaps the most important and obvious example is provided by the effects of the need for positive self-esteem on group behaviour. ... the need for positive self-esteem should motivate a desire to evaluate that category positively." (p. 33).

Namely, Turner (1982) viewed the need for positive self-esteem as the motivational source of (inter)group behaviour. Taken together, it was clearly recognised by Turner that both the cognitive and the motivational perspectives — particularly the categorisation process and the need for positive self-esteem respectively — do operate in regulating behaviour in terms of social identity. Similarly, most of the theorists accept, to a varying degree, that the two aspects are involved in the phenomena of intergroup biases.[14]

It may be useful to note that the motivational source and the cognitive source are, in general, related closely. For example, it would be thought from everyday common sense that motivations in some cases encourage/facilitate, and in other cases discourage/hinder, particular cognitive activities and their general intensity while particular cognitive activities and their intensity can determine motivations (see also Fiske & Neuberg, 1990; Stangor & Ford, 1992). Thus, it could be said that they are interdependently related. However, it may be fruitful to distinguish these conceptually separate ideas, especially in the cases where these processes are expected to counteract or restrict each other.

---

[14] This is evident even in Hamilton's statement in his concluding chapter of a book concerned with the cognitive perspective: "As we have seen throughout these pages, ... the person is seen as one who is adapting to a complex stimulus world through the use of cognitive mechanisms and strategies that have proved to be functional in the past. ... Yet if there is any domain of human interaction that history tells us is laden with strong, even passionate, feelings, *it is in the area of intergroup relations. And this point makes clear the fact that the cognitive approach, despite the rich and varied advances that it has made in recent years, is by itself incomplete.*" (Hamilton, 1981, p.347, emphasis mine).

Some empirical support for the cognitive and the motivational perspectives

Crossed categorisation Support for the hypothesised cognitive process can be found in the studies on crossed categorisation (e.g. Deschamps & Doise, 1978; Brown & Turner, 1979; Vanbeselaere, 1987, 1991). Crossed categorisation in the social identity approach involves a situation where individuals are members of two or more independent social categories, and can therefore share different combinations of membership with one another.[15] For instance, when one categorisation contrasting A (male) and B (female) is imposed on another categorisation contrasting X (British) and Y (Japanese), we have an example of crossed categorisation where the dimension AB (sex) and the dimension XY (nationality) are crossed. This situation is interesting because the cognitive process analysis and the motivational process analysis offer distinct predictions.

From the cognitive process analysis, differentiation between AX (male British) and AY (male Japanese) should be attenuated because accentuation of the difference between X (British) and Y (Japanese) should be neutralised by accentuation of the similarity within A (male) which includes AX and AY, on condition that categorisation between A (male) and B (female) is also salient. It also applies, for instance, to the differentiation between AX and BX. Differentiation between AX (male British) and BY (female Japanese) should be exaggerated because both categorisations, AB (sex) and XY (nationality), should accentuate the difference between them.

On the other hand, from the motivational process analysis, differentiation between AX (male British) and AY (female Japanese) should not differ from the differentiation between just X (British) and Y (Japanese) because the source of social comparison between the former is the same as that between the latter, which is the comparison between X (British) and Y (Japanese). The same rule applies, for instance, to the differentiation between

---

[15] Note that it is not a variation of categorisation as a cognitive process.

AX and BX and the differentiation between just A and B. Meanwhile, differentiation between AX and BY should be increased because the both categorisations, AB and XY, should serve, in an additive way, as the sources of the social comparison between them.

The critical difference between the cognitive and the motivational analyses seems to be whether the effect of categorisation is reduced on the original dimension when another categorisation is imposed across the original categorisation: the cognitive analysis predicts the reduced effect; the motivational analysis anticipates the same magnitude of effect.[16]

Empirical data obtained so far on this issue are not consistent. Firstly, Deschamps & Doise (1978) found reduced discrimination, measured by performance rating, between groups on one categorisation when it was crossed by another; but on general evaluations measured by dispositional attribution, there was no difference between simple categorisation and crossed categorisation. These results therefore only partly support the cognitive analyses.

Brown & Turner (1979) found that only diagonal categorisation (e.g. AX *vs.* BY) yielded significant discrimination in simplified rating tasks. The results were somewhat unreliable because Brown and Turner did not obtain discrimination between the groups in the simple categorisation condition. Nevertheless, the results that the effects of crossed categorisation for adjacent cells were non-significant seem to fit the cognitive rather than the motivational process despite Brown and Turner's own prediction.[17]

---

[16] See Hewstone, Islam & Judd (1993) and Hagendoorn & Henke (1991) for other models and/or results from real social groups.

[17] Their cognitive process prediction was that ingroup bias would be reduced between any crossed category cells whereas the present cognitive analysis predicts enhanced bias between diagonal cells. Their prediction may be correct in a situation where subjects engage in both categorisations at one time. However, in their experiment, subjects rated members of only in-in and out-out groups although subjects were informed about the crossed categories situation. In this case, crossed categorisation is virtually the same as simple categorisation in the cognitive analysis.

Lastly, Vanbeselaere (1987, 1992) showed, in performance and general evaluative ratings, that crossed categorisations, whether adjacent (between AX and AY, or AX and BX, in the above example) or diagonal (similarly between AX and BY), led equally to less discrimination than the simple categorisation. All these studies support the cognitive process analysis because every study showed reduced or no discrimination between adjacent categories (AX and AY, or AX and BX).

The cognitive analysis which stems from the categorisation principle has proved valid, in crossed categorisation situations, for adjacent cells. However, we must note that the general evaluative attribution in Deschamps & Doise (1978) yielded discrimination between the adjacent cells as strong as in the simple categorisation, which supports the motivational analysis. Also the diagonal categorisation was rather discriminatory in both Brown & Turner (1979) and Vanbeselaere (1987, 1992), consistent not only with the cognitive analysis but also the motivational analysis. Moreover, as will be mentioned in a later chapter, it may possibly be that some indices are sensitive to motivational, others to cognitive processes. If so, it still leaves the possibility that each of these studies measured only those variables relevant to the cognitive process.

Illusory correlation Schaller's (1991; Schaller & Maass, 1989) studies on illusory correlation and group membership provide an interesting analysis relevant to the present context. Illusory correlation refers to an erroneous perceived correlation between two events (Chapman, 1967). The significance of this concept for the research on intergroup relations lies in a particular form of it: an overestimation of rare traits or behaviour for minority group members. Hamilton & Gifford (1976) suggested that this illusory link is derived from a cognitive bias and the distinctiveness of both the minority group and rare events. What Schaller argued and demonstrated was that this is not the case when perceivers themselves share membership with the

perceived group members. The most relevant aspects of Schaller's (1991) results were A) that subjects showed illusory correlation favourable to their own group regardless of whether this was the majority or the minority group, and B) that this illusory correlation appeared even though subjects were given no specific goal about information. He claimed that the illusory correlation was guided by ingroup favouritism thus motivation laden (from A), and this happened spontaneously (from B).

Two points may be important. First, illusory correlation seems to be a robust finding, and the cognitive bias (distinctiveness) explanation appears to remain the dominant account. Thus, this demonstrates an importance of the cognitive perspective in a certain aspect of intergroup relations. Second, Schaller's studies in contrast illustrated a motivational element in this cognitive phenomenon: *self*-involvement in the perceived group members determined the direction of the correlation. While it is not entirely clear how much significance the frequency estimation tasks have for intergroup differentiation, Schaller's studies showed that both cognitive and motivational analyses are necessary even for this apparently cognitive phenomenon.

Negative social identity Further evidence for motivational processes has been obtained in the studies on negative social identity. There is evidence from laboratory studies that experimentally induced negative social identity leads to, not surprisingly, derogatory ingroup evaluation. However, derogation is eliminated in the case where subjects strongly identify with the ingroup (Karasawa, 1988, 1991). This result cannot possibly be explained by the category differentiation process or any known cognitive bias. While this result still remains indirect and only suggestive, it convincingly illustrates a motivational function of social identification.

Status difference Further support for the motivational perspective of intergroup biases is provided by the studies on status differences. This

aspect of the studies on status differences has already been pointed out by Turner (1981). To quote his summary:

> The role of the self-evaluative motive is also supported by the effects of status differences on intergroup behaviour. Status differences represent the outcomes of intergroup comparisons conferring positive or negative distinctiveness and also the antecedent conditions for different social strategies ... directed at the maintenance or protection of self-esteem ... ...
>
> Turner and Brown (1978) manipulated whether status differences were perceived as secure or insecure. High status groups tended to discriminate when either a legitimate superiority was threatened or an illegitimate superiority was perceived as stable; when an illegitimate superiority was also unstable, they tended to stress alternative status dimensions. Low-status groups tended to discriminate when their inferiority was illegitimate and especially when it was also unstable. Thus, as one might expect, there are different reactions to status differences according to whether the groups are seeking to preserve or restore positive distinctiveness.
>
> These data make it difficult to explain discrimination on the basis of ingroup-outgroup divisions solely in terms of cognitive processes; motivational factors need to be superimposed ..." (Turner, 1981, pp. 81-82)

Because the effects of high and low status in contemporary and later studies are not always consistent (for review, see Abrams & Hogg, 1988; Sachdev & Bourhis, 1987; Messick & Mackie, 1989), Turner's (1981) claim might be undermined. However, those other results were still explained in terms of motivational processes. As Sachdev & Bourhis (1987) suggested, "differences in subject samples, status operationalizations and dependent measures may well account for some of the discrepancies" (p. 279). Therefore, while more conceptual and methodological refinements are needed, the studies on the whole illustrate the merit of motivational analyses of intergroup biases.

As regards Sachdev & Bourhis' (1987) suggestions, it may be useful now to address the measurement issue. The most interesting finding for the present thesis is that, in their studies, allocation indices were found to be sensitive to status manipulations while a sociometric intergroup perception

measure always indicated ingroup favouritism regardless of group status (Sachdev & Bourhis, 1985, 1987, 1991). This point should be taken into account carefully in investigating the effects of the motivational process in intergroup biases.

Summary In brief, this section detailed some areas of intergroup relations research, in which empirical data support either of the two perspectives. Taken together, both cognitive and motivational perspectives seem to be indispensable in explaining the entire configuration of results. The next questions then, would be in what manner these processes operate, and how they relate to each other. Prior to answering these questions, it is attempted in the following section to clarify our conceptualisation of the nature of the various processes in the cognitive and motivational perspectives.

Particular processes and relevant phenomena in intergroup relations

When Brewer & Kramer (1985) mentioned cognitive and motivational processes, it was thought that the former meant processes involving the general concepts of the cognitive approach in social psychology (see, for example, Hamilton, 1981; Markus & Zajonc, 1985). This approach deals with "cold" human information processing, using a computer analogy. In contrast, the motivational process is thought to describe the "hot" processes pertinent to goal attainment in particular, and self-esteem in general. However, this distinction is rather too broad to serve for our discussion of the particular processes in intergroup relations. In this section, therefore, we shall first suggest a model where the relevant processes will be specified for intergroup relations, especially with reference to a minimal group situation. Next, we shall concentrate on a particular, probably fundamental, phenomenon in intergroup relations, as well as its pertinent processes.

Processes in intergroup relations As already discussed, there are a number of social psychological processes concerning intergroup relations; they include self-categorisation, stereotyping, (objective) categorisation, self-esteem, attention and salience, category differentiation, cognitive consistency, and social comparison. Moreover, there are other, more societal or historical processes when considering interactions among real social groups, which are beyond the scope of the present thesis. Among the social psychological processes, some can be classified as cognitive, and the others as motivational. In addition, it may be useful to distinguish whether the processes concern the accentuation effect and/or directionality.

Categorisation can be seen as a cognitive process that underlies perception in general. And it can be safely said that the categorisation is *not* motivational in origin. Also, the categorisation process cannot give directionality by itself whereas it fosters, as discussed earlier, the accentuation effect. Meanwhile, stereotyping (and self-stereotyping as arguably a part of it) is thought to concern essentially cognitive functioning (Hamilton, 1981, p. 336, for example). Moreover, there is a view that stereotyping is a direct consequence of categorisation (see Taylor, 1981, pp. 83-84). However, it should be noted that there are controversies whether stereotyping involves accentuation of intra-class similarities alone or together with accentuation of inter-class differences. Therefore, it is not clear if stereotyping can be equated with categorisation.

The category differentiation process derives from object categorisation process, and gives the basis from which categorisation extends to social stimuli and intergroup differentiation (Doise, 1978). It seems Doise's formulation combines the categorisation principles with social normative processes, thus explains not only the accentuation effect but also the directionality of intergroup differentiation. The cognitive feature is evident in Doise's categorisation process whereas motivational elements can be seen

only through the normative processes, thus at a different level. However, the normative processes are not well specified. Note, therefore, that the usage of the category differentiation process in this thesis excludes the normative elements. Thus, the present usage of the category differentiation process does not explain the directionality of the accentuation.

Self-categorisation can be conceived of mainly as a cognitive process that underlies, it is claimed, group processes in general. While this can be regarded as a background general process for group perception and behaviour, this does not explain the directionality of ingroup bias on its own. In self-categorization theory, motivational and normative elements are further incorporated to deal with the directionality (see Turner *et al.*, 1987, pp. 29-30 and pp. 55-56). In other words, self-categorization itself is not a source of directionality.

Cognitive consistency can be seen generally as a cognitive process. It is, however, less clear whether unit relationship between self and cognitive elements related to the ingroup may be seen as cognitive or motivational. Cognitive or motivational, cognitive consistency serves as a source of directionality, but not the accentuation effect.

As discussed earlier, self-esteem has been regarded as a source (and an end-result) of directionality in the social identity approach. It may also facilitate the accentuation effect although it does not account for the mechanism for accentuation. It is clearly a more motivational than any other kind of process.

Attention and salience are thought to concern both motivational and cognitive aspects of intergroup relations in a special way: they can be seen at a different level — as sub-mechanisms. These two elements will be discussed in detail in Chapter 2. Social norms are also seen at a different level, at which the distinction between the motivational and cognitive aspects is not directly relevant. Although norms concern directionality, social norms can be seen as

emerging from other processes and do not have any direct implications for directionality.

Lastly, social comparison has been claimed as a medium or a mechanism to achieve positive social identity. Thus, clearly the social comparison process is assumed to determine directionality of the accentuation effect. Whether self-esteem is involved in social comparison is debatable. Self-verification can be an alternative goal of the comparison (Abrams & Hogg, 1988). Whatever the goal is, however, it could be suggested that social comparison dictates directionality of intergroup differentiation, and serves to achieve positive (or verified) social identity.

With a framework of the nature of the processes (cognitive-motivational) and their resultant effects (accentuation-directionality), we have described each of the processes in intergroup relations, particularly with reference to minimal groups. In summary, self-categorisation and social norms could be perhaps set aside from the present analyses because they are too general and/or concern background factors, hence, they have no direct bearing on particular elements we are interested in. Objective categorisation could also be laid aside for the same reason. Discussion on salience and attention is pending since they are thought to be at a micro level, although they will play important roles in later analyses. Consequently, what remains at hand are the processes most relevant to (minimal) intergroup relations: the category differentiation process, stereotyping, cognitive consistency, self-esteem, and social comparison. The former three and the latter two are respectively cognitive and motivational processes. Meanwhile, whereas the first (and the second) concern the accentuation effect, the latter three dictate directionality.

Phenomena in intergroup relations We have already considered seemingly distinct phenomena in intergroup relations including group homogeneity effects, the accentuation effect (of intra-class similarities and

inter-class differences), ingroup favouritism (directionality), stereotypic perception, illusory correlation, and so on. There is a possibility, in the future, that these phenomena could be accounted for by a single process given sufficient theoretical and methodological progress in the research. At the moment, however, it would be useful to concentrate on a few phenomena to further our understanding of intergroup relations. For the *a priori* reasons that they have been studied relatively well in the social identity approach and that they are relatively more direct in their resultant implications, it is decided that first, ingroup favouritism and second, the accentuation effect should be analysed. While the accentuation effect involves group homogeneity effects (through intra-class similarities), homogeneity will be set aside from the main scope of the thesis for the same reasons. This results in focusing on the inter-class differentiation element in the accentuation effect.

These phenomena — ingroup favouritism and inter-class differentiation — correspond, respectively, to directionality and magnitude of ingroup bias. Effectively, therefore, the target phenomenon of the thesis can be summarised as ingroup bias. The five processes of direct importance for the analysis of ingroup bias appear to be category differentiation, stereotyping, cognitive consistency, self-esteem, and social comparison. Of these, the category differentiation process concerns the accentuation effect (magnitude of ingroup bias); cognitive consistency, self-esteem, and social comparison relate to directionality (ingroup favouritism). Self-esteem and social comparison may also be involved in the magnitude of ingroup bias, secondarily and recursively in the form of emphasising it for their motivational nature whereas relevance of cognitive consistency to the magnitude of ingroup bias is unclear. Now for convenience, we shall combine these two processes — self-esteem and social comparison — and label them the "social identity process". It can be said that self-esteem is the source, and social comparison the vehicle, of the process. Thus in short, the social identity

process and cognitive consistency can dictate the directionality of ingroup bias. Of the two, cognitive consistency will be considered only to a limited extent due to its rather ambiguous nature concerning the cognitive-motivational dichotomy. Finally, it should be noted that the category differentiation process is largely a cognitive process whereas the social identity process is predominantly motivational.

Summary The present thesis will focus hereafter on ingroup bias as a target phenomenon; the category differentiation process and the social identity process will be analysed as the relevant processes, being considered respectively as the cognitive and motivational determinants of ingroup bias.

A suggested difference in the processes

Automaticity-intentionality When confined to the minimal group situation, the cognitive and the motivational processes particular to ingroup bias can be characterised on the automaticity-intentionality dimension. Specifically, it is suggested that the category differentiation process is less intentional and more automatic than the social identity process.

A first reason for this claim is that the former is thought to be concerned with perception, thus to be at a lower level of behavioural control than the latter. Related to this, theories of behavioural regulation generally posit that control at a lower level is automatic (see Carver & Scheier, 1981; Vallacher & Wegner, 1987; also the next section for detailed discussion). Secondly, the category differentiation process is assumed to be well learned and a frequently repeated behavioural pattern.

It was previously argued that the social identity process is a motivational process, thus thought to be a goal-oriented process, the goal of which is to enhance and/or maintain ingroup-esteem. It seems plausible that a goal-oriented process is intentional. Finally, (intergroup) social comparison — a medium of the social identity process — clearly involves multiple

thought elements including choice of relevant groups, weighing various dimensions, and selection of strategies to achieve favourable comparison. It would be natural to assume that these elements are executed more intentionally than automatically.

Note, therefore, that the automaticity-intentionality claim is made not because the social identity and the category differentiation processes are, respectively, motivational and cognitive processes, but because of these particular aspects of the two processes. Automaticity of a process depends more on how well it has been learned and how easily it is accessible. Thus, it is conceivable that untrained cognitive processes need conscious effort to operate whereas well-learned motivational processes can be quick and effortless. Moreover, determination of whether processes are automatic or not depends on the unit of analysis. "At the level of [unit of] analysis appropriate for most social, personality, and clinical phenomena, virtually all cognitive processes are mixes of automatic and nonautomatic processes" (Uleman, 1989, p. 428, words in square parentheses mine). In this connection, it would be useful to consider, though difficult, the level (unit) of analysis for the processes. It is clearly not the levels of simply pushing buttons for choices, naming words or that sort (e.g. Lalonde & Gardner, 1989; Perdue, Dovidio, Gurtman & Tyler, 1990).[18] Probably, the analytic units are larger: the entire image of target groups or behavioural consequences to the groups.

In the rest of this sub-section, some of the reasons mentioned above are discussed partly in the light of the results obtained in minimal group experiments, and partly on theoretical grounds. Before taking on this job, however, let us briefly review the concept of automaticity used by social psychologists to form a clearer idea of how the category differentiation process and the social identity process differ on this dimension.

---

[18] Besides the unit of analysis, these studies do not deal with a minimal group situation.

Automaticity An automatic process generally could be defined in social psychology as a process in which processing is executed spontaneously, and without attention and conscious effort on an individual's part. It occurs when the person has a very well-learned response and is presented with a strong stimulus (Sears, Peplau, Freedman & Taylor, 1988, p. 162, paraphrased). It seems that the concept was introduced into social psychology from experimental psychology (see Shiffrin, 1988, for a review of automaticity in experimental psychology).

Originally, "automaticity ... simply denote[d] processing without attention" (LaBerge, 1981, p. 62, modified in square brackets). In social psychology, however, automaticity picked up such other concepts as un-awareness, non-intentionality, and un-controllability. Consequently, a suggestion has been made to classify different kinds of automaticity, taking account of these concepts (Bargh, 1989, 1992). In the present thesis, however, the automaticity-intentionality dimension, where a distinction is made between the category differentiation process and the social identity process, concerns the amount of cognitive resources required for a response, in line with most of the social cognition literature. It is assumed that the cognitive resources required to operate the process are greater at the intentional extreme and less at the automatic extreme (cf. Gilbert, 1989; Fiske & Neuberg, 1990).[19] Bearing these in mind, let us examine the suggested proposition (that the category differentiation process is less intentional and more automatic than the social identity process), with reference to the level of behavioural control, well-learnedness, goal-orientedness, and operational complexity.

Level of behavioural control As pointed out earlier, the category differentiation process is thought to concern perception and thus a relatively lower level of the behavioural control hierarchy. Since category

[19] For the roles of awareness, controllability, and spontaneity, see Uleman (1989) and Bargh (1989).

differentiation concerns conceptual coordination of multiple units (though not acts), it could possibly be seen at the level of "relationship" in Carver & Scheier's (1981) framework.[20] Meanwhile, the social identity process can be conceived of at a higher level of behavioural control. Because the process involves general ingroup-esteem, it could be seen mainly at the "principle" level of the behavioural hierarchy.

Well-learnedness In everyday life, categorisation as a cognitive process is thought to occur more frequently than other processes (such as particularisation) for at least one reason. In most of the cases, learning processes at school and everyday life involve simplifying things unless they are difficult or particularly interesting (cf. Fiske, Neuberg, Beattie & Milberg, 1987). Considering the complexity of our environment, it would be reasonable to assume that simplifying the environment, or categorisation, is a much more routine process than attending consciously to something important and/or interesting.

Goal-orientedness It was pointed out that the social identity process is a goal-oriented process through which people strive to maintain or achieve positive group-esteem. However, it is less clear whether or not the category differentiation process is goal-oriented. The category differentiation process was previously described as a mechanism by which stimuli are seen and treated by the use of categories on perceptual, evaluative, and behavioural dimensions. Although one could technically claim goal-orientedness of the process, generally speaking it would be better to conceive of it as more spontaneous.

Empirical support for the goal-orientedness and spontaneity of these processes can be seen, for example, in studies on social orientations. Brewer &

---

[20] Although "perception" is also posited, in Carver & Scheier (1981), to function as a standard-setting mechanism in a feedback loop (in other words, monitoring), perception can be more broadly understood as a type of a lower level action. See Appendix 1.1 for further discussion.

Silver (1978) manipulated social orientations (competition *vs.* cooperation) through reward structure. Social orientations moderated subjects' point allocation strategies but not evaluative bias towards ingroup and outgroup. Specifically, while subjects showed less bias in the cooperative than the competitive and the control conditions on the point allocation tasks, the evaluative ratings showed constant ingroup bias across the experimental conditions. These findings can be interpreted in the following manner. The social identity process (allocation bias is its result) was interfered with by another goal-oriented process (competition/cooperation) whereas this goal-oriented process did not affect the category differentiation process (evaluative bias is its result). This was due to the spontaneity of the category differentiation process. Note that this interpretation is based on an assumption that the point allocation task reflects the social identity process whereas evaluative ratings correspond somewhat more to the category differentiation process. One justification is that the former task allows subjects to use various strategies, whereas the latter concerns perception of the groups (see Chapter 3 for further elaboration).[21]

Similarly, Abrams & Brown (1989) also found that private self-consciousness affected ingroup bias in rating indices slightly but invariably, whereas competition led to more bias than cooperation in allocation indices when attitudes were perceived to be similar between the groups, *i.e.* group identity was threatened. These findings indicate that individual differences in private self-consciousness are associated with the degree of category differentiation, and that the process is not affected by social orientations or similarities. They also show that the social identity process was interfered with by other goal-oriented processes. Thus, the social orientation (competition) combined with similarity (threat to social identity) seems to

[21] Indirect support for the differential sensitivities of the tasks to the separate processes is drawn from Brewer & Silver's (1978) own results. The correlation between ingroup bias on the allocation task and on the evaluative ratings was non-significant (r =.14, n=72).

have facilitated the goal-oriented social identity process, probably by instigating the need for positive group-esteem. A conceptually similar line of results can also be observed in Sachdev & Bourhis' (1985, 1987, 1991) studies on power and status of groups.

Further support is given by Abrams (1985). In this study, subjects' attention to the experimental group situation was varied at three levels: enhanced, standard, and distracted. Ingroup bias in point allocation tasks was pronounced in the enhanced attention condition. Since attention to self increases self-regulatory processes (Wicklund, 1975), this result illustrates the intentionality of the social identity process, if not goal-orientedness.

Operational complexity It was argued that self-esteem in general, and ingroup-esteem in particular, is the source of the social identity process. Although the need for ingroup-enhancement itself appears natural and spontaneous, its behavioural expression should involve rather complex mental operations. It was pointed out previously that intergroup social comparison is a medium of the social identity process, and that this involves multiple thought elements such as choice of relevant groups, weighing various dimensions, selections of strategies and so on. Accordingly, it could be said that the social identity process involves rather complex operations. In contrast, the category differentiation process is not considered to require much mental operation because it is largely a perceptual process. Nonetheless, there is no direct evidence for these arguments about the operational complexity of the processes.[22]

Summary To sum up, the category differentiation process can be considered to be less intentional and more automatic than the social identity process. This claim can be made because the category differentiation process is thought to be at a lower level of behavioural control and well-learned,

---

[22] Indicative support can be seen in Swann, Hixon, Stein-Seroussi & Gilbert (1990). Their results indicated that comparison needs more logical steps than simple characterisation (categorisation in the present context).

while the social identity process is at a principle level of control, goal-oriented, and requires complex mental operations. The principal difference between the processes is the extent to which they operate with or without attention. The category differentiation process operates with less attention than the social identity process. To anticipate the later chapters just briefly, it is this feature that is utilised in the empirical studies reported in this thesis.

Inter-relations of the processes

If we accept the suggested distinctions between the cognitive and the motivational components in intergroup bias, the next question concerns their relationship. Some theorists suggest a complementary relationship between the cognitive and the motivational processes. For example, Turner (1981) argues that while the "categorization process ... makes salient or perceptually prominent the criterial or relevant aspects of ingroup-outgroup membership, ... the social comparison process transforms [these] simple perceptual or cognitive discriminations into differential attitudes and actions favouring the ingroup over the outgroup" (p. 82, word in square brackets mine). The perceptual discrimination and social comparison processes correspond, respectively, to the category differentiation and the social identity processes. More succinctly, Hogg & Abrams (1988) describe the relationship as follows: "... this automatic accentuation effect is guided by an important self-evaluative motivational consideration" (p. 23). In other words, the automatic cognitive category differentiation process is boosted by the motivational social identity process (see also Vanbeselaere, 1991).

At the moment, it would be reasonable to accept these suggestions. However, there are also ambiguous points in the formulation. These include whether they are dual or sequential processes, and whether they are two distinct processes or just two aspects of a single indivisible process. It is

hoped that the investigation in the present thesis will help further understanding of these points.

1.3 Related research areas

In this section, three topics in social psychology are briefly discussed in relation to the functioning and characteristics of the cognitive and motivational processes, to help develop hypotheses in the next chapter. These are salience, de-individuation, and distraction.

Salience and attention

The concept of salience is important firstly because a salient group membership governs actions conducted under the name of the group membership, and secondly because salience of social categorisation accentuates its effects. Meanwhile, attention to one's group membership (or social categorisation) appears to yield similar effects. Because there are different usages among researchers of the term of salience, the concept is sometimes confused with the concept of attention. Following Abrams (1990, 1994), it seems useful to distinguish between these terms.

Definitions of salience Turner *et al.*'s (1987) definition can be seen in their description of salient group membership. The salient group membership "refer(s) to one which is *functioning psychologically* to increase the influence of one's membership in that group on perception and behaviour, and/or the influence of another person's identity as a group member on one's impression of and hence behaviour towards that person ... " (p. 118, letter in brackets added, emphasis original). So, the term salience could be defined as the property of a category (especially a group membership) within a person which allows the category to regulate the person in terms of the category membership. Note that this definition of salience includes the *effect* of a category. The role of attention is not clear in Turner *et al.*'s (1987) formulation.

In contrast, Fiske & Taylor (1984) characterises salience as "a property of stimuli in context," whereas the idea of attention is defined as "the amount of selective cognitive work ..." (p. 185). Comparing the two sets of definitions, it is easily seen that Turner *et al.* (1987) consider salience as a quality of the both: the stimuli themselves, and the readiness on people's part to use them.[23] In other words, it could be said that their concept of salience includes the concept of attention.[24] Meanwhile, Fiske & Taylor's (1984) definitions distinguish attention from salience: the former is a characteristic on the subject's part; the latter is related to a objective setting which makes its certain element come out from the ground.

Definition used in the present thesis The present thesis adopts the definitions used by Fiske & Taylor (1984) since, firstly, they allow theoretically separate operationalisations of the two concepts, thus providing a framework to construct unique hypotheses. The distinction between salience and attention constitutes, as will be seen in Chapter 2, the essence which provides the basis of a further examination of intergroup biases in the thesis. And secondly, the latter definition of salience avoids the tautological nature of Turner *et al.*'s (1987) definition of salience by its effect.

An example of the application of this distinction is given in Abrams & Brown (1989), where attention was varied using individual differences in the tendency to attend to certain aspects of the self-concept (cf. Fenigstein, Scheier & Buss, 1975), while salience of social categorisation was manipulated by experimental conditions (that is, combinations of cooperative- *vs.* competitive-game structure, similarity in attitudes, and status difference).

---

[23] Although, Turner's (1982) orchestra analogy seems to distinguish salience from attention in much the same way as Fiske & Taylor (1984).

[24] A similar standpoint can be seen in Mullen (1987): that situational factors, specifically group composition, determine even attention to the self-concept. See also Wicklund (1980).

De-individuation studies

Whether participants' behaviour in a crowd is controlled or uncontrolled has been a central issue in the contemporary research on crowd behaviour. Incidentally, it could be argued that this distinction between controlled and uncontrolled behaviour corresponds to the distinction between the intentional and automatic aspects in ingroup bias. Thus, it would be useful to overview some of the arguments on the nature of crowd behaviour, in considering the nature of the automatic and intentional aspects of ingroup bias.

De-individuation Since Le Bon's (1896) classic study, crowd behaviour has generally been considered within psychology to involve unregulated primitive acts caused by a special state of the human mind in a crowd (Diener, 1980; Zimbardo, 1970). The process causing this mental state is now referred to as de-individuation. However, this simple equation between crowd and de-regulation has recently come to be criticised (e.g. Prentice-Dunn & Rogers, 1989; Reicher, 1984a).

For example, Prentice-Dunn & Rogers (1989) proposed a model of de-individuation which distinguishes de-individuation as de-regulation from de-individuation as controlled aggression encouraged through anonymity. Introducing the distinction between public and private self-awareness into their model, they defined de-individuation as "an intraindividual process in which antecedent social conditions reduce private self-awareness, thereby creating a subjective deindividuation state" (p. 89). Furthermore, they adopted behavioural control theory (Carver & Scheier, 1981), and explained that deindividuated "individuals still behave, but cease to regulate their conduct at the Principle and Program levels of control" (p. 95).

The Principle and Program levels of control in Carver & Scheier's (1981) theory refer, respectively, to the levels where conceptual, logical, or moral principles, and strategy use or local decisions, are both perceived and

used to guide behaviour. They are assumed to be equivalent to Robert Abelson's "meta-scripts" and "scripts" respectively. It is suggested now that these levels of control can be called intentional levels in the present thesis because a "behaving person's attention is directed largely to the Program level during most behavioral self-regulation" (Carver & Scheier, 1981, pp. 136-137), and attention needs to be focused, it is thought, to regulate one's behaviour also at the higher, Principle level.[25] On the other hand, levels lower than these, can be called automatic in this thesis. Recall that the definitional feature of automatic processing is freedom from attention.

To come back to de-individuation, it can be said, from Prentice-Dunn & Rogers' (1989) definition, that de-individuation is a process where one is being deprived of control only at the intentional level of behaviour, but not at other levels. Furthermore, de-individuation is not an outcome (e.g. aggression), but a process. It follows that some types of disinhibited behaviour which have been conventionally referred to as characteristic of de-individuation, should not be called de-individuated behaviour any more. These include behaviour that is in fact regulated, but which simply does not conform to the local norms, usually due to anonymity. In short, their model can be deemed a criticism of the ambiguity of target phenomenon of de-individuation, and it serves to clarify the nature of de-individuation in terms of behavioural control.

Another type of criticism comes from the social identity approach. Reicher (1984a) analysed episodes in a riot and illustrated that there were certain rules in the *ad hoc* group as to the goal, the target, and the area of the riot. Furthermore, Reicher (1984b) suggested that behaviour by de-

---

[25] Justification for this claim is, borrowing Carver & Scheier's (1981) words, that "the very nature of self-regulation at this level [*i.e.* a continuously branching chain of choice points] ... would commonly seem to require the active imposition of organization upon experience. ... consciousness may be involved in events at this level, in a continual process of reorganization, to a greater degree than at lower levels" (p.140, words in square brackets added).

individuated persons can be regulated through social identity, while it would be seen as de-regulated from a personal identity viewpoint (see also Spears, Lea & Lee, 1990). In short, Reicher's criticism concerns ignorance of the relevant situational factor in the analysis: the *ad hoc* group.

Although these two types of criticism are not necessarily consistent with each other, both of them show directions of theoretical developments in the study of crowd behaviour. Recognising this inconsistency, Abrams (1990; Abrams & Hogg, 1990b) suggested a model that integrates these two lines of criticisms: behavioural control and the social identity approach. The model was not only concerned with crowd behaviour, but was also designed to map out various other types of group behaviour (Abrams, 1990). According to the model, de-regulation concerns the amount of self-focus, and is independent of the distinction between social and personal identities. Therefore, de-individuation occurs with reduced self-focus while personal identity is salient. And behaviour based on social identity can be regulated or de-regulated.

This model, as well as the former two (Prentice-Dunn & Rogers, 1989; Reicher, 1984b), is highly relevant to the present thesis because it provides a framework for the analysis of intergroup behaviour in general. From these approaches, it can be suggested that the output of the de-individuation process varies, depending on 1) different levels of behavioural control [internal states] (e.g. whether or not behaviour is regulated at the Principle and Program levels of control), and 2) situational variables external to de-individuation itself which set or define the setting [situational factor] (e.g., personal *vs.* social identity salience in Reicher, 1984a, 1984b; public and private self-awareness in Prentice-Dunn & Rogers, 1989). These criteria will be useful also to build hypotheses about intergroup biases, considering similarity of concepts between de-individuation and automaticity of intergroup discrimination.

As for the latter criteria, Spivey & Prentice-Dunn (1990) demonstrated the importance of environmental cues to de-individuation effects. When there were prosocial cues, de-individuated subjects showed more prosocial behaviour, while when there were antisocial cues, they displayed more aggression compared with individuated subjects. Therefore, their study provides another illustration of the validity of Prentice-Dunn & Rogers' (1989) criticism of the traditional approach to crowd behaviour, which assumed only anti-social consequences of de-individuation.

Distraction

A more general issue is what leads to de-regulation at a higher level of behavioural control. A typical method in de-individuation studies is to emphasise "groupness" to reduce self-focus, thus causing de-regulation. It was pointed out, however, that this operationalisation overlooks behavioural regulation through group identity (Reicher, 1984b). Meanwhile, note that what is essential to the "groupness" operationalisation was to reduce attentional focus to private aspects of self. Therefore, the question comes to be what would reduce attention in general. This is where the concept of distraction becomes relevant.

Distraction has been studied in a wide range of areas in social psychology. In persuasion studies, for example, distraction was studied as a moderator of a persuasive message which affects reception of the message and prevents forming effective counter-arguments (see Petty & Brook, 1981, for review). Distraction was also studied in its own right as an underlying mechanism of social facilitation effects (see Baron, 1986, for a review). In this section, let us briefly overview the construct of distraction, its effects, and its operationalisations in social psychological studies.

Distraction will be defined, for the purposes of the present thesis, as a mental state where one's attention is being averted from, hence losing control

over, a focal event. The focal event can be a goal-oriented task, behaviour required for the task, or regulation of the behaviour. In other words, distraction can occur at any level of behavioural control. Note that the term distraction is used sometimes as a synonym for a distractor (distracting agent) especially in experimental work.[26] In experimental psychology, distraction may be used to divert subjects' attention from a main task, and may be measured by the delay in response time on the main task.

Effects The primary effect of distraction may be to limit the amount of cognitive resources available for a focal event. In social psychology, this effect leads to various forms of secondary effects depending on the level and kind of focal events. These include: thought disruption (cf. Festinger & Maccoby, 1964; Romer, 1979), evaluation apprehension (cf. Silverman & Regula, 1968), compensatory drive (cf. Sanders & Baron, 1975), and category-based or expectancy-congruent impression formation (cf. Fiske & Neuberg, 1990; Stangor & Ford, 1992).

The thought disruption effect of distraction influences attitude change following a persuasive message. Summarising a number of studies on this topic, distraction increases the persuasiveness of a message by preventing one from forming effective counterarguments (although excessive distraction leads to no change since it interferes with message comprehension) [see Petty & Brock (1981) and Romer (1979), for review].

A motivating effect of distraction is illustrated by social facilitation research. Social facilitation research concerns the effects of others' presence on task performance. It has been found that others' presence facilitates simple task performance and impairs complex task performance. One explanation of this effect holds that others' presence facilitates dominant responses by

---

[26] For instance, "We view distraction as something that directs attention away from some ongoing activity" (Baron, 1986, p.4).

raising the performer's drive level (Zajonc, 1965).[27] Sanders & Baron (1975) suggested that drive level is increased by the presence of others due to their distracting property, and that "social facilitation effects may be merely a subcategory of a more general phenomenon involving the motivational effects of distraction" (p. 963). More generally, the link between distraction and drivelike effects on task performance was formulated as distraction–conflict theory (e.g. Baron, 1986; Sanders, Baron & Moore, 1978).[28] Thus, whether the origin of distraction is others' presence or mechanical distraction, it is posited that distraction can lead to enhanced drive.[29]

Category-based impressions in person perception research refer to impressions of a target person influenced by the person's category labels (e.g. sex, profession, nationality). This idea is based on differential cognitive resource requirement for different forms of information processing (see Fiske & Neuberg, 1990). Thus, it is claimed that an impression based on category labels is easily formed while an impression based on detailed personal attributes needs greater cognitive resources (e.g. capacity, attention, and motivation). Therefore, distraction which limits the cognitive resources available is suggested to lead to category-based impression (see Gilbert, 1989; Stangor & Ford, 1992). Note that this effect is different conceptually from the automaticity of the category differentiation process which was suggested earlier. Category-based information processing involves applying existing stereotypes of a category to a category member (e.g. "Kate is feminine"), while the category differentiation process involves developing category

---

[27] However, Sanders (1984) for example argued that the self-presentation explanation (to look good in front of others) could not be excluded.

[28] Note that the former reference explicitly qualified the performance function with distraction: " however, this prediction [increased simple task performance with distraction] is not expected to hold for intense levels of distraction. Distraction–conflict theory recognizes that even if distraction does elevate drive, it also diverts attention from the task" (p. 7).

[29] According to Baron (1986), increase in drive-level derives from attentional conflict which distraction causes, not always, but in two cases: structural interference and capacity interference.

stereotypes through categorisation of individuals (e.g. "Members of Group A are more cheerful compared to members of Group B") (see also Section 1.4).

Types of operationalisation As evident from its definition, the operationalisation of distraction involves diversion of attention from the focal event. Because of the relatively long history and wide range of distraction studies, it is difficult to count all the particular methods of operationalising distraction. However, it is possible to outline a typology of the operationalisations. At least three types of operationalisation of distraction can be distinguished (Table 1.1).

First, distraction can be operationalised as the imposition of an extra task on subjects. There are several ways to sub-type the tasks within this class. For instance, the task can be concurrent (e.g. Zimbardo, Snyder, Thomas, Gold & Gurwitz, 1970) or sequential (e.g. Harkins & Petty, 1981); in the same (e.g. Gilbert, Pelham & Krull, 1988) or different (e.g. Stangor & Duan, 1991, Exp. 2) sensory mode. A second type of operationalisation utilises complexity of the task in which subjects engage. One sub-type in this class may be complexity of the task goal (e.g. Bodenhausen & Lichtenstein, 1987). Complexity of task material itself may be another sub-type (e.g. Stangor & Duan, 1991, Exp. 1). Crossed categorisation in intergroup relation research can be subsumed under this class (see the previous section). Yet another type of operationalisation involves a general level of attention rather than its diversion. Anxiety, for example, has been suggested as a cause of narrowed attention (Stephan & Stephan, 1985). Mood (e.g. Murry, Sujan, Hirt & Sujan, 1990), and limited cognitive capacity (Martin, Seta & Crelia, 1990, Exp. 3), are also proposed to affect information processing (attention). A generally reduced level of attention through these operationalisations is thought, similarly, to produce the effects of distraction which derive from attentional diversion through the former two types of operationalisations.

Some of the specific operationalisations of distraction will be discussed in some detail in the next section while briefly reviewing automaticity in social cognition research.

Table 1.1 A typology of distraction operationalisations

	Subtypes	Examples
Imposition of an extra task	Concurrent	Zimbardo *et al*, (1970)
	Sequential	Harkins & Petty (1981)
	Same sensory mode	Gilbert *et al.* (1988)
	Different sensory mode	Stangor & Duan (1991, Exp. 2)
Task complexity	Task goal	Bodenhausen & Lichtenstein (1987)
	Task material	Stangor & Duan (1991, Exp. 1)
General attentional depletion	Anxiety	Stephan & Stephan (1985)
	Mood	Murry *et al.* (1990)
	Limited cognitive capacity	Martin *et al.* (1990)

1.4 Automaticity in social cognition research

Social cognition research may be delineated in a narrow sense and a broad sense. Social cognition in the narrow sense means a particular domain in social psychology which deals with person perception and social inference. In short, "the object of study concerns how people make sense of other people and themselves" (Fiske & Taylor, 1984, p. 12). The broad sense of social cognition research is more an approach to psychological phenomena. One version of the approach employs an information processing analogy in explaining human behaviour (e.g. Markus & Zajonc, 1985; Sherman, Judd & Park, 1989). Another version views human behaviour and institutions as

derivations of a broader human cognitive functioning (e.g. Leynes & Codol, 1988).

What relates to the present thesis in social cognition, however, is more specific. First, there is a noticeable concern with the distinction between automatic and intentional processing. Second, there is an overlap (e.g. in stereotyping research) between social cognition and intergroup relations research.

A theoretical feature in current social cognition research

Stereotyping and categorisation A conceptual overlap between social cognition and intergroup relations research concerns similarity in underlying psychological processes between the two areas. This can be observed in the hypothesised process underlying stereotyping: categorisation. Categorisation is thought to be a basis for stereotyping in social cognition research; and for intergroup differentiation in intergroup relations research (see Section 1.2). It would be useful to clarify the similarities and the differences between categorisation and stereotyping.[30]

The categorisation and stereotyping processes are deemed similar in that both of them are cognitive processes which, put crudely, bundle scattered entities into one set. In Taylor's (1981) words, "the process of developing generalizations about social groups and imputing attributes to particular members of groups [*i.e.* stereotyping] is not fundamentally different from that of developing generalizations and imputing attributes to groups of targets [*i.e.* categorisation]" (p. 84, words in square parentheses mine). They differ, however, in the targets of the process; targets of

[30] In fact, this is not as easy as it first appears. As Ashmore & Del Boca (1981) noted, there is no agreement among researchers on the mere concept of a "stereotype", let alone whether or not it is by definition bad. According to them, however, the agreed core meaning of the term stereotype is "a set of beliefs about the personal attributes of a group of people" (p. 16). They also propose that "'stereotype' should be reserved for the set of beliefs held by an individual regarding a social group and that the term 'cultural stereotype' should be used to describe shared or community-wide patterns of beliefs" (p.19). Judd & Park's (1993) recent work adopts this line of definition.

categorisation are groups of *objects* whereas those of stereotyping are groups of *people*. More importantly, moreover, they perhaps differ in whether an emphasis is on the first or the second component of the process. Thus, it is thought that categorisation places emphasis on *developing* generalisations, and stereotyping on *imputing* attributes. Indeed, it can be said that whereas the categorisation process starts with forming (developing) a category itself, stereotyping practically means applying pre-existing stereotypes to members of the category.

These similarities and differences between categorisation and stereotyping seem to reflect a discrepancy between the alleged basic process (categorisation) and the process which the social cognition research actually concerns (stereotyping). This discrepancy may also be the case with intergroup research. The categorisation process is claimed to be a basis of intergroup differentiation whereas in fact, researchers have been more interested in its transformed versions such as category differentiation and self-categorisation. Furthermore, social comparison and self-esteem have come to be important variables in the research (see Sections 1.1 and 1.2). Therefore, while intergroup relations research and (a part of) social cognition research share the same alleged basic process, interests and actual processes which they deal with differ in their own ways.

Automaticity Next, it would be beneficial to consider a feature of the processes assumed in social cognition research. A general emphasis on mentalism and cognitive processes is the primary characteristic of the field (cf. Fiske & Taylor, 1984, pp. 12-14). Of the assumed processes, there has been an implicit concern for their automaticity-intentionality across many areas of studies. The use of schema in person perception, for example, is proposed to be automatic, unconscious, and mechanical in manner (e.g. Bargh & Pietromonaco, 1982; Collins & Loftus, 1975; Higgins, Bargh & Lombardi, 1985; Srull & Wyer, 1980). It is also claimed that larger activities, or sequences of

acts, are understood and conducted in a semi-automatic or mindless manner (Abelson, 1976; Langer & Abelson, 1972). An extension of this schematic information processing can also be seen in the concept of salience. Whether through relative numerical distinctiveness alone or in combination with category accessibility, salience of a category is assumed to trigger stereotypic inference (e.g. McGuire, McGuire, Child & Fujioka, 1978; Oakes & Turner, 1986) and memory bias (e.g. Howard & Rothbart, 1978), perhaps in an unavoidable manner.

In contrast to this traditionally implicit concern for automaticity, more recent studies explicitly tackle this issue. For example, Fiske & Neuberg (1990) theorised the influence of attentional and motivational resources, as well as information configuration, on the category-based and attribute-oriented processes in impression formation. It is firstly posited that "the rapid, 'perceptual', initial categorisation process ... requires no attention [that is, it is automatic]" and subsequently "three 'thoughtful' processes — confirmatory categorization, recategorization, and piecemeal integration ... require attention to and interpretation of ... information" (p. 12, words in square brackets mine). While motivation (goals) is posited to affect the way information is subsequently processed, available attentional resources are assumed to determine its influence: "[only] by paying more attention, ... [is] stereotyping ... amenable to intentional control" (p. 20, words in square brackets mine).[31] In other words, their theory of impression formation explicitly recognises the automatic aspect of stereotyping and furthermore, specifies conditions where intentional control is achieved.[32]

---

[31] Oakes & Turner (1990), however, argue that available attentional resources (limited information processing capacity, in their words) are not the cause of category-based information processing. Instead, they propose the utility of category-based processing (*i.e.* stereotype use). It could be said that Oakes & Turner (1990) emphasise the importance of information configuration more than Fiske & Neuberg (1990).

[32] A minimal group situation is considered, in Fiske & Neuberg's (1990) model, to be at the extreme example where the interpretation of a target's attributes fit an available category with ease.

This integration of automaticity and intentionality can be seen, though in a different form, in Stangor & Ford's (1992) analysis of accuracy-based processing orientation. They suggest that people are primarily motivated to understand others' behaviour as accurately as possible. This general goal gives way, according to them, to less effortful expectancy-confirming strategies when information processing becomes more difficult. While they seem to claim that expectancy-confirming selectivity is intentional (they describe it as a "strategy"), its operation should need less attention, and thus be considered more automatic because the process operates under "conditions that tax cognitive capacities" (p. 82). Judging from this, they implicitly suggest that the sequential order of the strategies is the intentional process first, and the automatic process second. Therefore, it is not necessarily compatible with Fiske & Neuberg's (1990) model which suggests default initiation of the automatic category-based process. Nonetheless, it is important now to note the fact that their model is also a compromise between the automatic and the intentional components of information processing.

Selected examples of empirical studies

Devine's (1989) study on stereotypes and prejudice During and after the American civil rights movement, racial prejudice, stereotypes, and discrimination have clearly come to be regarded as undesirable in the United States and countries under its influence. Nevertheless, the attitudes of the people and the social system from which the attitudes were formed have hardly changed. As a result, a new type of racism has been born. This is more implicit, subtle, and is not easily detected (Katz & Taylor, 1988).

Devine (1989) argues that knowledge of a cultural stereotype is different from its acceptance or endorsement. She assumes that social stereotypes should be well-learned, and thus, automatic, because they have

been frequently activated in a person's life, whereas personal beliefs need conscious attention since they are relatively newly acquired.

Using a nonconscious priming procedure where the intentional modification of response was impossible (cf. Bargh & Pietromonaco, 1982), she showed that prejudice-like evaluations were evident regardless of subjects' "prejudicedness" (Devine, 1989, Exp. 2). In a thought-listing task, however, subjects showed differential prejudice according to their prejudicedness (Exp. 3). Thus, high-prejudice subjects showed more negative and less positive thoughts about the target group than low-prejudice subjects. The former result was considered to show that both high- and low-prejudice subjects shared the same extent of stereotypes, the knowledge about the target group. In contrast, the latter result was interpreted to indicate intentional inhibition of prejudice by low-prejudice subjects because thought-listing is deemed as related to conscious attention.

On top of its unique theoretical claim about prejudice, this study provides a good example of methodology in investigating automatic and intentional processing. Thus, it utilised a combination of the hypothesised individual differences in the intentional component as the independent variable, and dependent measures with different sensitivity to automatic and intentional components in prejudice.

Stangor & Duan's (1991) study on person memory In contrast to Devine's study, Stangor & Duan's (1991) work can be seen as rather more theoretical. Their study concerns the organisation of social information under distracted and non-distracted conditions. In one experiment, half of the subjects were distracted with a concurrent task while learning about target groups labelled as red or blue (Exp. 2). This concurrent task involved listening to a news broadcast of which subjects were told that they would be asked to report on later. Subjects' main task was to learn about people from the two groups by reading their behavioural descriptions. The proportions of

the behavioural descriptions with different friendliness, were varied in the groups, so that recall of the behavioural descriptions could be determined as congruent, or not, with the proportion of friendliness in the groups.

The results were, in short, that distracted subjects recalled significantly greater expectancy-congruent information than incongruent information, whereas non-distracted subjects remembered more incongruent information than congruent information. This pattern of results was also confirmed with a stimulus complexity manipulation (Exp. 1). Thus, recall of expectancy-congruent information increased as the number of groups that subjects' had to learn about increased. These results were interpreted as showing that trait-based expectancy-congruent information processing occurs when people are not able to process information accurately (see Stangor & Ford's model described earlier).

A brief comment can be made about this study in relation to intergroup processes. While Stangor & Duan (1991) claim that the results under cognitive load give support to expectancy-congruent information processing, the results can be more readily interpreted in terms of the ongoing category differentiation process described earlier in the chapter. The first reason is that subjects were *not* believed to have any "expectation" about the anonymous "red" and "blue" groups when they started the tasks. The expectation was, if any, formed *during* the learning session on the targets' behaviour, not before. It follows that subjects could not possibly use a strategy based on an expectancy that had not existed when they processed information. A second reason concerns interpretation of the results. To recap, subjects were more likely to remember expectancy-congruent than incongruent information under cognitive load (with a concurrent task and stimulus complexity). Because congruent behaviour was operationalised as dominant behaviour for the group, in a sense, greater recall of expectancy-congruent behaviour could be interpreted as better recall of information that

conforms to the supposedly category-based impression, whether friendly or unfriendly. Effectively, this may indicate accentuation of the intra-category similarities, such that similarity in friendliness within a group was exaggerated. Thus, the results can be seen as indicating operation of the categorisation process under cognitive load. Because of this cognitive load, the accentuation effect is thought to have been rather automatic. This is exactly what was suggested in the previous section, concerning the category differentiation process — an intergroup application of the categorisation process. The results from non-distracted subjects could be interpreted in terms of the accuracy-based strategy. It is easy to believe that the accuracy strategy operated during the learning session about the target groups. It is more reasonable to assume that such a strategy should come into play when cognitive resources are abundant; that is, in the non-distracted conditions.[33]

To sum up, this study illustrates, first, the utility of distraction for revealing an automatic component of a given phenomenon: when something is happening under distracted conditions, it indicates automaticity of the relevant process.[34] Second, the results of the cognitive load conditions in this study are consistent with the category differentiation process interpretation in two senses: it indicates both accentuation of intra-class similarity and automaticity of the category differentiation process.

Gilbert *et al*'s cognitive busyness studies Since Heider's (1958) early analysis on attribution, a distinction between disposition and situation

---

[33] Another comment involves applicability of expectancy-confirming processing to intergroup research. In a minimal group situation, it is thought that there are no expectations about the groups except for, if any, generic norms of ingroup favouritism. Therefore, information processing must be accuracy-oriented according to Stangor & Ford (1991). However, as Howard & Rothbart (1978) demonstrated, memory is not necessarily accurate in an intergroup situation. This may mean that an expectancy-confirming — more correctly norm-confirming — process does occur in a minimal group situation. This would perhaps be due to constraints on cognitive capacity for some reason or others.

[34] NB this study showed that distraction facilitates the use of stereotypic information processing strategies. Gilbert & Hixon (1991) demonstrated that distraction ("cognitive busyness" in their words) inhibits activation of stereotypes, although it boosts their application.

has been an important dimension in the attribution and social inference research. Regarding this distinction, there is a suggestion of a "fundamental attribution error" of dispositional attribution for others' behaviour (Ross, 1977). Specifically, it was claimed that observers tend to overestimate the role of actors' dispositions and underestimate situational pressures for their behaviour. Related to this claim, Quattrone (1982) suggested that attributional processes consist of three stages: categorisation (identification of actions), characterisation (dispositional inferences about the actor), and correction (situational adjustment); he also argued that the first stage (categorisation) is performed rather automatically (see also Trope, 1986).

Based on these ideas, Gilbert, Pelham & Krull (1988) further suggested that of the two inferential processes, the initial "characterization is generally an overlearned, relatively automatic process that requires little effort or conscious attention, whereas [the subsequent] correction is a more deliberate, relatively controlled process that uses a significant portion of the perceiver's processing resources" (p. 734, words in square brackets mine). Gilbert (1989) reported a series of experiments which support their contention that characterisation needs little cognitive resources. These experiments typically provide evidence that characterisation is *not* influenced, whereas correction *is* hindered, by "cognitive busyness" (Gilbert & Krull, 1988; Gilbert & Osborne, 1989; and Gilbert *et al.*, 1988). Cognitive busyness is equivalent, according to Gilbert & Osborne (1989, footnote 1), to the more familiar term "cognitive load" which means experimental depletion of one's processing resources.

In one experiment (Gilbert & Osborne, 1989, Exp. 1), for example, the subjects' task was to estimate a videotaped person's trait anxiety. Half of the subjects were told that the target person was discussing anxiety-inducing topics, and the other half were told that the target was discussing mundane topics. While watching two 60 sec silent video clips of the target, half the subjects in each of these conditions had additionally to rehearse an eight-digit

number, and the other half did not. Subjects gave ratings of target's anxiety on 13-point scales after watching the videos. It was assumed that situational constraint information (anxiety-inducing topics) would be used for situational adjustment (correction) of the initial dispositional inference (characterisation), thus leading to less anxious estimation of the target. It was also predicted that cognitive busyness (digit rehearsal) would prevent this correction since more conscious attention is required at the correction stage than at the characterisation stage. The results of the anxiety estimation supported these ideas.

This is a typical example of the technique and the logic of cognitive busyness studies showing automaticity and intentionality of social inferential processes. What is important here is the notion that "automatic processes ... require scant 'resources' and thus are not disrupted by concurrent processing demands" (Gilbert, 1989, p. 194). This seems to be a shared assumption among the researchers into the automatic process, that enables detection of its very effects.

Cognitive resources in cognitive psychology

The issue of automaticity and distraction effects discussed in the previous sections may be viewed from different perspectives. One of these perspectives uses an attention and task performance paradigm. A number of psychological models for human information processing have been suggested within this perspective, which are divided mainly in two types: serial processing or parallel processing. An issue which is potentially relevant to the thesis concerns the nature of "cognitive resources" for performing particular tasks (for related issues and different models, see Wickens [1989] and a special issue [5] of *Human Factors*, [1988], *30*).

Multiple-resource theory Reviewing studies that employed a dual-task paradigm, Wickens (1980, 1984) suggested that the results from some of

the studies could be explained by introducing distinctions between differences of the task characteristics on the dimension of processing stages, modalities, and codes. The dimension of processing stages distinguishes early (encoding and processing) and late stages (responding). The dimension of modalities contrasts visual-manual with auditory-speech modalities. And, the dimension of codes classifies verbal and spatial codes of perceptual and central processing. According to his multiple-resource theory (Wickens, 1984), multiple tasks are often performed using parallel processing in different modalities. It is proposed that separate cognitive resources are allocated for the perceptual-cognitive and response stages in the processing stage dimension, for visual and auditory modalities in the modality dimension, and for verbal and spatial codes in the codes dimension. Thus, multiple-resources can be deployed to tackle concurrent tasks in different stages, modalities, and codes.

The theory predicts that "as one task becomes more difficult (resource demanding) in a dual-task environment, it will either produce progressively more interference with a concurrent task or will itself suffer a progressively greater dual-task decrement. The extent to which the former or latter effects is observed will depend upon the extent to which the task in question is designed as 'primary' or 'secondary'. ... the aforementioned performance-demand reciprocity will be manifest only to the extent that the two tasks share fundamental processing structures or 'resources' " (Wickens & Liu, 1988, p.600). In other words, a greater *trade-off* between task difficulty and performance is predicted especially for a secondary task when tasks are thought to share the same cognitive resource.

An implication of this model for the studies described in the previous section may be that if a distracting task differs from the main task on any of the three dimensions, it will not cause interference with the main task performance because it does not usurp the necessary resources particularly

for the main task. If this is the case, the absence of distraction effects may not be attributable to the hypothesised (relative) automaticity of the underlying process that the main task is supposed to capture. Note that utility of this model resides in its potential to explain results of a dual-task study of which two tasks were in different modalities or codes *and* that showed absence of interference. This model will be returned to in the concluding chapter to discuss the results of the experiments in the thesis.

Summary

In this section, social cognition research was briefly reviewed in relation to the distinction between automaticity and intentionality. It was pointed out that social cognition research overlaps intergroup research in topics and hypothesised underlying processes. Next, two theoretical and three empirical studies were presented in connection with automaticity and intentionality of the processes. For the theoretical work, it was argued that the two theoretical models are combinations of automaticity and intentionality. For the empirical studies, assumptions of the differential cognitive resource requirements for the different processes, and utility of distraction as a probing technique for automaticity, were highlighted. Finally, a multiple-resource model for the dual-task paradigm in cognitive psychology was briefly discussed.

1.5 Conclusion

In the first section, the social identity research was briefly reviewed as a background to the thesis. The main concepts, theories, and current issues were discussed. Moreover, two elements in intergroup biases were pointed out: accentuation and directionality. In the second section, it was argued that both cognitive and motivational perspectives were indispensable to the underlying psychological mechanisms. Next, various processes and their

effects were discussed, and a qualitative difference between two important processes was suggested: the category differentiation process was claimed to be less intentional and more automatic than the social identity process. In the third section, salience and attention, de-individuation, and distraction were discussed to provide a basis for the development of later hypotheses. In the fourth section, the distinction between automaticity and intentionality in social cognition research was highlighted. Relevant theoretical and empirical studies were critically presented.

On the basis of the above consideration, the next chapter will raise a strategic research question about the effects of distraction. A theoretical framework will be presented to integrate contradictory predictions. The following chapters will report seven empirical studies examining hypotheses derived from the framework.

Chapter 2

Research questions, assumptions, and hypotheses

Contents

2.1 The effect of distraction on ingroup bias: a contradiction

2.2 De-individuation and distraction

2.3 Distraction and ingroup bias

2.4 Group membership salience and ingroup bias

2.5 Assumptions and hypotheses

What is the relationship between attention and intergroup discrimination? When we are not aware of, or we are not paying attention to what we are doing, do we exert intergroup discrimination more, or do we lessen the extent of the discrimination? In this chapter, ingroup bias, amongst others, is taken as an index of intergroup discrimination and an empirical issue is raised in relation to the effects of distraction.[1] A framework is then suggested which integrates seemingly contradictory empirical evidence.

It has been claimed and found that social categorisation as a mental process is the cause of ingroup bias.[2] Ingroup bias is defined here as the tendency to treat and evaluate people in favour of ingroup members in an intergroup situation. While some variables have been reported to affect this bias, these are mostly at a sociological level of analysis, with the exceptions of

---

[1] For the purpose of clarity, it is suggested tentatively to distinguish ingroup bias from intergroup biases. While ingroup bias is proposed to refer to the tendency described in the main text above, intergroup biases can be defined as any bias caused by the intergroup situation. These include accentuation of intra-group similarities and inter-group differences, illusory correlation, ingroup bias, and so on.

[2] There seems to be at least two usages of the term "social categorisation". One refers to the experimental manipulation to divide subjects into groups; the other to the mental operations to classify social objects into categories. It is thought that the former experimental manipulation is used by the experimenter perhaps to induce the latter mental operation in subjects. It is important, however, to note that the former is an act of the experimenter, while the latter is an act of the subjects. See also Jahoda (1986) and Turner (1978, p.107).

the studies on group membership salience.[3] Because sociological explanations tend to remain at a functional level of analysis, they do not clarify the internal mechanism of the processes. Moreover, ingroup bias is a psychological phenomenon as well as a sociological/societal one. If we accept the proposition that ingroup bias is brought about as a result of certain psychological processes, motivational or cognitive, there should be more attempts to unravel the psychological processes which cause it.

This thesis, therefore, intends mainly to probe into these psychological processes, especially focusing on the relationship between the cognitive and the motivational processes of social categorisation itself, rather than investigating the effects of external variables. It is hoped that this attempt will help to further understand the phenomenon of ingroup bias in particular, and intergroup discrimination in general.

2.1 The effect of distraction on ingroup bias

The key concept in the research on intergroup relations may be the effect of group membership. In fact, group membership can be said to be the necessary condition for defining intergroup situations from a psychological point of view. The interest of the present study is to observe the effect of a variable which may possibly affect the functioning of group membership, so as to clarify its mechanism. The variable to be focused on here is distraction. Distraction can be defined as the state in which one's attention is diverted from the focal event. This variable is potentially of importance because it has been shown to affect intentional processes in different areas of research, and because the processes pertinent to ingroup bias are suggested to differ in intentionality (see Chapter 1 for both propositions). So, it is also theoretically

[3] Those sociological variables include the goal relationships between groups (co-operation and competition), the intra-group conditions (e.g. cohesiveness of the group), and the relationships between the groups involved (similarity, status difference, etc.),

relevant to examine the effects of distraction. At an empirical level, however, the question is what happens to ingroup bias when one is distracted from one's group membership.

According to self-categorisation theory (Turner, Hogg, Oakes, Reicher & Wetherell, 1987), salience of group membership facilitates ingroup bias.[4] It follows, conversely, that less salience will lead to less ingroup bias. To paraphrase, it is hypothesised that people will show less ingroup bias in a distracting situation than in a non-distracting situation. The results of Abrams (1985) support this idea. In his study, subjects in the distracted condition showed less discriminatory strategy in minimal group reward allocation to ingroup and outgroup others, compared with those in the enhanced attention condition. This appears to illustrate that distraction leads to less ingroup bias.

On the other hand, there is some evidence which, in essence, seems to suggest that cognitive distraction facilitates categorisation, hence causing more ingroup bias.[5] For example, Hamilton & Rose (1980) found in their first experiment that, after reading a number of descriptions of persons of various occupations, subjects' estimates of the frequencies with which certain traits had described persons in each of the occupational groups, displayed erroneous correlation that was consistent with subjects' occupational stereotypes. When faced with an overwhelmingly large number of stimuli (24 descriptions in Hamilton & Rose's study), which possibly distracted their attention, subjects seemed to categorise the stimuli with the help of pre-existing stereotypes. Furthermore, similar results have been obtained in the

---

[4] It should be noted as described in Chapter 1 that there is some confusion on the use and the definition of the term salience. Some use the term to describe the objective characteristics of a construct in relation to the situation (e.g. Fiske & Taylor, 1984), others including Turner *et al.* (1987) use the term to denote the temporal quality of the construct in mind being attended. The definition of the latter effectively means the compounded concept of salience and attention in the former (Abrams, 1992). Nonetheless, "salience" quoted here from Turner *et al.* (1987) can be understood in the present context as having a similar quality as attention in the Fiske & Taylor's (1984) sense since the objective settings are thought to be fixed.

[5] The origin of the idea can be traced back to Gordon Allport's (1954) contention that human cognitive limitation necessarily causes prejudice.

research on category representation. To quote from a recent review, "processing constraints such as time pressure or information overload are likely to increase formation of category-based representation" (Messick & Mackie, 1989, p.48).

For instance, Rothbart, Fulero, Jensen, Howard & Birrell (1978) found that one's impression of a collection of people was based more on group characteristics than on individual characteristics in the high memory load condition. Thus, while one's estimation of individuals' desirable characteristics varied according to the proportion of desirable individuals when there were relatively few characteristics, it varied with the proportion of desirable characteristics themselves, regardless of the proportion of desirable individuals, when the number of characteristics was large (see also Pavelchak, 1989). This seems to show that information processing based on categories tends to occur when the information set is large, thus when people are cognitively overloaded.

A demographic investigation in Germany also supports this line of research. Wagner & Schönbach (1984) reported that students in a lower educational status estimated more negative attributions consistent with the stereotype towards immigrants than those in a higher educational status. Furthermore, a path analysis showed that it was actually mediated by such cognitive capacities as cognitive complexity and intelligence. This result can be interpreted as showing that processing constraints, or cognitive capacities in this case, lead to more use of category information than that of individual information.

To sum up, distraction, which is derived from complication of the stimuli, a constraint on information processing, and so on, seems to encourage category formation and its utilisation, and thus it may lead to intergroup discrimination in general.

Apparently, these two sets of propositions contradict each other. One claims that distraction decreases ingroup bias; the other suggests that it increases the bias. How can these approaches be synthesised? Before getting on to solve this puzzle, let us look at the research on de-individuation for a clue.

2.2 De-individuation and distraction

Conceptually, de-individuation and distraction are similar in that both deal with mental states that are different from normal ones and which involve uncontrolled behaviour. So, it would be useful to clarify the relationship between them.

As reviewed in Chapter 1, Prentice-Dunn & Rogers (1989) defined de-individuation as an intra-individual process in which antecedent social conditions reduce private self-awareness, thereby creating a subjective de-individuation state. And it was further suggested in Chapter 1 that de-individuation could be characterised, in terms of behavioural control, as a process where one is being deprived of control at an intentional level of behaviour.

In the meantime, distraction was defined earlier in this chapter as the state where one's attention is diverted from the focal event. Considering the hierarchy of behavioural control, however, distraction can be re-defined here, more generally, as the state, in which one's attention is being averted from, and hence one has lost control over, focal behaviour at any level of the behavioural control hierarchy. So, it could be argued that de-individuation is the kind of the process which creates distraction at an intentional level of behavioural control.

If this is the case, a similar kind of framework can be applied to distraction as to de-individuation in order to clarify the phenomenon. Recall

that output of the de-individuation process was proposed to vary depending on 1) different levels of behavioural control, and thus different nature of internal states, and on 2) situational variables external to de-individuation itself (e.g. personal *vs.* social identity salience, public *vs.* private self-awareness, and so on). Likewise, it could be argued that the effects of distraction will be subject to 1) (manipulations that lead to) different levels of behavioural control, and to 2) the situations or contexts in which the behaviour occurs.

From the viewpoint of the framework above, it is firstly important to determine at which control level distraction gives influence: at the intentional control level or at the automatic (cognitive) control level. Secondly, as regards the situational factor, salience of group membership (or social categorisation) is of analytic interest for the obvious reason that it determines intergroup relations ("salience" in Fiske & Taylor's sense. See footnote 4). Now, let us go back, and apply this framework to the contradiction mentioned in an earlier section. The following two sections consider the two dimensions of the framework above respectively in order to interpret the contradiction and to develop hypotheses.

2.3 Distraction and ingroup bias

First of all, it would be worth considering what processes of ingroup bias are likely to operate at what level of behavioural control. This examination will then allow detailed discussion as to how distraction relates to different processes of ingroup bias. The resultant clarification will, subsequently, be applied to the contradiction presented earlier.

The processes of ingroup bias and their levels of control

Two processes have already been suggested in Chapter 1 as important for ingroup bias. The first is category differentiation as the cognitive process;

the second is the social identity process as the motivational aspect. And for revision, these two processes were proposed in Chapter 1 to differ on the automaticity-intentionality dimension: the cognitive process was assumed to be more automatic and the motivational process to be more intentional. The reasons were just briefly: the former is assumed to be a perceptual process, and thus to be at a lower level of behavioural control hierarchy; theories on behavioural regulation generally posit that control at a lower level is automatic; category differentiation is thought to be a well-learned and frequently repeated behavioural pattern; the social identity process is suggested to be a goal-oriented process, the goal of which is to enhance and/or maintain ingroup esteem; and this is thought to involve complex mental operations (see Section 1.2 for detailed discussion).

Meanwhile, the levels of behavioural control were suggested to be classified into two broader levels: the intentional and the automatic levels. Thus, from the above automaticity-intentionality arguments, the category differentiation process, firstly, can be seen at the automatic level of behavioural control. Secondly, the social identity process can be seen at the intentional level of behavioural control.

Distraction and the social identity process

The relationship between distraction and the motivational process of social identity is easily seen from the above consideration of behavioural control levels. Distraction is thought to affect intentional processes in general. More specifically, it is assumed to hinder or block the intentional processes by usurping attentional energy necessary for the process to operate (see Section 1.3 for relevant discussion). It follows that distraction will prevent control at the intentional level. Therefore, it is predicted that more distraction will reduce the effect of the social identity process since the social identity process is thought to operate at the intentional level of behavioural control. Although

it is interesting how different intentions interact under a certain degree of distraction, suffice it to mention for now that they may also interfere with each other. This issue will be further discussed later in the thesis.

Distraction and the category differentiation process

There can be two views in connection with the relationship between distraction and the category differentiation process depending on the extent of automaticity that the process is hypothesised to have. The first is an extreme view of automaticity of the category differentiation process, and the second a mild view.

A strong view of automaticity The first view relies heavily on the automaticity of the process.[6] As the category differentiation process is thought to operate at the automatic level of control, it is argued that distraction does not affect the process until the distraction becomes fairly large. As long as subjects' attention is distracted at the intentional level only, this process will still function due to high accessibility of the process.[7] After this point, distraction is expected to disrupt the process even at the automatic control level. Thus, this view predicts that the category differentiation process will operate equally effectively regardless of the degree of distraction, up to a certain point.

However, it can also be suggested that expression of the automatic process may actually increase with distraction. Because distraction is generally thought to affect processes at the intentional more than the automatic levels of control, it not only prevents the intentional processes from

---

[6] The meaning of automaticity in this thesis mainly involves required cognitive resources. See Section 1.2 for further discussion.

[7] The background assumption is that different psychological processes need different amounts of cognitive attention to execute them. Some processes including perceptual categorisation are thought to occur with less attention, whereas other processes need more intentional attention to execute them (cf. discussions in Devine, 1989; also section 4 in Chapter 1). Accessibility of category utilisation, that is, to summarise or simplify the situation, can be claimed to be high owing to life-long experience of doing so. Note that the term accessibility here refers to how easy it is to activate and execute the process. It does not refer to the idea commonly used in the cognitive approach in social psychology.

occurring, but can also facilitate detection of the automatic processes by means of inhibiting the intentional processes which are assumed to disturb expression of the automatic process (cf. Devine, 1989).

This principle can also be applied to explain some of the results described earlier. For example, one effect of processing constraints mentioned earlier was that information processing becomes category-based. This result, however, can be seen instead as the facilitation of expression of category information processing when constraints are imposed on intentional processes which inhibit it.[8]

In brief, it is suggested that expression of the category differentiation process will be facilitated, and thus will lead to greater ingroup bias under distraction. Thus, it is hypothesised further that the more distraction, the more the automatic process of category differentiation will become apparent.

Last but not least, it is important to note that distraction must affect only the intentional level of control in order for the above arguments to stand. In other words, distraction must be just strong enough to induce de-individuation in Prentice-Dunn & Rogers' (1989) sense. Earlier in this chapter, distraction was defined as the state in which one loses control over focal behaviour at any level of the behavioural control hierarchy. Thus, distraction may be greater than that preventing merely the intentional level of control as mentioned earlier. If distraction is greater, it comes to affect processes even at the automatic control level. It is then possible that even the category differentiation process is unlikely to operate. The prediction in this case is that there will be no ingroup bias.

A mild view of automaticity The second view depends on a hypothesised functional relationship between distraction and the category

---

8 There is a parallelism between this principle and Gilbert and others' arguments in that both conceptualise intentional processes as suppressing agents (see Gilbert, 1989; Devine, 1989; etc.) . However, while the work of Gilbert and others mainly concerns the use of stereotype, the current idea assumes category differentiation as a relevant event.

differentiation process. This relationship is an extrapolation from Messick & Mackie's (1989) contention that processing constraints are likely to increase formation of category-based representations. As opposed to the first view, this view predicts that the category differentiation process itself is facilitated as distraction increases. Though this relationship seems to remain functional, a possible mediator can be the amount of cognitive resources available. In fact, some theorists on impression formation assert that large cognitive resources encourage accuracy-processing or individuating processes whereas small cognitive resources necessitate category-based processing (cf. Fiske & Neuberg, 1990; Stangor & Ford, 1992). This view is reminiscent of Allport's classic study of prejudice. As for the reasons for the relationship however, there is nothing but an evolutionary explanation thus far: simply that it is (was) adaptive to do so (cf. Gilbert, 1989).

Although there is also an assumption of automaticity of the process in the second view, it is not as strict as in the first. The meaning of automaticity here, perhaps, remains only inescapability. Therefore, it is not exactly the same as the one presupposed in the first view. The role of behavioural control levels is not clear in the second view.

Summary and a conclusion Two views on the relationship between distraction and the category differentiation process were depicted. The first view provides a convincing explanation of the relationship: it is consistent with the strict sense of automaticity of the process, as well as the behavioural control hierarchy. Meanwhile, the second view appears plausible though it does not necessarily fit these ideas. Despite the differences, however, both views predict the positive relationship between distraction and expression of the category differentiation process. The current thesis prefers the first view because it is the richer and more constructive. This issue will be discussed again in a later chapter.

Solving the contradiction

The levels of the relevant processes and their relation to distraction have been examined so far. This sub-section will consider how these analyses may be applied to solve the contradiction presented at the beginning of the chapter.

Nature of the studies The contradiction centres on whether distraction leads to more or less ingroup bias. Concerning the level of behavioural control, it would firstly be useful to interpret the nature of the two sets of studies which suggest an opposite direction for the distraction effect. It can be argued that the former set, which suggest increased ingroup bias with distraction, are largely concerned with the level of automatic control, rather than the level of intentional control. This can be demonstrated by listing the explanatory concepts used in the studies: cognitive overload, cognitive capacities, information processing constraints.

Meanwhile, the second set, which indicate reduced ingroup bias due to distraction, seems to concern the intentional level of control, rather than the automatic level of control. In illustration of the nature of the studies, it is enough for now to say that distraction in Abrams' (1985) study was induced by a verbal instruction which explicitly asked subjects to conduct a task unrelated to group membership, and that this manipulation was intended to block the mental processes pertinent to ingroup bias. It is, therefore, assumed that subjects were expected not to have an intention to engage in ingroup esteem maintenance/enhancement. In short, it could be said that the contradiction stems partly from the different levels of analysis in the two sets of studies.

Dependent variables in the studies In view of the arguments in the previous sub-sections, it is presumed that distraction will decrease ingroup bias as measured by indices of the effect of the social identity process, whereas it will increase bias according to indices which tap the outcome of

the category differentiation process. It is, therefore, proposed that the differential results between the two sets of studies might have been caused by different types of dependent variables adopted in the studies: cognitive measures for increase with distraction, and intentional indices for decrease with distraction. This reasoning is supported when one takes another look at the measures used in each study.

Thus, the former set of studies are thought to have dealt with cognitive indices, such as impression formation, memory, and stereotypes, which seem suitable for detecting the effect of the cognitive process of categorisation. These studies do indeed suggest increase in bias with distraction. Meanwhile, the dependent variables in Abrams (1985) were measured in terms of reward allocation, which apparently meant to measure more intentional behaviour than simply cognitive effects. And in fact, the results showed decrease in bias in the distracted condition. It can be construed that category differentiation might have worked in the distracted condition, but that it was simply not detected very well in the reward allocation indices.[9]

In short, revision of the dependent measures in the studies demonstrates that the difference in the measurement types was likely to be another determinant of the contradiction between the two sets of results.

Summary of the section

The contradiction pointed out earlier between the two sets of results was whether distraction leads to increased or decreased ingroup bias. The level of behavioural control has been demonstrated to be a useful concept in solving the contradiction.

Firstly, the relevant processes were examined in terms of their control level and their relationship with distraction. Secondly, these analyses were

[9] Indirect evidence of this reasoning is given by Hong & Harrod's (1988) study, where they manipulated amount of thinking, and obtained significant ingroup bias in rating indices even in the distraction condition as well as in the control condition.

applied to the studies that appeared to have contradictory results. It was suggested that the level of analysis was different between the two sets of studies. Moreover, examination of the dependent variables in the studies demonstrated that different forms of measurement might have been responsible for the contradiction.

In conclusion, it is likely that the contradiction derived from confounding two distinct processes at different levels of behavioural control. These analyses also suggest the theoretical and empirical importance of distinguishing the two processes and the different levels of behavioural control.

2.4 Group membership salience and ingroup bias

The second dimension of the framework presented earlier was situational factors external to distraction. Salience of group membership was chosen for this dimension simply because it was assumed to determine the intergroup situation, where the phenomenon of ingroup bias was predicted to take place. However, group membership salience is thought to have further significance for the following reasons.

Firstly, it was implicitly assumed that ingroup-esteem maintenance/enhancement —the goal of the social identity process— is the major intention in intergroup situations. Although this assumption is quite acceptable in view of a large amount of research in intergroup relations, there is also evidence that shows other intentions may be strong (e.g., Ng, 1981; Rabbie, Schot & Visser, 1989). Meanwhile, several researchers seem to suggest that intergroup competitiveness and a norm of ingroup favouritism are dominant in intergroup situations, whereas an equity rule and politeness ritual are prevalent in interpersonal interactions (cf. Diehl, 1989; Insko *et al*, 1988; Ng, 1986). Since competitiveness and ingroup favouritism in intergroup

situations are theorised to derive from group membership, and since the social identity process is thought to be a bridge between the two, salience of group membership is hypothesised to highlight the intentional process of social identity. It can be said, therefore, that group membership salience not only sets the stage for intergroup relations, but also controls likely intentions in the setting.

Related to the first reason, the dimension of group membership salience is of interest because it gives an opportunity to test the assertion that ingroup bias comes at least partly from the social identity process. According to the social identity process, it is hypothesised that the degree of social identification with the relevant group determines the degree of the outcome of the process (Brown, Condor, Mathews, Wade & Williams, 1986). Hence, it is expected that the degree of ingroup bias will vary with the degree of identification. Although identification is conceptually a subjective index and cannot, in principle, be manipulated externally, this can be achieved by changing the degree of group membership salience because it is thought to increase the likelihood that one identifies with the relevant group. Besides that, since the category differentiation process is assumed to be rather automatic, it is not expected to rely on the degree of salience so long as there is a sufficient category salience to evoke the process. Consequently, it is hypothesised that variations in the degree of salience is more relevant to the social identity process. Group membership salience, thus, should map directly onto the social identity process.

Lastly, the dimension of group membership salience is theoretically important because it is assumed to interact with distraction, thus allowing a test of the hypotheses concerning the alleged processes for ingroup bias. On the one hand, salience of group membership is presumed to lay the foundation for both the motivational process of social identity and the

cognitive process of category differentiation.[10] In other words, group membership salience can be said to set the stage. Neither process would be triggered in the absence of at least a minimum degree of group membership salience. On the other hand, this general tendency is assumed to be qualified by distraction in such a way that distraction affects the intentional process more than the cognitive process when group membership is salient, whereas distraction does not affect either of the processes when group membership is not salient.[11]

2.5 Assumptions and hypotheses

Assumptions

Finally, the following is a summary of general assumptions implicit in the arguments so far. Hypotheses drawn from the arguments in this chapter are subsequently restated on the basis of the assumptions.

1 Ingroup bias is caused in intergroup situations by two main processes: the category differentiation process and the social identity process.

2 The category differentiation process is characterised as a cognitive process at the perceptual level; the social identity process as a motivational process, the goal of which is to maintain and enhance ingroup-esteem.

3 Therefore, the category differentiation process operates more automatically and less intentionally than the social identity process.

4a The category differentiation process operates when the relevant categories are salient.

---

[10] For both processes, at least a minimum degree of group membership salience (*i.e.* category salience) is presumed necessary.

[11] Note that it was formerly assumed that distraction would increase expression of the cognitive process of category differentiation. However, distraction is not expected to affect the cognitive process at a theoretical level in one view. And it is only functionally related to the cognitive process in another view.

4b Expression of the category differentiation process is suppressed when other intentions are counteracting (e.g. accuracy goal would suppress category differentiation).

5a The social identity process operates when one identifies with the category. The category must be salient, in the first place, to be identified with.

5b The social identity process is partly inhibited by counteracting intentions (e.g., equality, fairness, & self-presentation)

6 The social identity process is a major intentional process in intergroup situations when group membership is salient, though other intentions are also at work.

7 Distraction hinders intentional processes in general. Therefore, the social identity process is also impeded by distraction.

8 The category differentiation process is blocked only by the strongest distraction.

9 Increasing group membership salience increases the likelihood that one identifies with the relevant group.

Hypotheses

Listed below are the principal hypotheses of the thesis. Because they are still at a general level, each hypothesis will be translated into a specific prediction when tested in the individual studies. (The relevant assumptions are noted in the parentheses, with the most important ones being in bold.)

1 When relevant categories are salient, the category differentiation process will occur even under distraction. (1, 2, 3, **4a**)

2 When relevant categories are salient, expression of the category differentiation process will increase with distraction. (1, 2, 3, 4a, **4b**)

3 Increased group membership salience will increase the effect of the social identity process whereas it will not affect the category differentiation process. (1, 2, **4a**, **5a**, 9)

4 When group membership is salient, distraction will reduce the effect of the social identity process. (1, 2, 3, 5a, **6**, **7**)

5 As distraction increases, the less group membership salience will be related to the outcome of the social identity process. (1, 2, 3, **5a**, **6**, **9**)

6 Distraction will not affect the relationship between the outcome of the category differentiation process and group membership salience. (1, 2, **3**, 4a) [12]

7 Under the strongest distraction, no ingroup bias will be observed. (1, **6**, **8**)

---

[12] Note that this prediction concerns individual differences in the strength of the category differentiation process. The relationship between individual differences in category differentiation and group membership salience is not, in fact, known. A naive guess is that those who tend to engage strongly in category differentiation may also be readily influenced by group membership salience. Alternatively, these two tendencies may be completely unrelated. Therefore, this prediction is only a tentative one.

Chapter 3

Study 1. Distraction, group membership salience, and ingroup bias

– Pilot study 1 and Experiment 1 –

Contents

3.1 Background

3.2 Pilot study 1

3.3 Experiment 1: Method

3.4 Experiment 1: Results

3.5 Discussion

The second chapter raised an empirical question, and a theoretical framework was suggested to give an integrative explanation for it. The question was whether distraction leads to increased or decreased ingroup bias.

In the first section of this chapter, the theoretical relevance of this empirical question is discussed, and some of the general assumptions of the thesis are restated. Next, particular measurement assumptions and related issues in measurement are addressed. The first section concludes with an experimental design, and predictions derived from it. Subsequent sections report a pilot study and the first experiment. The pilot study develops an experimental procedure, particularly that of a distraction manipulation. Experiment 1 was originally designed to test some of the hypotheses constructed in the second chapter. The final section discusses the results of the studies and re-evaluates the experimental procedure.

Although the two studies were conducted in different countries, thus in different cultures for an administrative reason, this thesis does not

specifically encompass cultural factors. However, caution will be taken to compare and interpret the results of the studies.

3.1 Background

Theoretical relevance

Since Tajfel *et al.* (1971), minimal group experiments have repeatedly demonstrated that simple division of subjects into two groups leads to ingroup bias, that is, given the groups, one evaluates and treats anonymous others in favour of members of one's own group compared with those of the other group. Two processes have been suggested as the underlying causes of this phenomenon: the cognitive and the motivational processes.

The cognitive process relevant to this phenomenon is thought to be a perceptual process where one categorises or uses the existing categorisation in order to see the complicated world in a meaningful way. The motivational process pertinent to ingroup bias is considered to be an identity process where one tries to maintain and enhance one's group esteem. In this thesis, the former is called the category differentiation process, and the latter the social identity process.

One of the purposes of the thesis is to demonstrate the effects of these two processes empirically, not just as a theoretical speculation. Several attempts have been made so far to show the effects of each process. For example, Karasawa (1988) induced subjects to hold either strong or weak group identification and examined its interaction with subjects' own group status (inferior or neutral). When group identification was weak, subjects in the inferior status condition favoured outgroup members, who are superior, while they favoured their own group members as much as those in the neutral status condition did when group identification was strong. This demonstrates, it can be said, that intensity of social identity preserved the

social identity process while resisting reality. Analogous results were subsequently obtained in Karasawa (1991), and a meta-analysis also indicated moderate support for importance of group identification as a predictor of ingroup bias (Hinkle & Brown, 1990).

For the category differentiation process, studies on social judgements have provided some evidence of the process (e.g. Eiser & Stroebe, 1972). In McGarty & Penny (1988), for instance, subjects were asked to judge political statements on the right wing–left wing scale. These political statements were labelled as taken from two authors, and salience of the two authors' political positions were varied depending on the conditions. There was a consistent tendency that salience led to greater category differentiation in the judgements. Thus, intra-class similarity and meta-contrast ratio (Turner *et al.*, 1987) both increased, and inter-class overlap decreased, with salience. More importantly, this category differentiation effect was mediated by subjects' own political position. Category differentiation was more apparent when subjects' political position was relevant to the judgmental dimension. This firstly indicates individual differences in sensitivity to certain categories, and conversely demonstrates importance of dimensional relevance of the scale. Nevertheless, this study basically illustrates how judgements are influenced by categories ascribed to judgmental events.

However, these studies each investigated only one of the two processes and thus give no hint concerning the relationship between the two. Though several theorists have suggested certain ideas about the relationship, there is not enough evidence to draw a conclusion (see Chapter 1 for different theoretical perspectives). With this background in mind, the present studies were designed to disentangle the mechanism of the processes, by utilising the qualitative differences between the processes. Distraction is used as a tool in this exploration. Presence and absence of the distraction effects can be

informative of whether, or which of, the processes are concerned with the variable of interest.

Measurement assumptions

Test of this idea requires developing the appropriate indices to measure the effects of each of the two different processes. Therefore, it was decided to use several different types of dependent measures including the two traditional indices in the research, which are point allocations on matrices and evaluative ratings on semantic differential scales.

It is tentatively predicted that point allocations are concerned relatively more with the motivational process of social identity whereas the use of evaluative rating scales reflects the cognitive process of category differentiation.[1] It may be useful, at this point, to address two related issues regarding this assumption. First, characteristics of the response on a measure are conceptually separate from those of the hypothesised process that the measure is assumed to tap (For example, typing— often a well-learned, nearly "automatic" response— may reflect complex "intentional" mental operations, such as arguing; it may reflect less intentional operations, such as copy typing). Second, characteristics of a process are not the same as the process itself. It is the hypothesised *processes*, not their *characteristics*, that are proposed to be captured relatively better in the stated measures. For these two reasons, whether responses on the measures (as opposed to processes) are motivational or cognitive, or intentional or automatic (as opposed to processes themselves) is a secondary issue. What is more important is whether the processes are appropriately tapped with the stated measures.

With these points in mind, it is argued that the tentative empirical assumption made above is tenable. The first reason is that while point

[1] This empirical assumption is tentative in the sense that it will only be used as a guideline to interpret the results. Therefore, validity of this assumption will be empirically assessed later in the thesis.

allocation is thought to comprise more direct comparison between ingroup and outgroup— the essential part of the social identity process, evaluative ratings involve less direct comparison. This because ratings require independent judgements of the different targets; they are usually administered separately for different targets. In addition, point allocation tasks allow the use of various "strategies"; it is implicitly assumed by researchers that the point allocations reflect subjects' intentional allocation plans. In contrast, ratings on SD scales are assumed to be based on the image that subjects hold about the targets. Thus, it could be argued that ratings correspond more closely to the mere perception on the targets— an outcome of the category differentiation process. Related to this, it has been an implicit assumption among researchers that ratings on SD scales can tap respondents' stereotypes— the outcome of stereotyping or categorisation. It could be similarly argued that ratings on SD scales are useful to identify the outcome of the category differentiation process (see the next sub-section, however, for a measurement issue).[2] Finally, a rather secondary reason (since it relates more to the characteristics rather than the processes themselves) is that because evaluative judgements are thought to be made instantaneously, there is relatively little room for intentional processes to come into play in evaluative ratings (cf. Fazio, Sanbonmatsu, Powell & Kardes, 1986).

It should be noted that the assumption concerns *relative* merit of the different measures for the different processes. Comparative and strategic aspects could be easily emphasised for ratings if an experimenter wishes so. However, it is believed that the above arguments on the relative differences between the measures are plausible in a very neutral minimal intergroup situations.

---

[2] The direction of the rating bias (*i.e.* ingroup-favouring) may be explained by an unconscious process suggested by Perdue, Dovidio, Gurtman & Tyler (1990).

Issues in measurement

An important issue is the expected discrepancy between analyses at the theoretical and the empirical levels. This not only concerns the general issue of measurement accuracy, but also involves particular hypotheses about the effect of distraction, especially on the category differentiation process. That is, while the output of the automatic process of category differentiation is hypothesised to be unaffected by distraction at a theoretical level, it is expected to increase with distraction at an empirical level. This issue was briefly discussed also in the earlier chapters. The first reason for the expected increase is that expression of the automatic process is thought to be suppressed by counteracting intentions (cf. Gilbert, 1989; Devine, 1989). The second, connected, reason is that distraction is suggested to remove this suppression by inhibiting the intentions concerned. Therefore, no matter how accurate the measurement is, the expressed output of the automatic process will not reveal the actual enhancement of the process as a function of distraction.

A solution to this fundamental problem is that the predicted *direction* of the expressed output of the category differentiation process with distraction is opposite to that of the social identity process. Nonetheless, care should be taken in discussing the results especially when interpreting theoretical implications of results.

Another, mainly empirical, problem concerns measurement of the processes. It was tentatively assumed, in the present study, that point allocations are concerned relatively more with the motivational process of social identity whereas the evaluative rating scales with the cognitive process of category differentiation. However, whatever the indices might be, the pure outcome of the social identity process cannot be captured because the category differentiation process has automatic effects. In other words, every index is thought to be under the influence of the category differentiation

process to some degree. Therefore, even on the point allocation indices, what is important is the *change* in the degree of ingroup bias as a function of distraction, rather than its absolute value, because only the change would reveal that part of ingroup bias contributed by the social identity process.

Predictions for Experiment 1

In addition to distraction, group membership salience is manipulated in the present study. The importance of this variable was already discussed in Chapter 2. To recap, group membership salience is essential to define an intergroup situation from a psychological viewpoint, implies particular intentions in the situation, and is thought to be a core of the social identity process. Salience is also assumed to interact with distraction, thus allowing a test of the hypotheses concerning the alleged processes for ingroup bias.

In Experiment 1, distraction (present or absent) was crossed with group membership salience (salient or non-salient), using a 2 x 2 between-subjects factorial design. Note that category membership was intended to be kept at least minimally salient for every condition (cf. assumption 4a in Chapter 2). The general hypotheses stated in Chapter 2 are modified to conform to the current experimental design, as well as to the present assumption that point allocation indices reflect the social identity process and evaluative rating indices reflect the category differentiation process. Under these conditions, it is predicted:

1 that evaluative ratings will reveal ingroup bias in all conditions (evaluative ingroup bias was taken as an index for intergroup differentiation);

2 the degree of bias will be greater in the distraction than the no distraction conditions;

3 ingroup bias on the point allocation indices will be greater when group membership is salient than non-salient;

4 group membership salience will not affect ingroup bias on the rating indices;

5 when group membership is salient, there will be less ingroup bias in point allocations in the distraction than the no distraction conditions;

6 the more distracted subjects are, the less strongly group membership salience will be related to ingroup bias in the allocation indices;

7 distraction will not affect the relationship between ingroup bias on rating indices and the degree of group membership salience.

It is thought that testing these predictions depends on the success of the experimental procedure in bringing about, at least, ingroup bias in a minimal group situation. For this, and other reasons described shortly, a pilot study was designed, and is reported in the next section.

3.2 Pilot study 1

The aim of the pilot study was twofold. First, to check if the procedure as a whole was appropriate. A particular interest was whether or not a certain distraction technique was effective in the minimal group situation.

Abrams (1985) and Hong & Harrod (1988) are the only two studies, to the author's knowledge, which utilised distraction in the experimental design in a minimal group situation. The former manipulated distraction by verbal instructions in the beginning, and the latter by distracting tasks inserted between the measurements of ingroup bias. In the present study, it was decided to use concurrent distracting task described below. This type of manipulation was expected to have an advantage of better control of

distraction over the subjects because it forces subjects' attention away from the main tasks and because it enables one to manipulate a specific amount of distraction at a specific time. However, as there has been no study that used this method in the research area, the present study arbitrarily adopted a degree and a technique of distraction, taking account of studies in the social facilitation research (e.g. Sanders & Baron, 1975).[3]

Second, it was designed to test the hypotheses listed in the previous section. One assumption was that point allocation indices mainly concern the motivational process of social identity while evaluative ratings reflect the cognitive process of category differentiation. Through testing the hypotheses, it was hoped to unveil qualities of these indices especially on the intentionality-automaticity dimension.

Subjects and design

One hundred and thirty-two, 12-13 year old pupils from four classes at a junior high school in Osaka, Japan, participated in the experiment in a 2 (distraction: present *vs.* absent) x 3 (group membership salience: salient, non-salient, and control) experimental design.[4,5] Pupils from one of the four classes were assigned to the salient condition. Similarly, those from other two classes and those from the last class were respectively assigned to the non-salient and the control conditions. Half of the pupils in each class were given an extra task as a distraction manipulation.

---

[3] An alternative strategy might have been to identify the appropriate degree of distraction to be tested before the exploration of the hypothesis. However, it would not have been informative to take this strategy because there is no reference point that can be used to infer the relationship between ingroup bias and a particular degree of distraction.

[4] At the point of the classification of the pupils before the academic year, they were randomly assigned to the four classes.

[5] Control groups for salience were included in the design to check the general effect of the current distraction manipulation, free from a group context.

Procedure

The experiment was conducted in a classroom by an experimenter —the Principal of the school—, and an assistant —the class teacher—, in a group session for an entire class of pupils. The procedure of each condition was as follows.

1) General instruction Subjects were told that the experiment was about decision making. They were instructed to keep quiet and not to peep at each others' paper, during the session.

2) Distribution of the dependent measure booklet A dependent measure booklet and a small envelope were distributed to each subject in the classroom. The booklet consisted of two main parts: point allocation tasks and evaluative ratings.

3) Manipulation of group membership salience To divide subjects into two groups, a lottery was used, following the procedure adopted by Lemyre & Smith (1985). Subjects drew a lot from a box as the experimenter and the assistant walked around with the box. Subjects were requested to read the lot, and keep it secret. For the salient and the non-salient conditions, the lot gave subjects a person number and a group membership. Each subject's person number was unique and none of the numbers appeared in the dependent measure booklet. The group label was either "red" or "white". This division of the class into the two groups was explained using a figure on the blackboard. In the control conditions, the lot gave subjects only the person number. And thus, there was no explanation about the class division into the two groups. Subjects were asked to fill in the personal number and the group name, when appropriate, at the top of every page of the dependent measure booklet.

After looking at the lot, subjects put it in their envelope. In the salient conditions, subjects were requested to take seat on one side in the classroom

according to the group division. For the non-salient conditions, they did not move.

4) Manipulation of distraction After the lottery, the experimenter explained with examples how to complete the rating and point allocation tasks in the booklet. Subjects were told that there was no right or wrong answer.

Distraction was manipulated by written instruction on the cover page of the dependent measure booklet. Some letters, characters, and digits were italicised on each page of the booklet (35 letters and characters, and 12 digits in total). Subjects in the distraction conditions were asked, in the instruction, to copy all the slanted letters and digits into the margin on the right-hand side when they came across them during the tasks. After everyone completed the booklet, these booklets were collected.

Dependent measures

The dependent measure booklet consisted of three sections. The first two sections were the point allocation tasks and the rating tasks. One version has the allocation tasks first followed by the rating tasks (version 1) while the order was reversed in the other version (version 2). Manipulation checks were placed at the end (See Appendix 3.1 for details of the booklet and the tasks).

The point allocation task This task was to give points to pairs of anonymous people from the two groups by choosing a pair of points on a series of 2 x 7 matrices. The two groups were "white" and "red": those who picked the "white" lot were assigned to the group "white", and those who picked the "red" lot to the group "red". There were three types of matrices, and each type had right-left reversed, and up-down reversed versions. Therefore, twelve matrices appeared on the booklet in total. Subjects were told to imagine that they were to award money to these anonymous people. These allocation matrices did not have properties of so-called Tajfel matrices,

such as being able to calculate "pull" scores from the reversed versions: these three types for the "white" group subjects were different from those for the "red" group subjects. Hence, only the total points allocated to ingroup and outgroup members are reported in this chapter (Details of other indices are described in Appendix 3.2). Subjects in the control group used the same material but gave points to two anonymous people, of whom subjects knew only the person number, instead of the person number and the group membership.

The rating task Subjects were asked to indicate their ratings, first, of the "white" group members, and then of the "red" group members, on a series of six-point bipolar adjective scales. Ten adjective pairs were selected from Brewer & Silver (1978), Kakimoto (1989), and Lemyre & Smith (1985). These items were (translated from Japanese): 1 warm–cold, 2 creative–not creative, 3 intelligent–unintelligent, 4 strong–weak, 5 talented–untalented, 6 clear–unclear, 7 honest–dishonest, 8 friendly–unfriendly, 9 trustworthy–untrustworthy, and 10 generous–stingy.

Other measures The booklet also contained other items.

a) Preference as a friend Subjects were asked to indicate on a 6-point scale how much they wanted to make friends with a) ingroup members and b) outgroup members.

b) Importance of the rating items Subjects were asked to choose and rank order the three (out of ten) rating dimensions which best distinguished the two groups.

c) Criteria/strategies in the point allocation task Subjects were asked to indicate all of the strategies that they used in point allocation tasks from a list, including fairness, closeness to the people, self-interest, group interest, joint profit, self-content, etc (check 1). Subjects' normative justification of their allocation criteria/strategies was also asked on a 6-point

scale (how much do you think what you tried to do is right?: 1 definitely–6 definitely not, translated from Japanese).

Manipulation check items These included checks for group membership salience and distraction (The following items were all translated from the original Japanese text). All answer forms were Thurstone type scale: 1 "··· very much ···", 2 "··· fairly ···", 3 "··· to some extent ···", 4 "··· only a little ···", 5 "··· not very much ···", 6 "··· hardly ···", 7 "··· not at all ···", and 8 "I don't know".

Group membership salience check items were:

- "How much did you think about your own group when you answered to the allocation task?" (check 2); and
- "How much did you compare the target person with your own group when you answered to the rating tasks?" (check 3).

Distraction manipulation check items were:

- "How much did you concentrate on the tasks when you answered to the questionnaire?" (check 4); and
- "How much were you distracted (or confused) when you answered to the questionnaire?" (check 5).

The other check item was:

- "How difficult did you think the task was?" (check 6).

Results

Distribution of subjects The number of subjects assigned to each of the condition is displayed in Table A3.2.1 (Appendix 3.2), along with the distribution of the booklet versions and the division into the "white" and the

"red" groups.[6] Chi squares of every combination of the independent variables were examined, showing no indication of dependency.

Manipulations checks First, subjects' engagement in the distraction task was checked by counting the number of correctly copied italicised letters, digits, and characters. The criterion for correctness was that if a part of an italicised sequence was copied correctly, it was counted as correct. There were 29 of these sequences in total. The overall proportion of correctly copied italics was not very high (M =13.27, 45.8%). There was no significant difference between the proportions of correctly copied italics from the allocation and the rating tasks [respectively, M s=46.4 and 44.4(%), SDs=3.78 and 1.85, t (57)=.69, $n.s.$]. For the group membership salience manipulation check, subjects' self-report did not significantly differ between the salient and the non-salient conditions on the items "group thoughts in allocation" and "group comparison in ratings", though means were mostly in the expected direction, especially in "no distraction" conditions (see Table 3.1). Description of the control conditions is omitted from the table because, in these conditions, check items asked: whether subjects thought about, or compared with himself/herself.

Subjects' self-report of distraction did not differ significantly between the distraction conditions and the no distraction conditions, though the differences were in the expected direction, especially on the "how much distracted" item (see Table 3.2). Meanwhile, an analysis of the "self-thoughts" items in the control conditions indicated that subjects were less likely to think about themselves when they were distracted than when they were not.[7] This may constitute evidence for the effectiveness of the distraction manipulation.

---

[6] 17, 32, 14, 18, 33, and 18 subjects were respectively assigned to the salient, non-salient, and no category conditions under distraction; and salient, non-salient, and no category conditions under no distraction.

[7] As subjects in the control conditions did not have any group membership, these items concerned 1) how much the subject thought about themselves when they gave points to the two people, and 2) how much they compared others with themselves when they rated the people. For the first item, M = 1.92, n = 13, in distraction condition and M = 3.50, n = 18, in the

To sum up, the check items did not show statistically significant results for either of the experimental manipulations. However, it may be that manipulation check items themselves were not appropriate. These items are not necessarily ideal because "group thoughts in allocation", for example, was meant to measure group membership salience, but it was confounded with a distraction manipulation check. Bearing in mind the uncertain interpretation of the manipulation check items, therefore, analyses were conducted concerning the predictions.

Table 3.1 Mean scores on check items for group membership salience

	Salient	Non-salient
Thoughts of own group in allocation task		
Distraction	3.19 (16)	3.52 (27)
No distraction	3.81 (16)	3.34 (32)
Comparison with own group in rating task		
Distraction	4.44 (16)	4.00 (27)
No distraction	4.25 (16)	3.50 (32)

1) The higher the number, the more salient (range 1-7).
2) The figure in brackets is the number of the subjects who completed the item.

no distraction condition ($F = 5.95$, $df = 1/29$, $p < .05$); for the second item, $M = 3.0$, $n = 13$, in the distraction condition and $M = 3.4$, $n = 18$, in the no distraction condition ($F = .54$, $df = 1/29$, *n.s.*). For both items, the higher the number, the more group thoughts subjects had (range 1-7).

Table 3.2 Mean scores in check items for distraction

	Group membership salience					
Distraction	Salient		Non-salient		No category (control)	
"how much distracted"						
Distraction	4.25	(16)	3.56	(27)	3.67	(9)
No distraction	3.31	(16)	3.31	(32)	3.53	(17)
"how much concentrated"						
Distraction	4.50_a	(16)	5.30_a	(27)	3.33_b	(9)
No distraction	4.69_a	(16)	4.47_a	(32)	4.65	(17)

1) The higher the number, the more distracted (range 1-7).
2) The figure in brackets is the number of the subjects.
3) Different subscripts within the lower section denotes means which are significantly different (Duncan's test, $p < .05$)

Point allocation index The difference between total points allocated to ingroup and outgroup members on the point allocation matrices was calculated. This can be regarded as an index of ingroup bias. The means are shown in Table 3.3. Ingroup bias was significantly higher in the salient than the non-salient group membership conditions [main effect of salience: $F(1,93)=5.12$, $p < .05$]. Furthermore, ingroup bias in the salient/no distraction condition was significantly greater than zero ($p < .05$, two-tailed) while it was not so in the salient/distraction condition, though the difference between the two conditions was not statistically significant. In short, it can be said that predictions 3 (that allocation ingroup bias will be greater when group membership is salient than non-salient) and 5 (that allocation ingroup bias will be less in the distraction than the no distraction conditions, under group membership salience) were reasonably supported.

Evaluative ratings Ingroup bias in ratings was calculated by subtracting outgroup ratings from ingroup ratings on each scale. Across all ten scales, there were no significant effect of conditions and the interaction (see Appendix 3.2 for details). However, the grand mean was significantly greater than zero ($M = .11$, $p < .05$). This supports predictions 1 (that rating

bias will appear in all conditions) and 4 (that group membership salience will not affect ingroup bias on the rating indices), but not prediction 2 (that rating ingroup bias will be greater in the distraction conditions than in the no distraction conditions).

The most differential dimension in rating The averaged rating bias of the three most differential dimensions (as chosen by the subject) and that of the other seven dimensions were subject to 2 (salience) x 2 (distraction) x 2 (repeated measure) ANOVA. The differential dimensions were expected to be more sensitive than the rest to detect ingroup bias. No such indication was obtained. No effect was significant (see Table 3.4).

Preference of the person as a friend The preference score was calculated by subtracting preference ratings for outgroup members as a friend from that for ingroup members. This sociometric index was expected to measure subjects' rather spontaneous response (the outcome of the automatic process). It was predicted that there would be more ingroup bias in the distraction than the no distraction conditions. This score was subject to 2 (salience) x 2 (distraction) ANOVA. No effect was significant (see Table 3.5), though the pattern of means was in the expected direction.

Table 3.3 Mean total points given to ingroup and outgroup members

	Salient		Non-salient	
	Distraction	No distraction	Distraction	No distraction
For ingroup	206.4	207.5	204.0	206.8
For outgroup	200.6	196.5a	204.8	207.6b
INGROUP BIAS	5.8	11.0#	-.8	-.8

1) The numbers of subjects were 16, 16, 31, and 32 in salient/distraction, salient/no distraction, non-salient/distraction, and non-salient/no distraction condition respectively.
2) Different subscripts denotes means which are significantly different (Duncan's test, $p < .05$, two-tailed).
3) # denotes that the figure is significantly different from zero on ingroup bias ($p < .05$, two-tailed).

Table 3.4 Rating bias on the differential and non-differential dimensions

	Distraction		No distraction	
dimension	Salient	Non-salient	Salient	Non-salient
Differential*	.24	-.04	.07	.28
Non-differential **	.05	-.02	.03	.27#

* The averaged score on the three most differential dimensions.
** The averaged score on the other seven dimensions.
1) The figure indicates ingroup bias. The higher the number, the more in favour of ingroup.
2) # denotes the figure is significantly different from zero ($p < .05$, two-tailed).
3) The number of subjects in each cell is, from left to right, 15, 27, 18, and 31.

Table 3.5 Ingroup bias in preference of the person as a friend

	Distraction		No distraction		*F* value		
	Salient	Non-salient	Salient	Non-salient	distraction	salience	interaction
Relative preference	.53	.50	.17	.18	1.25	.00	.01

1) The number of subjects in each cell is, from left to right, 17, 30, 18, and 33.
2) Total mean across conditions was .37, and bigger than zero ($p < .05$).

Relation to group membership salience The relationship between group membership salience check items and the dependent measures was examined (see Table 3.6). There was a significant positive correlation, in the no distraction condition, between ingroup bias in total points and check 2. Meanwhile, the coefficient in the distraction condition for check 2 was not significant, though as high as in the no distraction condition. If one takes only statistical significance of the coefficients as a criterion, this finding supports prediction 6 (that the more distracted subjects are, the less strongly group membership salience will be related to allocation ingroup bias). Similarly, overall pattern of coefficients also matches prediction 7 (that distraction will

not affect the relationship between rating ingroup bias and group membership salience), though it is not necessarily clear-cut. Thus, no significant relation was found between the degree of group membership salience and the rating index in the distraction conditions. Nor was the relation found in the no distraction condition.

Further investigation The ten rating scales were factor analysed (see Table A3.2.2 in Appendix 3.2). Four factors were extracted on the basis of eigenvalues (2.19, 1.47, 1.33, and 1.14; 21.9%,14.7%, 13.3% and 11.4% of the total variance was explained respectively). The check items were also factor analysed and two factors formed (see Table A3.2.3 in Appendix 3.2).

The first factor for the check items consisted of subjects' self-reported "difficulty" and "confusion", and the second factor of "group thoughts in allocation" and "concentration". It can be said that while the first factor involves "task quality", the second factor concerns "subjects' involvement".

Pearson's correlation coefficients between scale scores on the basis of these factors are shown in Table A3.2.4 (Appendix 3.2). The "subjects' involvement" factor score was moderately correlated with the first rating factor scale score (r =.40, p <.01), and the "task quality" factor score negatively with the second factor scale score (r =-.30, p <.05). Thus, the more subjects were involved in the task, the more they showed ingroup bias in rating dimensions of generosity, honesty, and warmth; the more subjects felt the task difficult/confusing, the less were they biased in rating dimensions of friendliness and trustworthiness.

Note that the both of the correlations contradict the assumption that evaluative ratings reflect the automatic process because the results may be understood in such a way that the more subjects thought, and the less the tasks made them confused, the more bias they showed on some of the ratings. The reason for this is unclear. Therefore, these rating dimensions will be included in the main study to see whether or not the results can be replicated.

Table 3.6 Correlations between dependent variables and salience

	Distraction		No distraction	
variables	check2	check3	check2	check3
Bias in total points#	.24	-.16	.26*	.11
	(47)	(42)	(50)	(48)
Rating bias	.10	.24	-.21	.19
	(44)	(40)	(51)	(49)
Differential ratings	.14	.12	-.19	.07
	(49)	(44)	(49)	(47)
Sociometrical index	.08	-.07	-.23	.15
	(49)	(44)	(51)	(49)

Spearman's coefficients. Figures on the other lines are Pearson's correlation coefficients

1) The indices are arranged so that the positive coefficient means positive relation between group membership salience and ingroup bias. Check 2 and 3 respectively concern thinking about groups in the point allocation and the ratings.

2) * denotes the figure is significantly different from zero ($p < .05$, one-tailed)

3) The figure in brackets is the number of subjects used to calculate the coefficient.

Discussion

Predicted effects The main results were that a) ingroup bias in total points allocated was greater when group membership was salient, b) distraction reduced this ingroup bias though non-significantly, and c) neither distraction or salience had any effect on rating bias although the overall level of rating bias was significant. The first and second results moderately support predictions 3 (that allocation ingroup bias will be greater when group membership is salient than non-salient) and 5 (that allocation ingroup bias will be less in the distraction than the no distraction conditions, under group membership salience). While the third result fail to support prediction 2 (that rating ingroup bias will be greater in the distraction than the no distraction conditions), but supports predictions 1 (that rating bias will appear in all

conditions) and 4 (that group membership salience will not affect ingroup bias on the rating indices).

On the relationship between salience and dependent measures, there were different predictions for the point allocation indices and the rating indices, in the distraction and the no distraction conditions. The results of one of the two check items for group membership salience (check 2) provided moderate support for predictions 6 (that the more distracted subjects are, the less strongly group membership salience will be related to allocation ingroup bias) and 7 (that distraction will not affect the relationship between rating ingroup bias and group membership salience), while further investigations were not necessarily consistent. Thus, the results for the predictions were mixed and inconclusive. Meanwhile, the manipulation check items did not confirm the expected differences among the conditions, and some items were thought to be confounded. So, it is not clear if the mixed results can be ascribed to either inappropriate measures, the unsatisfactory experimental manipulations, or the erroneous predictions.

Measurement Judging from all these, it is too early to say whether the indices are measuring what they are supposed to measure. There is, especially for the rating indices, some doubt about the sense in treating them as a single measure across dimensions responsible for the category differentiation process. Meanwhile, ingroup bias in total points provided satisfactory evidence to suggest that the point allocation index measures the social identity process fairly well. Although the type of point allocation tasks used in the pilot study did not allow it, examination of different strategies indicated by the "pull" scores on Tajfel's matrices will be fruitful in future studies, so as to check further validity of the motivational assumptions.

Another issue of measurement involves rating scales. Six-point scales were used in the pilot study to avoid a tendency for "mid-scale point response" among Japanese samples (Hayashi, 1988). However, it could be

said that this scale type might have induced forced discrimination. To check this possibility, it is desirable to use seven-point scales in the main studies.

The experimental procedure There are several points to be improved in the experimental procedure. First, in the pilot study, anonymity of the subjects was partly violated in the salient group membership condition. Thus, subjects, it is assumed, knew who were in their and the other groups (in other words, group membership) though they did not know the others' personal numbers. An alternative salience manipulation should be devised, to ensure anonymity and more stringent control. Related to this, it is not clear, from the manipulation checks, if the manipulation of group membership salience was successful or not. It is necessary to introduce better indices to check group membership salience, as well as distraction.

In the pilot study, explanation of tasks was provided in the dependent measure booklet, and it may be that not all subjects read the instructions properly. In the main experiments, the instructions will therefore be provided separately from the dependent measure booklet.

A further administrative drawback of the pilot study was the length of the procedure. Each session took about one hour to complete. Since the length of the session may not only affect subjects' general motivation but also may interfere with the distraction manipulation (the averaged proportion of correctly copied italics was rather low: 45.8%), it is desirable to reduce the length, and number, of tasks.

3.3 Experiment 1: Method

Considering the results of the pilot study, the following procedure was adopted. The main differences between the pilot study and Experiment 1 concern the manipulation of group membership salience, dependent measures, the length of the experimental session, and a distracting task.

Subjects and design

Ninety two, 12-13 year old boys and girls (42 male and 50 female) from a grammar school in Kent, England, participated in the experiment in a 2 (distraction *vs.* no distraction) x 2 (salient *vs.* non-salient group membership) between-subjects factorial design. Subjects were randomly assigned to each of the four experimental conditions.

Procedure

The experiment was conducted in four classrooms simultaneously. The procedure within each classroom corresponded to one of the experimental conditions. Subjects were randomly assigned into one of the classrooms. An experimenter and an assistant, a teacher of the school, administered the session in each condition.[8] The procedure of each condition was as follows:

1) General instructions General instructions introduced the experiment as research on decision making, and emphasised that subjects should keep quiet and should work by themselves (see Appendix 3.3 for detail). At this point, a dependent measure booklet, an explanation sheet, one large and one small envelope, and a black ball-point pen were placed on each of the desk where subjects were seated.

2) Manipulation of social categorisation First of all, subjects drew a lot per person from a box while the experimenter and the assistant were walking around with the box. The lot gave subjects a personal code number and a name of the group to which they were to be assigned. The numbers were all unique and none appeared in the dependent measure booklet or the explanation sheet. The group name was either "red" or "blue". (It was found later that 47 subjects took the "red" lot and 45 took the "blue" lot.) Subjects were told to keep the number and the group name secret.

---

[8] The experimenter was a British male in the distraction/salient and the no distraction/non-salient condition respectively; and was a British female in the no distraction/salient and the distraction/non-salient condition respectively.

Subjects put the lot into the small envelope, and wrote down the number and the group name on the first page of their dependent measure booklet. Group membership salience was manipulated at this point. Subjects in the salient conditions were told that the lots were to divide them into two groups, and a poster in front of the classroom was used to illustrate that roughly half of the subjects were in the "red" group, and the other half the "blue" group (see Appendix 3.4). In addition, anticipation of competition between the groups was induced for these conditions. That is, they were informed that they were going to make a team with the people of the same group, and going to play a game independently within the team in order to decide which group performed best. Meanwhile, subjects in the non-salient conditions were told that the lots were just for convenience of the research and protect their privacy. In these conditions, no explanation was given as to how they were divided, nor were they informed of competition.

Both during the explanation of the task and while subjects were completing the booklet, group membership salience was reinforced continually in the salient conditions. Firstly, every group name in the booklet and the posters were "outlined" and coloured with red and blue according to the group names. Secondly, these subjects were asked to fill in their group membership at the top of every page of the booklet. In the non-salient conditions, on the other hand, group names were not emphasised, and were mentioned minimally in the booklet. Non-salient condition subjects filled in their initials at the top of every page instead of their group names.

3) Explanation of the tasks The dependent measure booklet consisted of two main parts: point allocation tasks and rating tasks. The order of the two tasks was counter-balanced within each experimental condition. The experimenter explained how to do the two tasks, using two posters. Each poster contained one example from either of the two tasks. The examples and

KENT
TEMPLEMAN
LIBRARY
UNIVERSITY

explanations were given also on the explanation sheet provided to subjects (see Appendix 3.5).

In the distraction conditions, an extra task was then introduced. The booklet in these conditions contained italic letters throughout the two main tasks.[9] The extra task was to find, and to circle, the letters as soon as subjects came across them while filling in the dependent measure booklet. Subjects in the distraction conditions were also informed that there was only just enough time to complete the booklet. In the no-distraction conditions, no such mention was made of time.

4) Completion of the dependent measure booklet and debriefing

Subjects took about 15 minutes to complete the booklet in each condition. After every subject had finished the booklet, they were asked to put all documents into the large envelope and to write down their sex on it. They were debriefed at the end of the experiment.[10]

Dependent measure booklet

The booklet consisted of two main parts and the other (see appendix 3.6). The main parts were the point allocation task and the rating task.

The point allocation task This task was to give points to a pair of anonymous people, one from the "red" group and the other from the "blue" group, by choosing a pair of points on a matrix. Subjects completed six matrices. Each of the six matrices was for a different pair of people, who were identified only by group membership and a code number. These matrices are classified into three types: F *vs.* MD•MIP; MD•MIP *vs.* MJP; and MD *vs.*

---

[9] Fourteen letters were italicised in the point allocation tasks and ten in the rating tasks. It is difficult to assess the effects of this difference in number because the nature of the two tasks are different.

[10] In the debriefing section as far as the distraction/non-salient condition is concerned, no subject could guess the real purpose of the experiment. One subject expressed that he thought the experiment was something about mathematics. Concerning the distraction manipulation, only one subject expressed that finding italic letters was difficult.

MJP•MIP.[11] Here, the symbols in capital letters correspond to each of the allocation strategies defined in Tajfel (1978): F stands for fairness, MD for maximum difference, MIP for maximum ingroup profit, and MJP for maximum joint profit. Matrix types used in the study are shown in Fig. A3.7.1 (Appendix 3.7). There were two sub-types for each matrix type. These sub-types were identical, within a matrix type, in terms of combinations of points. The difference between the sub-types was which of the two rows was for an ingroup member and for an outgroup member. For the sub-types $[^{in}_{out}]$, the first row was for an ingroup member and the second for an outgroup member; for the sub-type $[^{out}_{in}]$, the first row was for an outgroup member and the second for an ingroup member.

The actual combinations of digits in the matrix types were taken from Abrams' (1985) study, and are displayed in Fig. A3.7.1 (Appendix 3.7). The matrices appeared in the same order for every subject in the dependent measure booklet (see Appendix 3.6). However, note that one matrix can be either subtype $[^{in}_{out}]$ or $[^{out}_{in}]$, depending upon subject's group membership.[12] Subjects were told to imagine that each point stood for one pence.

See Appendix 3.7 for full explanations of each matrix type in terms of the allocation strategies defined in Tajfel (1978).

The rating task Subjects were asked to indicate his/her ratings, first, of the "red" group members, then of the "blue" group members, on a series of seven-point bipolar adjective scales. On the basis of the pilot study, five adjective pairs were selected. These were:

---

[11] Throughout the thesis, "matrices" refer to the actual material appeared in the order in the dependent measure booklet, while "matrix types" refer to those with ingroup-outgroup correction.

[12] Thus, for the subjects who were assigned to the "red" group, the order of the matrix types was: 1. A^{out}_{in}, 2. B^{in}_{out}, 3. C^{out}_{in}, 4. A^{in}_{out}, 5. B^{out}_{in}, and 6. C^{in}_{out}, whereas for the subjects who were assigned to the "blue" group, the order of the matrix types was: 1. A^{in}_{out}, 2. B^{out}_{in}, 3. C^{in}_{out}, 4. A^{out}_{in}, 5. B^{in}_{out}, and 6. C^{out}_{in}.

a. warm–cold
b. dishonest–honest
c. friendly–unfriendly
d. untrustworthy–trustworthy
e. generous–selfish

Other dependent variables The booklet contained other items.

a) Preference for the person as a friend Subjects were asked to indicate how much they want to make friends with both ingroup members and outgroup members. This item was immediately after the rating task, followed by the next item.

b) Importance of the rating items Subjects were asked to choose one concept which distinguished the two groups most, out of five concepts which correspond to the five adjective pairs: warmth, honesty, friendliness, trustworthiness, and generosity.

c) Self-reported strategies in the point allocation task Immediately after the allocation tasks, followed the questions on the criteria/strategies that subjects used in the point allocation tasks. These were concerned with subjects' intentions in the point allocations in terms of fairness, joint profit, ingroup profit, group win, etc., in 7-point scales (how much did you try to do each of the things?: 1 very much–7 not at all). Subjects' normative justification of their allocation criteria/strategies was also asked in a 7-point scale (how much do you think what you tried to do is what people like your parents or teachers would want you to do?: 1 very much–7 not at all).

d) Collective self-esteem A collective self-esteem scale was included towards the end of the booklet. Sigger's (1992) Collective Self Regard scale was utilised instead of Luhtanen & Crocker's (1991) because Sigger's (1992) scale is assumed, and has been constructed, to measure transitory self-esteem as a group member instead of chronic self-esteem. This scale is suitable for the purpose of the present experiment with the minimal group situation since the

nature of the minimal group is temporary, and *ad hoc*. It was placed before the manipulation check items for half of the subjects in each condition, and after them for the other half.

Manipulation check items Manipulation check items included checks for group membership salience and distraction.

a) Group membership salience Group membership salience check items were:

- "When you gave points to people, how much did you think about your own group?" (1 very much–7 not at all); and
- "When you gave your views about the other group, how much did you compare it with your own group?" (1 very much–7 not at all).

b) Distraction Distraction manipulation check items were:

- "How much did you concentrate on the questions when you answered them?" (1 very much–7 not at all); and
- "How much were you distracted when you answered to them?" (1 very much–7 not at all).

c) Others The other check items were:

- "How difficult did you think the task was" (1 very much–7 not at all); and
- "How difficult was it to find the italics?": for the distraction conditions, or "How difficult was it to answer the questions?": for the non-distraction conditions (1 very difficult–7 not at all).

3.4 Experiment 1: Results

Manipulation checks

Distribution of subjects 24, 22, 23, and 23 subjects were assigned respectively to the Distraction/Salient, Distraction/Non-salient, No distraction/Salient, and No distraction/Non-salient conditions. These numbers are displayed in Table A3.8.1, along with the distribution of the

booklet versions and the division into the "red" and the "blue" groups. Chi squares of every combination of the independent variables were examined, showing no indication of dependency.

Experimental manipulations For the group membership salience, subjects' self-report did not significantly differ between the salient and the non-salient conditions on the two items "thinking about group membership in allocation" and "group comparison in ratings" (see Table 3.7).

As another manipulation check for group membership salience, temporal group esteem was measured by Sigger's (1992) Collective Self-Regard (CSR) scale. Analyses of this scale score showed interesting interactions between salience and other variables (see Table 3.8). Firstly, a 2 (distraction) x 2 (salience) ANOVA on CSR scale score produced a marginally significant interaction effect between distraction and salience [F (1,86)=3.52, p < .075]. While group esteem was higher in the distraction than the no distraction conditions when group membership was not salient, it did not differ between the conditions when group membership was salient.

Secondly, the interaction effect between salience and order of the scale was marginally significant [F (1,86)=3.37, p < .075]. The order of the scale is whether CSR scale was placed before or after the other manipulation checks (CSR-checks *vs.* checks-CSR). This factor was not originally in the experimental design, but was incorporated to counter-balance any possible item order effects. The interaction effect was perhaps caused by the higher value in the salient/CSR-check condition.

It can be argued that these interaction effects show interference of the two variables with the outcome of group membership salience, rather than failure to manipulate group membership salience itself. The first reason is that the manipulation check of salience does not actually measure salience, but its psychological impact (end-result): collective self-regard. Recall that salience is defined with the characteristics of the setting rather than its psychological

impact. A second reason is that the psychological impact of salience is thought to be moderated by the above variables: distraction and the order of measurement. Distraction is hypothesised to impede the social identity process for which group membership salience lays the foundation; engagement first in manipulation check items (in the order, CSR-checks) is assumed to make subjects reflect on the experimental procedure and dissociate themselves from the situation, including the group setting.

Therefore, a better index of group membership salience manipulation might be its outcome when distraction and the order effect did not come into play. Thus, supplementary analysis was conducted for the subjects who were not distracted and whose temporal group esteem was measured before the other check items (*i.e.* the CSR-checks/no distraction cells). This analysis revealed that temporal group esteem was somewhat higher in the salient than the non-salient conditions, corroborating the effect of the salience manipulation [Ms = 44.09 and 36.09 respectively, n = 11 for both; F (1,21) = 3.61, $p < .075$].

For the distraction manipulation, the expected results were obtained. First, subjects did engage in the distraction task in the intended manner in each distraction condition. Out of 46 subjects in the distraction conditions, all subjects circled more than half of the italic letters embedded in the rating tasks, and 45 subjects circled more than half of the embedded italic letters in the point allocation tasks. The remaining one subject also circled some of them. Second, subjects in the distraction conditions reported being distracted more than those in the no distraction conditions [Ms = 3.04 and 2.40 respectively on a scale ranging from 1 (not at all) to 7 (very much); F (1,86) = 4.19, $p < .05$]. There was no difference in the subject's concentration on the tasks among conditions. The item to check subject's concentration on the tasks was, at first, meant to measure another aspect of the distraction manipulation.

However, concentration seems to differ in content from distraction.[13] As an afterthought, this item does not serve as a distraction manipulation check.

The variables other than the experimental ones were found to have had influence on some of the dependent measures, but these variables did not have interactions with the experimental variables.[14] Thus, those variables were employed as covariates, when applicable, in the analyses reported hereafter.

Table 3.7 Mean score on group membership salience manipulation checks

items	Salient	Non-salient
Thinking-about-group in allocation		
Distraction	4.25 (24)	3.68 (22)
No distraction	3.26 (23)	3.59 (22)
Group comparison in rating		
Distraction	3.29 (24)	3.73 (22)
No distraction	3.56 (23)	4.04 (22)

1) The higher the number, the more salient (range 1-7).
2) The figure in brackets is the number of the subjects who completed the item.

[13] In the pilot study, a factor analysis on the check items formed two factors; and the "distraction" check item loaded heavily only on one factor, whereas the "concentration" check item did only on the other factor. The fact that subjects' (recognition of) concentration was not different among conditions excludes the possibility for distraction to have worked in an opposite way from what was intended. That is, were it not for the results pattern on the manipulation check, it could be argued that distraction actually had induced attention to the tasks in the distraction conditions due to difficulty of the task which had made subjects optimally motivated.

[14] The group division into the "red" group and the "blue" group correlated with some of, the self-reported strategy measures, the "pull" scores, and the rating bias scores. Booklet versions, either allocation-ratings or ratings-allocation, had influence on some of the "pull" scores. And finally, order of the CSR scale and the manipulation check items had effect on the CSR score as reported above.

Actually booklet versions had multivariate interaction effect with salience on self-reported strategy measures [F (8,77) = 2.36, $p < .05$]. However, no univariate interaction effect with salience was significant. Therefore, this effect was disposed of the way described in the text.

Table 3.8 Mean Collective Self Regard (CSR) scale score

variables	Salient		Non-salient	
Distraction				
Distraction	39.4	(23)	42.3_a	(22)
No distraction	40.1	(20)	36.7_b	(22)
Order of the CSR scale				
CSR scale – manipulation checks	43.1_a	(21)	39.3	(20)
Manipulation checks – CSR scale	36.9_b	(24)	39.5	(22)

1) The figure in brackets is the number of the subjects.
2) Different subscripts within the upper section and the lower section denotes means which are significantly different (Duncan's test, $p < .05$)

Point allocation indices

Total points One index of ingroup bias from the point allocation tasks is total points allocated to ingroup and outgroup members on the matrices. This index was subject to a 2 (salience) x 2 (distraction) x 2 (repeated measure: ingroup *vs.* outgroup) ANOVA. First of all, the main effect of ingroup-outgroup factor (repeated measure) was significant, showing overall ingroup bias [F (1,88) = 14.28, $p < .001$]. Secondly, the interaction effect between distraction and ingroup-outgroup factor (repeated measure) was significant [F (1,88) = 7.11, $p < .01$]. In the distraction conditions, the difference in total points between the groups was exaggerated compared with the difference in the no distraction conditions. Finally, the interaction effect between salience and ingroup-outgroup factor (repeated measure) was marginally significant, indicating that ingroup bias was emphasised in the salient conditions compared with the non-salient conditions [F (1,88) = 2.86, $p < .10$; see Fig. 3.1].

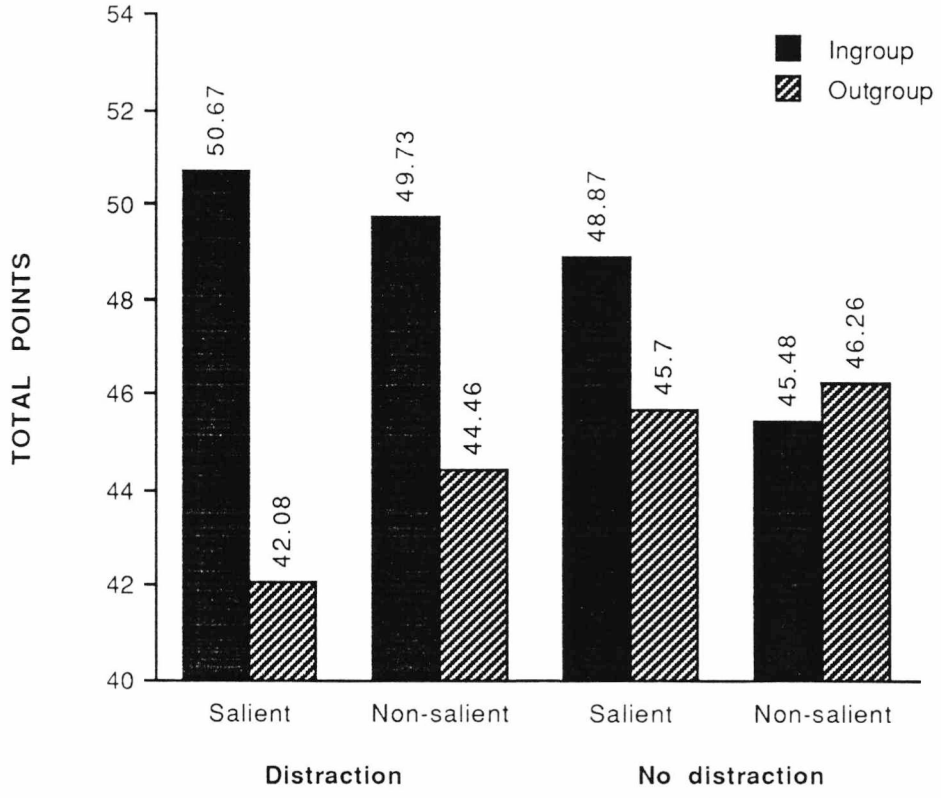


Fig. 3.1 Total points to ingroup and outgroup members by salience and distraction

* t (23)=5.33, p <.001; † t (21)=1.98, p <.10.

Pull scores Another type of indices from the point allocation tasks are "pull" scores. "Pulls" of strategies were calculated from the data on the allocation tasks following the description in Turner, Brown & Tajfel (1979).[15] The pull strategies considered in the present study were: maximising the

[15] Correlations between the relevant raw matrix score and the pull score was calculated and listed below for each of the strategies. All the correlations were large and significant (n = 92, p < .001, for all the correlations). The matrix scores were arranged so that the higher the correlation coefficient, the more it indicates consistency.

.68 between the [MD•MIP *vs.* F] matrix score & the pull of MD•MIP (on F)
.71 between the [MJP•MIP *vs.* MD] matrix score & the pull of MJP•MIP (on MD)
.55 between the [MJP *vs.* MD•MIP] matrix score & the pull of MJP (on MD•MIP)
.83 between the [MD•MIP *vs.* MJP] matrix score & the pull of MD•MIP (on MJP)
.84 between the [F *vs.* MD•MIP] matrix score & the pull of F (on MD•MIP)
.74 between the [MD *vs.* MJP•MIP] matrix score & the pull of MD (on MJP•MIP)

difference between ingroup and outgroup (MD), maximising ingroup profit (MIP), maximising total profit across ingroup and outgroup (MJP), and equal allocation (F).

The basic idea of the scoring is that the choice on the point allocation matrix represents the strategies according to the distance between the choice and each extreme of the matrix. Thus, the same choice is viewed from the strategies of either of the extremes. So, the choice is thought to be the mixture of the strategies of both ends. It is assumed that the pull scores can extract the extent of the strategy (or combination of the strategies sometimes) only of one extreme out of an amalgam of the strategies of both extremes. The pull score of MD (on MJP•MIP), for example, represents the strength of MD strategy against the mixture of MD, MJP and MIP strategies on the MD *vs.* MJP•MIP points matrices.

Six pull scores were calculated from the matrices of the present study (see Table 3.9). There was a significant effect of group membership salience on the MD (*vs.* MJP•MIP) pull score [F (1,85) = 5.58, $p < .05$]. Bias was higher in the salient (M = .77) than the non-salient (M = -.13) condition. There was also a significant interaction between salience and distraction on the F (*vs.* MD•MIP) pull score [F (1,85)= 6.93, $p < .01$]. When subjects were not distracted, the pull score of F (against MD•MIP) did not significantly differ between the salient and the non-salient conditions whereas it was larger in the salient condition than in the non-salient condition when subjects were distracted. Finally, the pull score of MD•MIP (against MJP) was larger in the distraction conditions than in the no distraction conditions [F (1,85) = 5.58, $p <$ .01]. The results of all the pull scores are shown in Table 3.9.

Table 3.9 The mean "pull" scores of each strategy

	Distraction		No distraction		*F* value		
"Pull"	Salient	Non-salient	Salient	Non-salient	distraction	salience	interaction
MD•MIP (on F)	.88#	.64	.91#	-.17	.82	2.69	.98
MD•MIP (on MJP)	$1.92^{\#}{}_{a}$	1.36#	$.30_{b}$	$-.09_{b}$	7.38**	.93	.06
MD (on MJP•MIP)	$1.08^{\#}{}_{a}$	-.09	.44	$-.18_{b}$	.55	5.58**	.71
MJP•MIP (on MD)	.42	.73	.78	-.09	.20	.79	1.89
F (on MD•MIP)	$3.79^{\#}{}_{a}$	$1.55^{\#}{}_{b}$	$2.65^{\#}{}_{a}$	3.18#	.17	1.86	6.93**
MJP (on MD•MIP)	-.50	.00	.22	.00	1.04	.10	.80

1) # denotes the figure is significantly different from zero point ($p < .05$, two-tailed)
2) Different subscripts on a line denotes means which are significantly different (Duncan's test, $p < .05$).
3) *F* value: * $p < .05$, ** $p < .01$; $df = 1/85$ for all effects. Group division and booklet versions were entered as covariates.

Rating indices

Ingroup bias in each rating dimension Rating bias was calculated by subtracting the outgroup rating score from the ingroup rating score for each dimension.[16] A multivariate analysis of variance revealed a significant multivariate main effect of distraction [F (5,81)=3.12, $p < .05$]. For two of the five scales (trustworthiness and generosity), the univariate main effect of distraction was significant, indicating that subjects in the distraction conditions showed more ingroup bias than in the no distraction conditions [F (1,85)=11.52, $p < .01$; F (1,85)=8.56, $p < .01$]. Means of the rating indices are shown in Table 3.10.

[16] This index was arranged for this analysis such that the higher the score the more positive (warm, honest, friendly, trustworthy, and generous) the value indicates. The same MANOVA, and ANOVAs were conducted on distance between the ratings for ingroup and outgroup for each dimension, *i.e.* absolute value of the bias, showing no significant multivariate or univariate effects (see Table A3.8.2).

The summed score of the ingroup bias across five rating scales showed the same tendency as in the individual rating bias indices: the main effect of distraction was significant [F (1,85)= 4.53, $p < .05$, see Table 3.11]. The grand mean (and *SD*) was 1.98 (6.61), significantly larger than zero (two-tailed).

The most differential dimension in ratings[17] Rating bias on the most differential dimension (as chosen by the subject) and the mean rating bias of the other four dimensions were subject to a 2 (salience) x 2 (distraction) x 2 (dimensions: repeated measure) ANOVA. Only the main effect of dimensions (repeated measure) was significant, indicating that ingroup bias on the most differential dimension was stronger than the bias on the other dimensions [F (1,80)=6.21, $p < .05$; see Table 3.12].

Preference rating of the person as a friend The preference score was calculated by subtracting the preference rating of outgroup members as a friend from that of ingroup members. A 2 (salience) x 2 (distraction) ANOVA on this index showed the same tendency as in the other rating indices. That is, when subjects were distracted, they preferred ingroup members to outgroup members more than when they were not distracted [F (1,89)=4.04, $p < .05$; see Table 3.13].

---

[17] 19, 9, 25, 16, and 15 subjects chose respectively warmth, honesty, friendliness, trustworthiness, and generosity as the most differential dimension.

Table 3.10 Mean rating bias on each dimension

"Pull"	Distraction		No distraction		*F* value		
	Salient (n =24)	Non-salient (n =21)	Salient (n =23)	Non-salient (n =22)	distraction	salience	interaction
Warmth	.08	1.19#	.22	.32	1.09	2.98 †	2.09
Honesty	.21	.91#	.44	.14	.51	.25	2.02
Friendliness	.29	.57	-.13	.59#	.29	2.02	.47
Trustworthiness	.83#a	1.00#a	-.30b	-.09b	11.52**	.29	.01
Generosity	.75#	1.24#a	-.13b	.00b	8.56**	.73	.24

1) The figure indicates ingroup bias. The more, the more in favour of ingroup.
2) # denotes the figure is significantly different from the neutral point zero ($p < .05$, two-tailed).
3) Different subscripts on a line denotes means which are significantly different (Duncan's test, $p < .05$).
4) *F* value: $^{\dagger}p < .10$, $^{*}p < .05$, $^{**}p < .01$; df =1/85 for all effects. Group division was entered as a covariate.

Table 3.11 Mean sum score of ingroup bias in ratings

	Distraction		No distraction		*F* value		
	Salient	Non-salient	Salient	Non-salient	distraction	salience	interaction
Ingroup bias	2.17	4.90a	.09b	.95	4.53*	1.60	.43

1) The figure indicates ingroup bias. The more, the more in favour of ingroup.
2) Different subscripts denotes that means which are significantly different (Duncan's test, $p < .05$).
3) *F* value: $^{*}p < .05$, df =1/85 for all effects. Group division was entered as a covariate.

Table 3.12 Rating bias on the most differential dimension and the others

dimension	Distraction		No distraction	
	Salient (n =22)	Non-salient (n =20)	Salient (n =22)	Non-salient (n =20)
The most differential	.77	1.05	.59	.60
Mean of the others	.40	$.99_a$	$-.21_b$	$.08_b$

1) The figure indicates ingroup bias. The more, the more in favour of ingroup.
2) Different subscripts on a line denotes means which are significantly different (Duncan's test, $p < .05$)

Table 3.13 Ingroup bias in preference of the person as a friend

	Distraction		No distraction	
	Salient	Non salient	Salient	Non salient
Ingroup bias in preference	$.61^{\#}$	$.91^{\#}{}_a$	$.00_b$	.36

1) The figure indicates ingroup bias. The more, the more in favour of ingroup.
2) # denotes the figure is significantly different from zero point ($p < .05$, two-tailed)
3) Different subscripts on a line denotes means which are significantly different (Duncan's test, $p < .05$)

Comparing the allocation indices and the rating indices

In order to extract comparable measures of the point allocation indices and the rating bias indices, factor analyses were conducted on the pull scores and the ingroup bias scores in ratings.

Factors from the pull scores The six pull scores were subject to a principal-components analysis. Three factors were extracted on the basis of eigenvalues (1.65, 1.23, and 1.00 respectively; 27.5%, 20.9%, 16.7% of the total variance was explained respectively), and obliquely rotated. The factor loadings are shown in Table 3.14. The first factor seems to correspond to the

competitive choices against outgroup. Therefore, we could consider the score of this factor as a representative measure of ingroup bias from the point allocation tasks.

Factors from rating bias The five ingroup bias scores in ratings were subject to a principal-components analysis. The five items formed a single factor (eigenvalue for the factor was 3.20; 64.1% of the total variance was explained by the factor). The factor loadings are shown in Table 3.15. As the factor covers all the dimensions, we could treat the score of this factor as a representative measure of ingroup bias from rating tasks.

Comparison between the pull and the rating factor scores A 2 (salience) x 2 (distraction) x 2 (indices: repeated measures) ANOVA on the first factor scores for pulls and ratings produced a significant main effect of distraction and an interaction effect between salience and indices [F (1,86)= 7.86, $p < .01$; F (1,86)=6.64, $p < .05$].

Table 3.16 shows mean factor scores by distraction and salience. Subjects showed more ingroup bias when they were distracted than when they were not, confirming the general tendency obtained in the previous analyses. More importantly, however, the significant interaction effect between salience and indices indicates different sensitivity of the two indices to group membership salience. Namely, the allocation index was larger in the salient conditions than in the non-salient conditions while the reverse was true for the rating index [F (1,88)=4.96, $p < .05$; F (1,86)=4.78, $p < .05$].

Comparison of the raw scores Because dependent variables for the above analysis were factor scores of the indices, the results only show the relative degree of ingroup bias among the conditions. Thus, in order to compare the pull index and the rating index for their absolute level of ingroup bias, average scores across the raw indices that mainly constituted the factors were calculated for both indices. Although this comparison may involve some psychometric problems, these measures are comparable at least

in light of their range, mean, and variance.[18] Fig. 3.2 shows the mean scores for the both indices.

These indices were subject to a 2 (salience) x 2 (distraction) x 2 (indices: repeated measures) ANOVA.[19] Firstly, the main effect of distraction was significant, indicating that distraction caused stronger ingroup bias both for the allocation and the rating indices [F (1,85)=8.07, $p < .01$]. Secondly, the interaction effect between salience and indices was significant, confirming the results of the factor scores [F (1,86)=8.88, $p < .01$]. Comparison between the indices suggested that ingroup bias was stronger in the allocation index than in the rating index when group membership was salient [Ms=.93 and .23; t (46)=2.82, $p < .01$]. Meanwhile, ingroup bias between the allocation and the rating indices did not differ significantly when group membership was not salient, and correlation between the indices was moderately high [Ms= .22 and .58; t (42)= -1.46, *n.s.*; r = .42, $p < .01$]. Furthermore, the allocation index in the salient conditions was larger than that in the non-salient conditions [F (1,89)= 5.02, $p < .05$).

From these results, it can be argued that ingroup bias in the allocation index increased with group membership salience while ingroup bias in the rating index is not very much affected by group membership salience.

---

[18] Each of the individual pull scores ranges, in theory, from -6 to 6, and so does each of rating scores. Thus, we could compare directly the two indices. Specifically, the average pull score was calculated from the pull scores of MD•MIP (on MJP), MD•MIP (on F), and MD (on MJP•MIP). These correspond to the first factor of the pulls. The average rating score was calculated from the raw ingroup bias scores in warmth, honesty, friendliness, trustworthiness, and generosity. These five correspond to the rating factor score. The means (standard deviations) for the average pull score and the average rating score were, respectively, .59 (1.58) and .40 (1.32).

[19] Group division was entered as a covariate.

Table 3.14 Factor loadings of the "pull" scores

"pulls"	Factor 1	Factor 2	Factor 3
MD•MIP (on MJP)	.822		
MD•MIP (on F)	.663		
MD (on MJP•MIP)	.564		
MJP•MIP (on MD)		-.835	
F (on MD•MIP)		.735	
MJP (on MD•MIP)			.943

1) The figure is the factor loading of the item. Absolute loading value less than .30 are omitted.
2) 65% of the total variance is explained by the three factors.
3) Correlation coefficients between the first factor score and the second, the second with the third, the third with the first were, respectively, -.08, -.06, and -.13 (all *n.s.*) .

Table 3.15 Factor loadings of ingroup bias score in ratings

Ingroup bias dimensions in ratings	Factor 1
generosity	.866
warmth	.816
trustworthiness	.813
honesty	.809
friendliness	.688

1) The figure is the factor loading of the item.
2) 64.1% of the total variance is explained by the factor.
3) Cronbach's alpha for the five items were .86 (n=90).

Table 3.16 Mean factor scores for allocation bias and rating bias

	Distraction		No distraction	
	Salient	Non-salient	Salient	Non-salient
Index	(n =24)	(n =21)	(n =23)	(n =22)
Allocation bias (factor score)	$.39_a$	.04	-.04	$-.46_b$
Rating bias (factor score)	.03	$.45_a$	$-.28_b$	$-.16_b$

1) The figure indicates ingroup bias. The more, the more in favour of ingroup.
2) Different subscripts on a line denotes means which are significantly different (Duncan's test, $p < .05$)

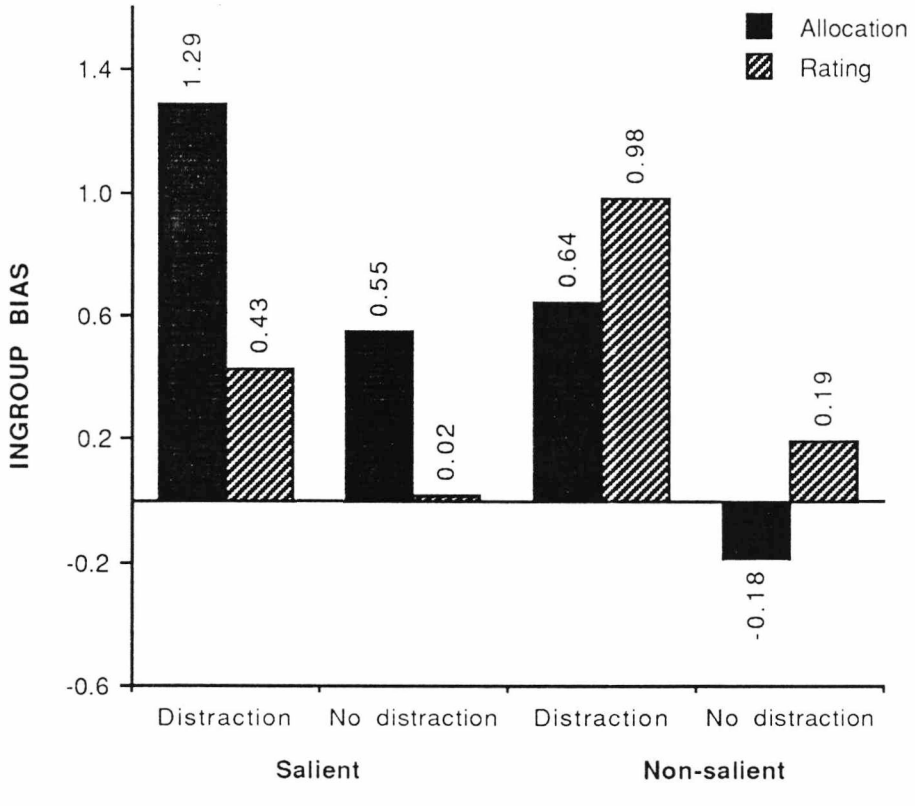


Fig. 3.2 The average raw scores for the rating bias and the allocation bias indices

Validity of the indices — on cognitive measures

The following analyses concern the assumption that allocation indices correspond to the intentional process of social identity, and the rating indices to the automatic process of category differentiation.

Self-reported intentions in point allocation First of all, preliminary analyses were conducted to check how various allocation intentions were distributed across the conditions. There were no significant differences among the conditions in the self-reported intentions in point allocation except for one item (*i.e.* "self-interest": see Table 3.17). On this intention, subjects reported self-interested allocation more in the distraction conditions than in the no distraction conditions. Note, however, that the values were in any case well below the neutral point.

Relation with group membership salience The relationship between ingroup bias in different indices and group membership salience was explored in several ways.

Collective self-esteem scale score Collective self-esteem (as measured with CSR scale) was examined as an index of group membership salience. Correlation coefficients were calculated among the CSR scale score and the allocation and the rating indices for ingroup bias (Table 3.18; see footnote 18 for the ingroup bias indices).[20] When subjects were not distracted, there were significant correlations between the CSR scale score and the ingroup bias indices whereas correlation between the ingroup bias indices was not significant. Meanwhile, when subjects were distracted, correlations between the CSR scale score and the ingroup bias indices were not significant while correlation between the ingroup bias indices was significant.

---

[20] In this analysis, group division (red or blue), booklet versions (task order: rating - allocation, or allocation - rating), and order of the CSR scale (manipulation checks - CSR, or CSR - manipulation checks) were used as concurrent control variables. Therefore, correlation coefficients reported here are partial correlation coefficients.

Thinking about group membership As indices of group membership salience, check items for thinking-about-group-membership were examined. Correlations between the amount of thinking-about-group-membership and ingroup bias indices in allocation and rating were calculated (Table 3.19). The most noticeable difference between the distraction and the no distraction conditions is that whereas the allocation index correlated significantly with the amount of thought devoted to the ingroup in the distraction conditions, it did not in the no distraction conditions. The rating index correlated significantly with the amount of thinking-about-group-membership in both of the conditions, though to a lesser degree compared with the allocation index in the distraction conditions. This seems to show, against the expectation of the study, that 1) the point allocation index detected the intentional process of ingroup bias when subjects were distracted while 2) the rating index reflected the intentional process fairly well regardless of distraction.

Relationship with the corresponding check items The pull scores were examined for their correspondence to the check items both in the distraction and the no distraction conditions.

Correspondence between allocation strategies and intentions To check how the pull scores reflect the alleged intentions, correlation coefficients were calculated between selected pull scores and recognition of the corresponding intentions. Specifically, the pull scores of F (on MD•MIP), MJP (on MD•MIP), and MD (on MJP•MIP) were coupled, respectively, with recognition of Fairness, Joint profit, and Maximum difference (see Table 3.20). There seem to be differences among strategies in subjects' awareness of the strategies they took. The Fairness strategy was recognised more than the other strategies in all conditions, whereas subjects hardly seemed aware of the Joint Profit strategy. Interestingly, use of the Maximum Difference strategy was significantly correlated with subjects' self-reported strategy in the distraction conditions. This may reflect the pattern of point allocations

where subjects were more discriminatory when they were distracted, and it is consistent with the results on the amount of thought devoted to group membership.

Discrepancies Discrepancy between what subjects thought they tried to do and what they actually did was calculated by subtracting actual allocation measures from self-reported strategy measures. The absolute value was also obtained. The results were not very clear except that discrepancy for the Fairness strategy seems smaller than the other two strategies in the absolute value index. This tendency is partly consistent with the above analysis of correspondence (see Table A3.8.3 in Appendix 3.8 for detail).

Table 3.17 Self-reported strategies in point allocation

	Distraction		No distraction		*F* value		
Intentions	Salient	Non-salient	Salient	Non-salient	distraction	salience	interaction
Fair to each person	5.21#	4.36	4.78#	5.09#	.14	.56	2.71
Fair to each group	5.08#	4.64	5.09#	5.17#	.52	.23	.56
Self interest	3.33	2.95#	2.70#	2.09#	4.53*	2.60	.06
Group interest	3.58	3.18	2.87#	2.83#	1.64	.53	.37
Joint profit	3.75	3.77	3.61	3.78	.01	.53	.37
Feeling	3.79	3.36	3.04#	3.52	.57	.00	1.69
Relative group gain	3.00#	3.32	2.70#	2.61#	1.51	.05	.20
Nothing in particular	4.42	4.18	4.56	4.13	.02	.73	.05

1) The figure is arranged so that the more, the more of its intention subjects recognised (range 1-7).
2) # denotes the figure is significantly different from zero point ($p < .05$, two-tailed).
3) *F* value: * $p < .05$; $df = 1/87$ for all effects. Group division was entered as a covariate.

Table 3.18 Correlations between Collective Self-Regard (CSR) scale score and the allocation and the rating indices for ingroup bias

	Partial correlation coefficient	
	The allocation index	The rating index
Whole sample (df = 79)		
CSR scale score	.24 *	.23 *
The rating index	.30 **	
Distraction conditions (df = 37)		
CSR scale score	.17	.07
The rating index	.35 *	
No distraction conditions (df = 38)		
CSR scale score	.23 †	.34 *
The rating index	.11	

1) Correlations were calculated, controlled by group division, booklet versions, and order of CSR scale.
2) † $p < .10$, * $p < .05$, ** $p < .01$

Table 3.19 Correlations between thinking-about-group-membership and the allocation and the rating indices for ingroup bias

	Partial correlation coefficient	
	The allocation index	The rating index
Whole sample (df = 85)		
Thinking-about-group in allocation	.31 **	.33 ***
Group comparison in rating	.11	.22 *
Distraction conditions (df = 41)		
Thinking-about-group in allocation	.45 ***	.35 *
Group comparison in rating	.33 **	.24 †
No distraction conditions (df = 40)		
Thinking-about-group in allocation	.11	.25 †
Group comparison in rating	-.05	.25 †

1) Correlations were calculated, controlled by group division and booklet versions
2) The value of thoughts of groups is arranged so that the more, the larger the positive relation it shows with ingroup bias factor scores.
3) † $p < .1$, * $p < .05$, ** $p < .01$, *** $p < .001$

Table 3.20 Correspondence between point allocation strategies and subjects' awareness of them

	Partial correlation coefficient		
Strategy and its awareness	Distraction (df = 42)	No distraction (df = 42)	Whole sample (df = 88)
Fairness	.48 *	.58 *	.51 *
Joint profit	-.10	.13	.02
Maximum difference	.28 *	.04	.14 †

1) Correlations were calculated, controlled by group division and booklet versions, between subjects' awareness of each of the strategies and corresponding pull scores. The more, the more it shows correspondence between awareness of strategies and allocation strategies.
2) † $p < .10$; * $p < .05$

Sex differences

Although sex difference was not of interest in this study, in order to see its possible interaction effects with experimental variables, supplementary analyses were conducted concerning sex differences.

First of all, distribution of sex in each cell were not statistically dependent on either of experimental conditions (see Table A3.8.4 in Appendix 3.8). So, even if the sex have effects on dependent variables, it is thought that the effect are counterbalanced.

Multivariate analyses revealed significant multivariate main effects of sex on self-reported strategies, manipulation check items, and rating bias indices [F (8,81)= 2.45, $p < .05$; F (5,81)= 4.97, $p < .001$; F (5,81)= 2.65, $p < .05$: all with salience and distraction as covariates]. In particular, univariate analyses indicated that male subjects 1) thought themselves as more self-interested, more competitive and less fair to each group in the point allocation, 2) thought about their own group more, and felt the tasks easier, and 3)

favourably rated ingroup members compared with outgroup members, more than female subjects did so. Independent univariate analyses on preference bias and summed score in rating bias showed the significant main effect of sex, confirming the results pattern of rating bias [F (1,82)=4.21, $p < .05$; F (1,82)=7.82, $p < .01$: see Table A3.8.5 in Appendix 3.8].

No multivariate interaction effect between sex and experimental variables on any dependent variable was significant.

3.5 Discussion

The experimental manipulations of Experiment 1

From the analyses of the manipulation check items, the manipulations for both distraction and salience seem to have been successful. Subjects' group membership was more salient in the salient conditions than in the non-salient condition, and subjects felt distracted in the distraction conditions more than in the no distraction conditions.

For the manipulation of group membership salience, use of illustrative posters and colouring of the group names turned out well, as well as subtle administrative emphasis on groups by the experimenters. For the distraction manipulation, the italic letter finding task seems distracting at least enough to differentiate from the no distraction conditions. With regard to the manipulation checks for group membership salience, however, a measurement problem should be noted as discussed in the results section. Because group membership salience is a characteristic of the setting, perception of the setting is just an approximation. And it is problematic because this perception is thought to be vulnerable to the other independent variable: distraction.

Secondly, the results of the experiment corroborated the basic assumption that the minimal group situation produces ingroup bias among

the participants. In spite of the bare presence of the categories, many indices, especially rating indices, showed ingroup favouritism even in the non-salient conditions. This result is discussed later.

ANOVA approach

Rating indices There were, for ratings, five evaluative dimensions and one sociometric dimension. For both, ingroup bias score was calculated by subtracting outgroup ratings from ingroup ratings. The difference score seems to serve the purposes of the present study although ingroup and outgroup evaluations are claimed to have different functions (Crocker, Blaine & Luhtanen, 1993; Sigger, 1992). Because rating ingroup bias on the five dimensions formed a single factor in a factor analysis, the composite score seems to be a fairly reliable index.

This index, as well as individual rating bias indices, showed increased ingroup bias in the distraction conditions compared with the no distraction conditions. This pattern is consistent with prediction 2 (that rating ingroup bias will be greater in the distraction conditions than in the no distraction conditions). Though the grand mean was significantly larger than zero, this was not the case in all the individual conditions. So, it can be said that only limited support was obtained for prediction 1 (rating ingroup bias in all conditions). Finally, since there was no significant effect of salience for this and individual rating indices, prediction 4 (that group membership salience will not affect ingroup bias on the rating indices) was supported.

Point allocation indices Two types of index were calculated from the point allocation tasks. The first type was total points allocated to ingroup and outgroup members on the allocation matrices. The second type was the pull scores of allocation strategies. Several integrative indices of allocation ingroup bias were extracted on the basis of the factor analysis of the pull scores.

Unexpected results of distraction Across these indices, strong and consistent results were that distraction led to *increased* ingroup bias. And a weaker but also fairly consistent finding was that salience moderated the degree of ingroup bias. While the latter result is in line with prediction 3 (that allocation ingroup bias will be greater when group membership is salient than non-salient), the former result is completely the opposite of prediction 5 that anticipated decreased allocation bias in the distraction condition, and contradicts the results of the pilot study, Abrams (1985), and Hong & Harrod (1988).

One could argue that the unexpected results may be due to some sort of measurement problem. Namely, the point allocations may in fact result from automaticity, for some reason or other, just like the rating indices. This possibility is, however, not very plausible because the effect of distraction on allocation indices in all the three studies (Abrams, 1985; Hong & Harrod, 1988; and the pilot study) was the same, and also, the pilot study resembled the procedure of the present experiment quite well.

Another possible reason for the unexpected results may involve the degree of distraction. That is to say, the degree of distraction may have been, in fact, different between the pilot study and main experiment. As mentioned in Chapter 2, distraction is thought to prevent a person not only from investing intentional efforts to maintaining or enhancing self esteem, but also from all the other intentional processes, such as self presentation. Those other intentional processes are thought to introduce noise and "error" to the intentional process of social identity (General assumption 5b). So, if the degree of distraction deprives a person of only this idiosyncratic "error", the resultant discrimination will increase.

This reasoning is supported by the comparison of the manipulation check of distraction between this study and the pilot study. In the pilot study, the degree of distraction was around the neutral point (3.74 for the distraction

conditions and 3.31 for the no distraction conditions on the scale which was ranged from 1: not at all to 7: very much). The pilot study revealed increased discrimination on point allocations in the no distraction conditions. In contrast, Experiment 1 produced increased discrimination on point allocations in the distraction conditions where the degree of distraction was weaker than the neutral point (3.04 for distraction conditions and 2.40 for no distraction conditions on the same scale of 1: not at all to 7: very much). Self-reported distraction in the pilot study was significantly stronger than that of Experiment 1 [F (1,191)=11.45, $p < .001$].[21] In other words, subjects exerted strong bias on allocation indices when mildly distracted, and weak bias when strongly distracted, thus supporting the discussion above about the degree of distraction. Strictly speaking, however, we are not able to draw a conclusion, at this point, whether this explanation is true or not. In order to do so, we must be able to tell what intentional processes are eliminated at what degree of distraction. Investigation of the function of distraction to the various intentional processes is the subject of later studies.

Further investigation To test this idea of "noise", at least, as a phenomenon, a supplementary analysis was conducted using subjects' self-reported level of distraction. Three levels of distraction were created from subjects' self-report. On the 7-point scale (1 very much distracted–7 not at all distracted), subjects who marked on 1, 2, and 3 were categorised as the "strongly distracted" group, those on 4 and 5 as the "moderately distracted" group, and those on 6 and 7 as the "not distracted" group.

The same allocation and rating indices —the average of the three competitive pull scores and the average of the five rating bias scores— were subject, this time, to a 2 (salience) x 3 (self-reported distraction) x 2 (repeated

[21] Incidentally, the effect of the distraction manipulation on its self-report across the two studies was also significant [F (1,191)= 4.96, $p < .05$].

measure) ANOVA.[22] This produced a significant interaction effect between salience and repeated measure (F = 7.28, df = 1/83, p < .01). Separate 2 (salience) x 3 (distraction) ANOVAs for the allocation and the rating indices showed a marginally significant main effect of salience for the allocation index [F (1,82)= 3.38, p < .10], but no effect was significant for the rating index [F (1,82)= 1.65, *n.s.*]. The mean score of each index is shown in Table 3.21. Though not statistically significant, the hypothesised pattern was obtained on the allocation index. That is, when group membership was salient, subjects who were "strongly distracted" showed no ingroup bias in the allocation index, whereas subjects who were "moderately distracted" showed the strongest and significant ingroup bias, and lastly subjects who were "not distracted" showed moderate ingroup bias.

Consequently, it could be argued that the contradictory results with distraction between the pilot study and Experiment 1 were, perhaps, due to the differences in the degree of distraction between the studies. Although the reason for this pattern is not known yet, an intriguing phenomenon, it can be said, may be emerging from these data. An investigation into this phenomenon may be an interesting direction of the research.

[22] Both the pull score and the average ingroup bias in ratings varies in theory from -6 to 6. Therefore, we could tentatively treat the two indices as comparable indices.

Table 3.21 Ingroup bias by self-reported level of distraction

	Salient		Non-salient	
Allocation index				
strongly distracted	.47	(5)	.17	(6)
moderately distracted	1.29 #	(16)	-.04	(16)
not distracted	.80	(26)	.45	(20)
Rating index				
strongly distracted	.16	(5)	1.27	(6)
moderately distracted	.31	(16)	.16	(16)
not distracted	.19	(26)	.73 #	(20)

1) The figure in brackets is the number of the subjects.
2) # denotes the figure is significantly different from zero point ($p < .05$, two-tailed)

The effects of salience Prediction 3 about group membership salience on the point allocation indices was on the whole supported. Namely, both total points and the discriminatory pulls, especially the pull of MD against MJP•MIP, showed more ingroup bias in the salient conditions than in the non-salient conditions. This also constitutes a conceptual replication of the results in total points of the pilot study.

Together with the results of the rating indices, this pattern concerning the effect of salience on the rating and allocation indices is best summarised in Fig. 3.2: the allocation bias increased with group membership salience while group membership salience did not affect the rating bias. In short, predictions 3 and 4 concerning the effects of salience for the rating and allocation indices were both consistently supported.

Correlational approach

Prediction 6 concerning the relationship between group membership salience and allocation bias was supported with the CSR scale score (see Table 3.18). Namely, the allocation bias index was positively related with group

membership salience, measured by CSR, in the no distraction conditions while the relation was not significant in the distraction conditions.

On the other hand, the prediction was not supported with the check items designed to measure group membership salience directly. The results were reversed, and are consistent with the line of analysis above as to the degree of distraction. Namely, significant correlations were obtained in the distraction conditions but not in the no distraction conditions, between the amount of thinking-about-group-membership and the allocation bias index (see Table 3.19). This pattern supports the "noise" explanation. That is, it is considered that distraction eliminated other intentions in the distraction condition so that thoughts of ingroup favouritism emerged to be correlated with ingroup bias, while the other thoughts interfered with the thought of ingroup favouritism in the no distraction condition, thus failed to have clear correlation with the ingroup bias.

Furthermore, the positive correlation between the point allocation index and the rating index in the distraction conditions and its absence in the no distraction condition are understandable when taking account of the hypothesised elimination of "noise" intentions in the distraction conditions (Table 3.18). That is, "noise" intentions were thought to have blocked the output of the intentional process of social identity. Therefore, distraction may have facilitated the social identity process by eliminating noise intentions, leading the indices for ingroup bias to correlate in the distraction conditions.

The results were mixed for prediction 7 that distraction would not affect the relationship between the rating ingroup bias index and the degree of group membership salience. Thus, for the rating index, correlations with CSR scale score differed between the distraction and no distraction conditions. While there was no significant correlation in the distraction condition, a moderate correlation was found in the no distraction condition (Table 3.18). So, the results of correlation with CSR scale score are not

consistent with prediction 7. Meanwhile, correlation with salience check items seems to support prediction 7. That is, more or less the same correlation coefficients were obtained both in the distraction and the no distraction conditions (Table 3.19).

On these mixed results, two comments can be made. Firstly, it is difficult to interpret the results because prediction 7 was based on the tentative assumption that individual differences in vulnerability to group membership salience correlates with individual differences in the strength of category differentiation. This assumption may not necessarily be valid. Secondly, it is difficult to judge confidently from those results because, again, the indices for group membership salience are not thought to be very reliable.

Measurement

Variations among the pull scores Concerning the "pulls", it seems to be easier to interpret these results if we introduce the idea of justifiability of different strategies along the strength of group membership. Namely, we could assume, for example, that to take Fairness strategy is easy regardless of the group membership strength because it is a universal virtue and highly justifiable, while to choose MD against MJP•MIP is difficult because it needs some arguments to justify why one sacrifices maximum ingroup profit. However, salient group membership is assumed to help justify MD strategy such that MD is for the relative good of one's ingroup. The pull of MD•MIP against MJP is thought to be moderately easy to justify in terms of group membership because it brings maximum ingroup profit anyway, yet not as much so as Fairness strategy. These arguments can be applied to the rest of the strategies.

Bearing these points in mind, the results on the MD (on MJP•MIP) pull score, for instance, are quite understandable. Thus, the pull of MD against MJP•MIP is the least justifiable because it actually impedes ingroup profit.

This choice seems to have occurred only when group membership was salient, and thus the need for social identity was strong enough for the members to sacrifice the absolute benefit. Moreover, it seems that subjects needed to be distracted in order to ignore the merit of choosing MJP•MIP.

In the meantime, as Fairness (against MD•MIP) is thought to be most justifiable strategy, subjects chose it even in the non-salient conditions (pulls were significantly larger than zero in every condition). This is consistent with the previous literature. Nevertheless, this general tendency is qualified by the effect of salience and distraction. For example, distraction seems to have weakened the subjects' orientation to Fairness when group membership was not salient. It may probably be that distraction deprived subjects of their intention, on the whole, to achieve fairness. However, salience of group membership increased this weakened orientation in the distraction condition. This interaction would be explained by the nature of group membership. In salient conditions, the orientation of group differentiation (MD•MIP) is also thought to be strong despite the easy justifiability of Fairness. As a result, it seems, choosing Fairness against MD•MIP becomes rather difficult, thus subjects need distraction to flee from the constraints of group membership.

Similarly, the results on the pull of MD•MIP against MJP can be explained with these ideas. It seems subjects needed to be distracted in order to choose MD•MIP against MJP ignoring the merit of choosing MJP. And it is not surprising, if MD•MIP against MJP is yet fairly justifiable, that the salient conditions and the non-salient conditions indicated the same pattern.

The above interpretations presuppose that different intentions about allocations may probably interfere with one another (e.g. F and MD•MIP). Without this presupposition, it is more difficult to explain the pattern of results.

Nature of the indices *Results of ingroup bias indices* Comparison of ingroup bias between the point allocation index and the rating index

revealed that the former was powerful when group membership was strong, but there was no difference between the two indices when group membership salience was weak.[23] These results should, it can be argued, suggest that group membership salience "fuels" the motivational process of social identity by increasing the subjects' identification with the group, while it does not affect the category differentiation process.

Conversely, these results support the assumption that the point allocation index reflects the intentional process while the rating index taps more of the automatic process.

Another aspect of ingroup bias indices is that many rating indices showed ingroup bias even in the group membership non-salient conditions. The experimental procedure in these conditions was designed to evoke only category differentiation, and not to the extent that identification to the group follows. Therefore, it can be argued that the rating indices measured the kind of ingroup bias that did not derive from group membership salience. That is, the outcome of the automatic process of category differentiation.

Related to this, it should be noted that the pattern of the results on the two indices discussed above rules out the alternative interpretation of the nature of the two indices. The alternative interpretation would be that the two indices actually measure the result of a *single* psychological process with different sensitivities, instead of the results of the two different psychological

---

[23] The re-analysis of the data from the pilot study showed similar pattern of results, though non-significantly. That is, an allocation index (standardised average score for the four versions of the matrix type MD•MIP against MJP) showed more ingroup bias than a rating index (standardised sum score of the scales corresponding to those in Experiment 1, except "generosity", because its connotation was different between the two studies: "financial" in the pilot study, whereas "mentally" in this study) when group membership was strong [*M*s= .10, and -.33, t (15)= 1.01, *n.s.*], while the difference between the rating and the allocation indices was less when group membership was non-salient [*M*s= .14, and -.05, t (33)= -.76, *n.s.*]. ANOVA on another allocation index created in the same way from the matrix type of MD against MJP•MIP produced significant interaction effect between salience and distraction [F (1,49)= 6.21, $p < .05$]. When group membership was salient, the allocation index score was larger than the rating index score [*M*s = .32, and -.32, t (16)= 2.25, $p < .05$], while the allocation index score was smaller than the rating index score when group membership was non-salient [*M*s = -.16, and .14, t (33)= -1.07, *n.s.*].

processes. More precisely, one could argue that rating indices would be simply more sensitive than point allocation indices to detect ingroup bias, so that the effect of distraction would not necessarily correspond to intentionality/automaticity. This explanation would be plausible if we had not found that ingroup bias on the rating index was, in fact, smaller than that in a point allocation index when group membership was salient. In sum, the most plausible explanation seems to be that the two indices are not just similar measures with different sensitivities, but that they correspond, at least comparatively, to the two psychological processes.

Results of self-report measures for allocation strategies The results of self-reported intentions, their correspondence to, and discrepancy from, actual point allocations did not clearly support the assumptions that the point allocation indices reflect the intentional processes. While subjects seem to have been aware of the fairness strategy (the pull of F against MD•MIP) reasonably well, the maximum differentiation strategy (the pull of MD against MJP•MIP) correlated only marginally with the corresponding self-report (Table 3.20). And there was no indication of awareness for the joint profit strategy (the pull of MJP against MD•MIP).

These differences among strategies may be partly due to the general size of the pulls and self-reports. That is, while the pull of F against MD•MIP and the corresponding recognition was considerably large, the other two were quite weak for both the pulls and the corresponding recognition. If this is the case, the results do not constitute evidence against intentionality of the allocation indices. This idea needs further investigation in future studies.

Other findings

Differential rating dimension The difference in ingroup bias between the most differential dimension and the other dimensions confirms the general assumption that ingroup bias is apparent in relevant dimensions,

and supports the idea that the most differential dimension constitutes the most sensitive dimension that can capture ingroup bias better than the other dimensions. However, there is a high chance that subjects may have judged differentiality of dimensions on the basis of how they actually rated the groups. Therefore, it may be wise not to draw firm conclusions from this result.

Sex and cultural difference There was an indication, at least for the present sample of 12-13 year old pupils, that male subjects were more competitive than female subjects in the British sample. For the cultural differences, nothing can be said because of the different format of measurement, the procedure, etc. between the pilot study for the Japanese sample and Experiment 1 for the English sample.

The experimental procedure

Finally, there are a number of pros and cons of the procedure of the current experiment. First, as mentioned earlier in this section, the concurrent distracting task of italic-letter-finding was found to be a fairly reliable technique. The manipulation check for distraction, as well as the results pattern among the conditions, indicated that subjects were reasonably distracted by the distracting task in Experiment 1. And it was suggested that the slight difference in the distracting tasks between the pilot study (copying the letters) and Experiment 1 (circling the letters) were sufficient to vary the degree of distraction. Secondly, the salience manipulation was, it seems, also successful from the results although improvement of manipulation check and its conceptual problem were addressed.

The method of group division by a lot adopted from Lemyre & Smith (1985) was found effective, too. An advantage of this method is that it does not take as much time as other tasks (such as the artistic preference test or dot estimation task). Therefore, it helps shorten the duration of the total

experimental session. This was especially important for conducting an experiment using young school children as subjects. The use of the explanation sheet as well as the posters was found quite effective because it not only ensured that subjects understood the tasks, but also it allowed the distraction manipulation to be introduced quite naturally. In short, these modifications from ordinary minimal group experiments seem suitable for the present purposes.

Chapter 4

Study 2. The degree of distraction and ingroup bias

— A report of Experiment 2 —

Contents

4.1 Background

4.2 Method

4.3 Results

4.4 Discussion

This chapter reports Experiment 2, which was designed to explore the pattern of results obtained in the secondary analyses for Experiment 1. Since the secondary analysis was based on subjects' self-reported level of distraction, and because the results are not necessarily considered reliable partly due to the small number of the strongly distracted subjects, the degree of distraction was experimentally manipulated in Experiment 2.

4.1 Background

Pilot study 1 and Experiment 1 produced opposite results for the effect of distraction. Namely, distraction reduced ingroup bias on point allocation in Pilot study 1 while it increased the allocation bias in Experiment 1.[1] Subsequently, the degree of distraction was found to be different in the manipulation checks between the studies: subjects in the no distraction condition in Pilot study 1 felt more distracted, though not significantly, than those in the distraction condition in Experiment 1.

[1] The allocation bias in the thesis could be referred to, more correctly, as the allocation ingroup bias. The same applies to the rating bias. These terms, however, are mostly used, instead, for convenience.

A way to test this interpretation would be to match, and compare the results of, the conditions across Pilot study 1 and Experiment 1 according to the manipulation checks for distraction and others. However, it would be problematic to make a direct comparison across the studies due to the differences between them in formats of measurement, experimental procedure, and backgrounds of the two subjects groups, including the language of the study.

A secondary analysis was conducted, instead, for the data of Experiment 1, classifying subjects into three levels on the basis of self-reported degree of distraction. This secondary analysis indicated that the moderate degree of distraction led to the largest allocation bias. It supports the interpretation that the differential results between the studies could be due to the different degrees of distraction. However, the number of subjects classified as strongly distracted was only 5 in the salient group membership condition of Experiment 1. Moreover, the effect of the self-reported degree of distraction was not statistically significant. And generally, the analyses on the basis of self-report may not be reliable nor strong enough as one could easily argue that the focal effects might have somehow influenced the self-report, instead of the other way round.

For these reasons, Experiment 2 was designed to manipulate the degree of distraction experimentally. Besides the differences in the overall procedure and the language of the study, the distraction manipulation itself differed slightly between Pilot study 1 and Experiment 1. The distracting task was to copy italic letters, characters, and digits in Pilot study 1 whereas it was just to circle italic letters in Experiment 1. To examine the relevance of the differences, therefore, both manipulations were utilised in the present study, leading to three levels of distraction: no distraction, moderate distraction, and strong distraction. These distraction conditions were designed to correspond, respectively, to the no distraction in Experiment 1, the distraction in

Experiment 1 (and the no distraction in Pilot study 1), and the distraction condition in Pilot study 1. Details of the procedure are described in the method section.

Another issue in the current study concerns the relationship between group membership salience and ingroup bias indices. Interference of distraction with this relationship is hypothesized both to reveal the relevance of the intentionality assumption of the social identity process and to illuminate the nature of the indices (cf. hypothesis 3 in Chapter 2 and prediction 6 in Chapter 3). The results in Pilot study 1 and Experiment 1 were not very clear. While problems with measurements for group membership salience were addressed earlier, it might be important to search for a consistent pattern of results before drawing any conclusions about this relationship. Therefore, in the current study, the following provisional predictions will be examined with the same indices for the related variables.

Firstly, group membership salience is expected to have a positive relationship with the allocation bias under the moderate distraction condition, given the following assumptions. The first is an assumption of Study 1 that the allocation bias is concerned relatively more with the motivational process of social identity. The second is the general assumption (9), put forward in Chapter 2, that increased group membership salience increases the likelihood that one identifies with the relevant group. The third is the assumption, put forward in the discussion of Chapter 3, that other intentions interfere with the social identity process in the no distraction conditions, while moderate distraction gets rid of those noise intentions. The fourth is the general assumption (7), suggested in Chapter 2, that the social identity process is impeded by distraction (in this context, stronger one).

The second provisional prediction is that distraction will not affect the relationship between the rating bias and the degree of group membership salience. One reason for the prediction is an assumption in study 1 that the

rating bias is concerned relatively more with the cognitive process of category differentiation. See the assumptions for hypothesis 6 in Chapter 2 for the other reasons.

Predictions

In the current study, the same conceptual and the empirical assumptions hold as in Study 1. Group membership salience is kept constant to the degree of the salient conditions in Experiment 1. To restate the predictions under these circumstances, in the oneway between-subjects design with the three levels of distraction, it was predicted:

1 that the allocation bias would be strongest in the moderate distraction condition.

2 that the allocation bias would be positively related to the degree of group membership salience only in the moderate distraction condition.

3 that the rating bias would increase as distraction increases.

4 that distraction would not affect the relationship between the rating bias and group membership salience.

4.2 Method

Subjects and design

Sixty-nine second year school boys from three classes in a grammar school (12-13 year old) in Kent, England, participated in a minimal group experiment. They were assigned to each of the three experimental conditions by class. These pupils had randomly been assigned to the classes at the beginning of the academic year. The three experimental conditions varied in terms of the degree of distraction: no distraction, moderate distraction, and strong distraction.

Procedure

The procedures for the no distraction and the moderate distraction conditions were exactly the same, respectively, as those of the no distraction and the distraction conditions under the salient group membership manipulation in Experiment 1. Briefly, subjects first drew a lot to be assigned to either a "blue" or a "red" group. After the explanations of the tasks, they filled in a dependent measure booklet. Of the two conditions, the distracting task was given only in the moderate distraction condition. The procedure of the strong distraction condition was different from that of the moderate distraction condition under the salient manipulation only for the distraction manipulation, and consequently for the explanation of the tasks (see Appendices 4.1, 4.2 and 4.3 for instructions etc. for this condition). The experimental sessions were administered by a British male experimenter and an assistant (the class teacher) in three classrooms simultaneously, each corresponding to one of the three experimental conditions.

The manipulation of distraction The degree of distraction was manipulated by presence/absence of the time pressure, and the complexity and the nature of the distracting task that subjects had to engage in while they were completing the experimental tasks. As mentioned above, the manipulations for the no distraction and the moderate distraction were exactly the same as the corresponding conditions in Experiment 1. Meanwhile, the distracting task in the strong distraction condition, was to find and copy those italicised letters in the right margin of the booklet, similar to the distraction manipulation in Pilot study 1. It is assumed that copying is more distracting than just circling the italicised letters. In this condition, there were 48 slanted letters in total in the booklet (20 in the rating and 28 in the allocation tasks), compared with 24 of them in the moderate distraction condition (10 and 14, respectively, in the rating and the allocation tasks).

Dependent measure booklet

There were six versions of the dependent measure booklet. The characteristics of each version are described in Table 4.1. In the current experiment, the versions that have the manipulation checks first, followed by the collective self esteem scale, were not included.

4.3 Results

Manipulation checks

Distribution of subjects 22, 25 and 22 subjects were respectively assigned to the no, moderate, and strong distraction conditions. These numbers are displayed in Table A4.4.1 (in Appendix 4.4), along with the distribution of the booklet versions and the division into the "red" and the "blue" groups. Chi squares of every pair of the independent variables were examined, showing no indication of dependency.

Experimental manipulations[2] The mean values of manipulation check items and relevant indices are shown by condition in Table 4.2. Group membership salience was designed to be kept at a high and the constant level in all conditions. And neither of the two manipulation checks for salience indicated significant difference among the conditions [F (2,65)= .13, *n.s.*, grand mean=4.07 for thinking-about-group-membership in allocation; F (2,65)=1.73, *n.s.*, grand mean=3.53 for group comparison in rating]. Collective Self-Regard (CSR) scale scores did not differ from each other, either [F (2,64)=1.44, *n.s.*]. Unfortunately for the distraction manipulation checks, subjects' self-report of distraction and concentration did not differ among the three conditions [F (2,65)= .16, *n.s.* ; F (2,65)= .62, *n.s.*]. On the other hand, the number of subjects

---

[2] Subjects engaged in the distraction task in the intended manner in each distraction condition. In the moderate distraction condition, 23 out of 25 subjects circled more than half of the italic letters embedded in the rating tasks, and 24 circled more than half of the embedded italic letters in the point allocation tasks. In the strong distraction condition, 20 out of 22 subjects copied more than half of the italic letters embedded in the rating tasks, and 21 copied more than half of the embedded italic letters in the point allocation tasks.

who failed to complete either the rating tasks or the point allocation tasks were larger in the strong distraction condition than in the moderate and the no distraction condition as shown in Table 4.2 [χ^2 (2) = 6.02, $p < .05$].

Table 4.1 Versions of the dependent measure booklet

Ver.	Distraction level	Distracting task	No of italics	Order of tasks
1	No	None	0	Allocation — Rating
2	No	None	0	Rating — Allocation
3	Moderate	Circling italics	24	Allocation — Rating
4	Moderate	Circling italics	24	Rating — Allocation
5	Strong	Copying italics	48	Allocation — Rating
6	Strong	Copying italics	48	Rating — Allocation

Table 4.2 Manipulation checks

Manipulation checks	No distraction (n = 22)	Moderate distraction (n = 25)	Strong distraction (n = 22)
Salience check			
group thinking in allocations §1	4.24	4.04	3.95
group comparison in ratings §1	3.56	3.12	4.00
Distraction check			
distraction during the tasks §2	2.57	2.80	2.82
concentration on the tasks §3	4.76	4.36	4.82
Collective Self Esteem score $	37.00	41.17	37.76
No. of subjects who failed to complete the tasks	0	1	4

§ The higher the number, the more 1) salient, 2) distracted, and 3) concentrated (range 1-7). The number of subjects who completed these items was 21, 25, and 22 from the left.

$ The number of subjects who completed the scale was 22, 24, and 21 from the left.

Point allocation indices

Total points Total points that subjects gave to ingroup and outgroup members were calculated from the point allocation data. The mean total points are shown by condition in Fig. 4.1. This index was subject to a 3 (distraction) x 2 (repeated measure: ingroup *vs.* outgroup) ANOVA.[3] First of all, ingroup members were given more points than outgroup members, confirming the overall ingroup favouritism [F (1,66)= 6.07, $p < .05$]. Secondly, though not statistically significant, this tendency was exaggerated when subjects were moderately distracted [the interaction effect: F (2,66)= 1.95, $p < .15$]. Planned comparisons between mean point allocation to ingroup and outgroup members showed significant difference only in the moderate distraction condition [t (24)= 2.58, $p < .05$]. There was a quadratic trend with distraction for the difference score between points to ingroup and outgroup members, as shown in Fig. 4.1 [F (1,66)=3.82, $p < .06$].

Pull scores The pull scores of strategies were calculated from the data on the allocation tasks following the description in Turner, Brown, & Tajfel (1979).[4] The mean pull scores of each strategy are shown by condition in Table 4.4. Though not statistically significant, expected results concerning the effect of distraction were obtained. Thus, discriminatory strategies [MD•MIP (on F), MD•MIP (on MJP), and MD (on MJP•MIP)] were stronger in the moderate distraction condition than in the strong and the no distraction

---

[3] Booklet versions (allocation-rating or rating-allocation) was entered as a covariate in this analysis because it had (marginally) significant effects on total points to ingroup and outgroup members [F (1,65)=2.85, $p < .10$; F (1,65)=4.09, $p < .05$].

[4] Correlations between the relevant raw matrix score and the pull score was calculated and listed below for each of the strategies. All the correlations were large and significant ($n = 69$, $p < .01$, for all the correlations). The matrix scores were arranged so that the higher the correlation coefficient, the more it indicates consistency.

.72 between the [MD•MIP *vs.* F] matrix score & the pull of MD•MIP (on F)
.51 between the [MJP•MIP *vs.* MD] matrix score & the pull of MJP•MIP (on MD)
.58 between the [MJP *vs.* MD•MIP] matrix score & the pull of MJP (on MD•MIP)
.77 between the [MD•MIP *vs.* MJP] matrix score & the pull of MD•MIP (on MJP)
.81 between the [F *vs.* MD•MIP] matrix score & the pull of F (on MD•MIP)
.80 between the [MD *vs.* MJP•MIP] matrix score & the pull of MD (on MJP•MIP)

conditions. There was a nearly significant quadratic trend with distraction for the pull of MD•MIP against MJP [F (1,66)=3.18, p <.08].

Another distinctive feature among the pull scores concerns the pull of F against MD•MIP. This pull score was generally large and significant in all three conditions, and was relatively smaller in the moderate distraction condition than in the strong and the no distraction conditions. There was a quadratic trend with distraction for this pull [F (1,66)=6.55, p <.05].

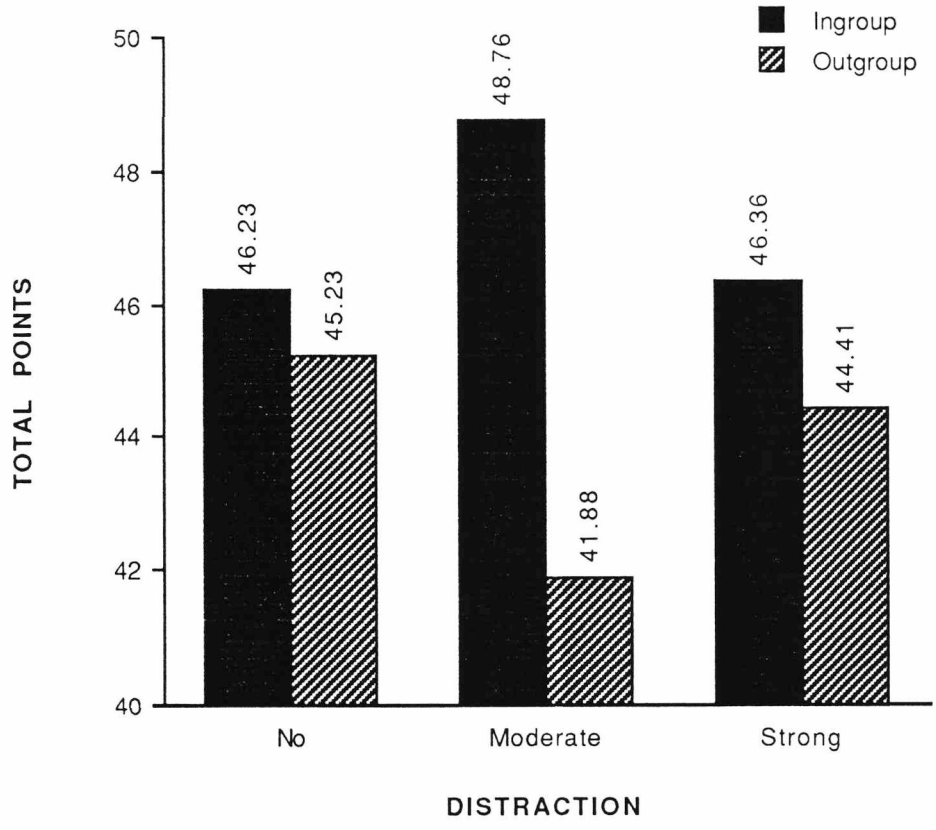


Fig. 4.1 Total points to ingroup and outgroup members by distraction

Table 4.3 The mean pull scores of each strategy

pull	No distraction (n =22)	Moderate distraction (n =24)	Strong distraction (n =21)	F value Effect of distraction
MD•MIP (on F)	.23	.96	-.09	1.51
MD•MIP (on MJP) $^{\$}$	.18	1.40$^{\#}$	.50	1.35
MD (on MJP•MIP)	.00	.76	.64	.55
MJP•MIP (on MD)	-.18	-.36	-.18	.07
F (on MD•MIP)	3.59$^{\#}{}_{b}$	1.52$^{\#}{}_{a}$	2.55$^{\#}$	4.31*
MJP (on MD•MIP)	.00	-.28	-.68	.72

1) # denotes the figure is significantly different from zero point ($p < .05$, two-tailed)
2) Different subscripts on a line denotes means which are significantly different (Duncan's test, $p < .05$)
3) F value: * $p < .05$; df =2/66 for all effects except for that of MD•MIP (on MJP).

$ Group division and booklet versions had significant effects on this index [F (1,65)=5.83, F (1,65)=4.10, p <.05 for both]. Thus, these variables were entered as covariates for the analysis. Consequently, the degree of freedom for this analysis was 64.

Rating indices

Ingroup bias on each rating dimension Rating bias was calculated by subtracting the outgroup rating score from the ingroup rating score for each dimension.[5] Results of the rating indices are shown in Table 4.4. No main effect of distraction on any of the five dimensions was significant. For trustworthiness, there was a marginally significant linear trend of increase with distraction [F (1,65)=2.96, p <.10]. No quadratic trend with distraction on any of the five dimensions was significant.

Sum score of ingroup bias in ratings The sum score of the ingroup bias in five rating scales was calculated. While the sum scores in the strong and the moderate distraction conditions were significantly bigger than zero,

[5] This index was arranged for this analysis such that the more positive (warm, honest, friendly, trustworthy, and generous) the higher the value.

thus suggesting clear ingroup bias, the main effect of distraction was not significant (see Table 4.5). There was no significant linear or quadratic trend.

The most differential dimension in rating [6] Rating bias on the most differential dimension (as chosen by the subject) and the mean rating bias of the other four dimensions were subject to 3 (distraction) x 2 (repeated measure) ANOVA. The main effect of dimensions (repeated measure) was significant, indicating that ingroup bias on the most differential dimension was stronger than that on the other dimensions [F (1,64)=9.58, $p < .01$; see Table 4.6]. The interaction effect between dimensions (repeated measure) and distraction was marginally significant [F (2,64)=2.92, $p < .075$]. This interaction could be attributed to the strong rating bias on the most differential dimension in the strong distraction condition.

Preference rating of the person as a friend The preference score was calculated by subtracting the preference rating of outgroup members as a friend from that of ingroup members. The results are shown in Table 4.7 by condition. This index was subject to a oneway ANOVA with three levels of distraction (no, moderate, and strong). The main effect of distraction was not significant [F (2,63)= .18, *n.s.*]. There was no significant linear or quadratic trend.

---

[6] 7, 11, 14, 14, and 22 subjects chose respectively warmth, honesty, friendliness, trustworthiness, and generosity as the most differential dimension.

Table 4.4 The mean rating bias on each dimension

dimension	No distraction (n =22)	Moderate distraction (n =24)	Strong distraction (n =21)	F value Effect of distraction
warmth	.18	.46	.33	.18
honesty	.00	.54	.00	.83
friendliness[S]	.09	.79[#]	.43	1.37
trustworthiness[SS]	-.18	.42	.76	1.42
generosity	.27	.50	.81[#]	.59

1) The figure indicates ingroup bias. The higher the figure, the more in favour of ingroup.
2) # denotes the figure is significantly different from neutral point zero ($p < .05$, two-tailed).
3) F value: df =2/64, for warmth, honesty, and generosity; 2/63 for friendliness and trustworthiness. No effect was significant.
4) Quadratic trend test: Fs= .26, 1.59, 1.77, .06 and .02 respectively for warmth, honesty, friendliness, trustworthiness and generosity. All $n.s.$

S Group division had a significant effect on this index, thus was entered as a covariate in the analysis [F (1,63)=5.34, p <.05].

SS Booklet versions had a significant effect on this index, thus was entered as a covariate in the analysis [F (1,63)=3.59, p <.05].

Table 4.5 The mean sum score of ingroup bias in ratings

	No distraction (n =22)	Moderate distraction (n =24)	Strong distraction (n =21)	F value Effect of distraction
Ingroup bias in rating	.36	2.71[#]	2.33[#]	1.15

1) The figure indicates ingroup bias. The higher the figure, the more in favour of ingroup.
2) # denotes the figure is significantly different from neutral point zero ($p < .05$, two-tailed). Incidentally, the total mean was 1.82 and was significantly bigger than zero.
3) F value: df =2/64. The distraction effect was not significant.
4) Quadratic trend test: F (1,64)=.92, $n.s.$

Table 4.6 Rating bias on the most differential dimension and the others

dimension	No distraction (n =22)	Moderate distraction (n =23)	Strong distraction (n =20)
The most differential	$.28_a$	$.78^{\#}$	$1.50_b{}^{\#}$
Mean of the others	.02	$.48^{\#}$	.19

1) The figure indicates ingroup bias. The higher the figure, the more in favour of ingroup.
2) # denotes the figure is significantly different from the neutral point ($p < .05$, two-tailed).
3) Different subscripts on a line denotes means which are significantly different (Duncan's test, $p < .05$)

Table 4.7 Ingroup bias in preference of the person as a friend

	No distraction (n =22)	Moderate distraction (n =25)	Strong distraction (n =19)	F value Effect of distraction
Ingroup bias in preference	.36	$.52^{\#}$	.32	.18

1) The figure indicates ingroup bias. The higher the figure, the more in favour of ingroup.
2) # denotes the figure is significantly different from the neutral point ($p < .05$, two-tailed)
3) The main effect of distraction was not significant (df =2/63).
4) Linear trend test: $F(1,63)= .02$, *n.s.*; Quadratic trend test: $F(1,63)= .34$,*n.s.*

Comparing the allocation indices and the rating indices

As in Experiment 1, factor analyses were conducted on the pull scores and the rating bias scores in order to extract comparable measures of the point allocation indices and the rating bias indices.

Factors from the pull scores The six pull scores of this study were subject to a principal-components analysis. Two factors were extracted on the basis of eigenvalues (1.96 and 1.40 respectively; 32.7% and 23.3% of the whole variance was explained respectively), and obliquely rotated. The factor loadings are shown in Table 4.8. The first factor seems to correspond to the competitive choices against outgroup. Therefore, we will consider the average

score of the three competitive pulls which loaded most heavily on this factor as the representative measure of ingroup bias from point allocation tasks.

Factors from rating bias The five ingroup bias scores in ratings were subject to a principal-components analysis. The five items formed a single factor (eigenvalue for the factor was 2.37; 47.3% of the whole variance was explained by the factor). The factor loadings are shown in Table 4.9. As the factor covers all the dimensions, we will treat the average score of the five dimensions as the representative measure of ingroup bias from rating tasks.

Comparison between the pull and the rating indices The average scores of the items that constituted the first factor for pulls and ratings were, respectively, calculated and were subject to a 3 (distraction) x 2 (indices: repeated measures) ANOVA.[7] The main effects of distraction and of indices, and their interaction effect were not significant [F (2,64)= 2.12, F (1,64)=.42, F (2,64)= .85; all *n.s.*]. Nonetheless, while the point allocation index showed significant ingroup bias only in the moderate distraction condition, the rating index did so both in the strong and the moderate distraction condition (p <.05, two-tailed; see Fig. 4.2). The correlations between the point allocation index and the rating index were .11 (n =22, *n.s.*), .59 (n =24, p <.01), and .12 (n =22, *n.s.*), respectively, in the no, moderate and strong distraction conditions. There was a nearly significant quadratic trend with distraction for the allocation index [F (2,64)= 3.49, p <.07]. The comparison of the moderate condition *vs.* (the no and strong conditions)/2 for the allocation index confirmed this weak trend [t (64)=1.87, p <.07].

---

[7] Each of the individual pull scores ranges, in theory, from -6 to 6, and so does each of the rating bias scores. Thus, we could compare directly the two indices. Specifically, the average pull score was calculated from the pull score of MD•MIP (on MJP), MD•MIP (on F), and MD (on MJP•MIP). These correspond to the first factor of the pulls. The average rating score was calculated from a raw ingroup bias score in warmth, honesty, friendliness, trustworthiness, and generosity. These five correspond to the factor from rating bias.

Table 4.8 The factor loadings of the pull scores

pulls	Factor 1	Factor 2
MD•MIP (on MJP)	.830	
MD (on MJP•MIP)	.796	
MD•MIP(on F)	.608	.396
F (on MD•MIP)	-.507	.333
MJP•MIP (on MD)		-.772
MJP (on MD•MIP)		.697

1) The figure is the factor loading of the item. Absolute loading value less than .30 are omitted.
2) 56% of the total variance is explained by the two factors.
3) Correlations between the first factor score and the second were -.04 (*n.s.*).

Table 4.9 The factor loadings of ingroup bias score in ratings

Ingroup bias dimensions in ratings	Factor 1
Generosity	.753
Warmth	.737
Friendliness	.724
Trustworthiness	.655
Honesty	.549

1) The figure is the factor loading of the item.
2) 47.3% of the total variance is explained by the factor.
3) Cronbach's alpha for the five items were .71 (n =67).

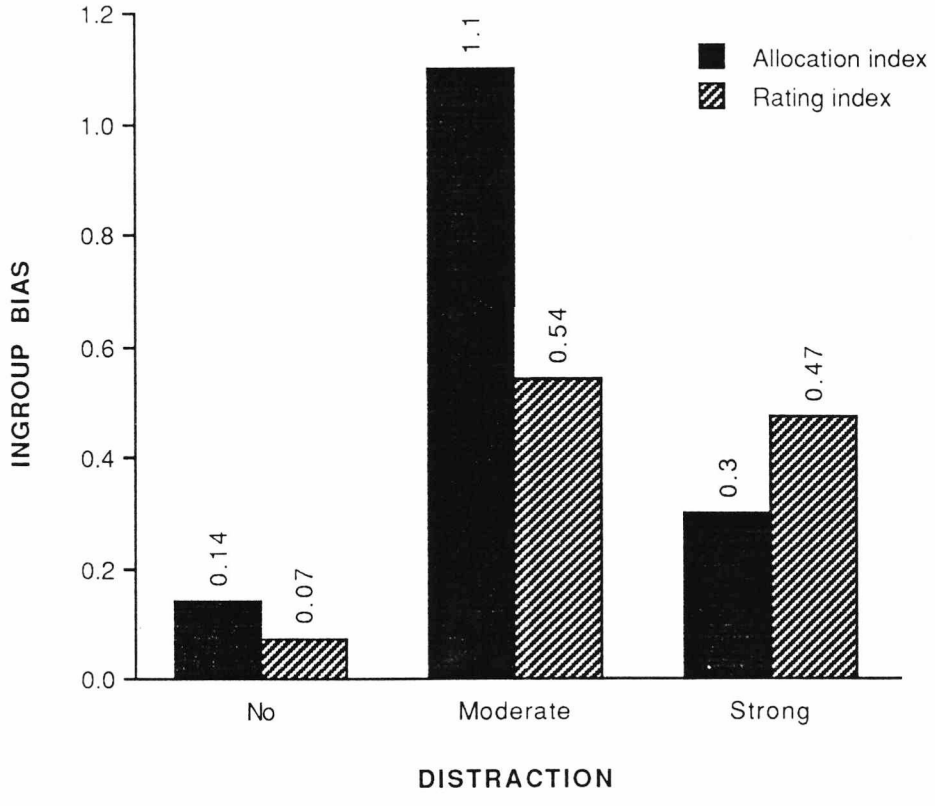


Fig. 4.2 The allocation and the rating indices of ingroup bias by distraction condition

Cognitive measures

Group membership salience and ingroup bias In relation to predictions 2 and 4, correlations between group membership salience and ingroup bias indices were calculated for each condition (Table 4.10). First of all, the relationship to the ingroup bias indices differed considerably among the indices of group membership salience. These differences may be caused partly by the small number of cases in the conditions for calculating correlations. Alternatively, it may be due to the differences in what the indices are measuring. In any event, it is difficult, from these results, to draw a consistent picture about the predictions.

Note, however, that for the whole sample, "thinking-about-group-membership in allocation" correlated both with the allocation and rating bias indices, whereas "group comparison in rating" did not correlate with either of the indices. A similar result was also obtained for the whole sample of Experiment 1 (Table 3.19).

Self-reported strategies in point allocation After the point allocation task, subjects answered how much they tried to adopt each allocation strategy. The results for each self-reported strategy are shown in Table 4.11. Of particular interest here are the results of Group win and Fair to Each Group strategies.[8] That is, the more subjects were distracted, the less they thought they had tried to make their own group win relative to the other group. Meanwhile, subjects thought they had most tried to be fair to each group when they were strongly distracted, while they least thought they had when they were moderately distracted.

While the former result is an expected one as a manipulation check for distraction, it is interesting when compared with the actual results of the discriminatory pulls (see Table 4.3). Thus, the discriminatory pulls were strongest in the moderate distraction condition, despite that subjects recognised themselves to be most discriminate when they were not distracted. To paraphrase, it could be said that subjects in the no distraction condition thought they took discriminatory strategies when they in fact did so the least, while subjects in the moderate distraction condition took discriminatory strategies actually more than the others when they did not think they did. Nonetheless, it should be noted that even the largest self-report mean was only just above the neutral point. Therefore, one could argue that subjects on the whole did not positively recognise they had taken discriminatory strategies.

---

[8] There were moderate correlations with actual pull scores for both Maximum Differentiation and Fairness (Pearson's r =.37 and .33 respectively, $p < .01$, two-tailed).

In relation to the latter result, subjects' self-report of Fairness strategy seem to fit relatively well to the actual pull of F against MD•MIP. In the moderate distraction condition, subjects least recognised their own fairness to each group when their fairness pull was the least, and subjects in the strong distraction condition most recognised their own fairness when their pull of F against MD•MIP were fairly strong.

Table 4.10 Correlations between group membership salience and ingroup bias in allocation and rating indices

	Partial correlation coefficient with:	
Index of group membership salience	Allocation index	Rating index
Strong distraction condition (df = 16)		
thinking-about-group in allocation	.53 *	.16
group comparison in rating	-.18	-.20
CSR scale score	-.11	.14
Moderate distraction condition (df = 19)		
thinking-about-group in allocation	.41 *	.70 ***
group comparison in rating	.12	.31 †
CSR scale score	.21	.24
No distraction condition (df = 17)		
thinking-about-group in allocation	.33 †	.61 **
group comparison in rating	.42 *	.19
CSR scale score	.04	-.30
Whole sample (df = 62)		
thinking-about-group in allocation	.42 ***	.41 ***
group comparison in rating	.09	.06
CSR scale score	-.02	-.18 †

1) Correlations were calculated, controlled by group division and task order, between group membership salience indices, and the allocation and the rating indices derived in the factor analyses.
2) The values of the salience indices are arranged so that the larger the correlation coefficient, the more positively group membership salience is related to ingroup bias.
3) † $p < .1$, * $p < .05$, ** $p < .01$, *** $p < .001$: different from zero,

Table 4.11 Self-reported strategies in point allocation

Strategy	No distraction (n =22)	Moderate distraction (n =25)	Strong distraction (n =22)	F value
Fairness to each person [S]	4.54	4.36	4.91#	1.25
Fairness to each group[SS]	4.23	3.80_a	$5.04^{\#}{}_b$	3.25*
Self interest [S]	3.68	3.08#	3.18	.73
Group interest [S]	3.68	3.52	2.95#	1.15
Joint profit	3.82	3.40	3.09#	1.16
Self-satisfaction	4.23	3.52#	3.36	1.56
Group win [S]	4.27	3.52#	2.77#	3.48*
Nothing in particular	4.45	4.08#	4.32#	.23

1) The figure is arranged so that the higher the figure, the more each strategy was recognised (range 1-7).
2) # denotes the figure is significantly different from neutral point 4 ($p < .05$).
3) The means with different subscripts differ significantly (Scheffee test: $p < .05$).
$ Group division had an effect on the item, thus, was entered as a covariate in the analysis ($df = 2/65$)
$$ Both group division and booklet versions had effects on the item, thus, were entered as covariates in the analysis ($df = 2/64$). For the remaining three strategies, $df = 2/66$.
* $p < .05$

4.4 Discussion

Manipulations

The results of the manipulation check items were somewhat ambiguous. Neither self-reported distraction nor self-reported salience was significantly different among the experimental conditions. Unlike Experiment 1, Collective Self-Regard scale score was not different among the conditions, either. However, more persuasive evidence of distraction was obtained: more subjects in the strong distraction condition failed to complete either rating or point allocation tasks than in the moderate distraction and the no distraction condition. In fact, all subjects in the no distraction conditions completed the

tasks. This was also the case in Experiment 1: all the subjects completed both the rating and the point allocation tasks. Therefore, it could be argued that the distracting task in the strong distraction condition in this study was strong enough to distract subjects from their engagement in the experimental tasks.

The self-reported level of distraction in this study fell between the levels of the distraction and the no distraction conditions in Experiment 1. Collective self esteem scores in this study, as a manipulation check of group membership salience, also fell between the levels of the qualified salient and non-salient conditions (*i.e.* under no distraction with the questionnaire order of CSR - manipulation checks). The difference in the absolute levels between the experiments may be due to the school difference and/or a small difference in the experimental procedures. Both schools were selective grammar schools. Whereas Experiment 1 was conducted in a classroom different from subjects' home classroom with subjects from other classrooms, the experiment in this study was conducted in home classrooms with the home classmates. The former arrangement might enhance the effect of experimental manipulations because it constitutes a more depersonalised and novel situation.

ANOVA approach

Allocation bias Concerning the major prediction on the allocation bias, the current study replicated the results of the secondary analysis for Experiment 1. That is, the allocation bias was larger when subjects were moderately distracted than when they were either not distracted or strongly distracted, both in the indices of total points and discriminatory pulls (*i.e* MD•MIP against F, MD•MIP against MJP, and MD against MJP•MIP). The quadratic trend with distraction was marginally significant both for the total points difference score and the pull of MD•MIP against MJP (and also for the composite score of the three discriminatory pulls).

Rating bias A linear increase with distraction was predicted for the rating bias. This prediction was not strongly supported. Across the rating dimensions, the general tendency was that the rating bias was very small in the no distraction condition while it was a little larger in the moderate and the strong distraction conditions (see Table 4.4, 4.5, and 4.7). There was a linear trend of increase with distraction, only for one rating dimension. There was no significant quadratic trend. In short, the rating bias on the whole either only slightly increased with distraction, or stayed at the same degree.

Graphic representation of the two biases With a certain procedure, comparable indices for the allocation bias and the rating bias were created and displayed in Fig. 4.2 (see the results section for the procedure). This figure demonstrates that the current experiment achieved the aim of replicating the results of both Pilot study 1 and Experiment 1. Thus, it seems firstly that the no distraction and the moderate distraction conditions respectively correspond to the no distraction and the distraction conditions of Experiment 1 under the salient manipulation. Both the allocation and the rating indices increased in the moderate distraction condition, and the overall level was higher for the allocation index than the rating index. Meanwhile, it appears that the moderate and the strong distraction conditions respectively correspond to the no distraction and the distraction condition of Pilot study 1 under the salient manipulation. That is, while the allocation bias decreased in the strong distraction condition, the rating bias remained at the same level.

Although this pattern was not an explicit prediction in the present experiment, it corroborates the underlying assumption that the distraction manipulation operated at three levels.

Correlational approach

The predictions about the relationship between group membership and ingroup bias were, a) that the allocation bias would be positively related

to the degree of group membership salience only in the moderate distraction condition, and b) that distraction would not affect the relationship between the rating bias and group membership salience. However, as mentioned in the results section, it is difficult to draw any conclusion about the predictions from the pattern of correlation coefficients in Table 4.10.

There can be at least two possibilities for this confusion. One possibility is that these indices for group membership salience may either be unstable or inappropriate to measure what they are supposed to measure. Another possibility is that the indices for ingroup bias are unreliable.

For the first possibility, as pointed out already in the previous chapter, group thoughts items are confounded with a distraction check, and CSR scale score is problematic as a measure for salience because CSR scale measures the psychological end-results of group membership while salience is a property of objective settings. As regards instability of the indices, in fact, the correlations in Experiment 1 do not even conform to those in the corresponding conditions in the present experiment (compare Table 4.10 and Tables 3.18 and 3.19).

For the second possibility, it can be said that the chance is low because the analyses with the ingroup bias indices in the previous sub-section were successful, thus proving that the indices were suitable for their measurement.

In short, the predictions for the relationship between group membership and ingroup bias were not supported, and it was considered that the indices for group membership salience were not appropriate. One aim of further studies is, therefore, to develop an appropriate measure of group membership salience.

Other results

Factors in the indices Factor analyses revealed a similar pattern to Experiment 1. Though the pull scores formed two factors instead of three, the

first factor corresponds to the first factor in Experiment 1. Both factors loaded heavily on the three discriminatory pulls. One difference was that the factor in the current experiment also loaded fairly strongly, but negatively, on the pull of F against MD•MIP while the factor in Experiment 1 did not load on it. Ingroup bias in ratings formed again a single factor in this study as in Experiment 1. This combination of adjective pairs seems to be coherent.

Differential dimension of rating Results concerning the most differential dimension (as chosen by subjects) were strongly suggestive for the nature of the indices. A differential dimension refers here to the dimension that subjects select as distinguish best between the two groups. Firstly, ingroup bias was more pronounced on the most differential dimension compared with the other dimensions, replicating the results of Experiment 1. Secondly, the degree of ingroup bias was clearly larger in the strong distraction condition than in the moderate and the no distraction conditions. This result constitutes a sharp contrast to the overall result in the allocation indices. That is to say, strong distraction decreased the magnitude of the allocation bias whereas it increased the rating bias on the most differential dimension.

This pattern is consistent with the proposed difference between the point allocation tasks and the rating tasks in two ways. Firstly, point allocations are thought to reflect intentional processes, thus, are more vulnerable to distraction which gets rid of conscious attention. Therefore, strong distraction should impair ingroup bias measured with the point allocation tasks. On the contrary, rating tasks are assumed to depend more on the image of targets, thus less vulnerable to distraction since image processing is thought to need little conscious attention. Therefore, distraction should barely affect ingroup bias measured with the rating tasks. The increase in ingroup bias in the strong distraction condition may be due to the relaxation

of the inhibiting function of intentional processes (see Chapter 2 for relevant arguments).

Secondly, this image processing measured with the rating tasks should be apparent more on the relevant dimension than on the other dimensions. While it may be to do with conscious attention to the relevant dimension, it is more plausible that the frame of reference pre-determines the dimension of image processing regardless of conscious attention to it. In this study, choice of the frame of reference was left to the individual subject while it could have been experimentally controlled. Investigating into this line of reasoning may be fruitful.

Self-reported allocation strategies It was pointed out, in the results section, that recognition of Group Win strategy did not fit the actual point allocation pattern of the corresponding discriminatory pulls whereas recognition of Fair to Each Group strategy matched to the actual allocation pattern. This pattern is consistent with the analysis for correspondence between allocation strategies and intentions for Experiment 1 (see Table 3.20). Two reasons are conceivable. One concerns the size of the actual pull scores. The other concerns social desirability.

For the size, the F (on MD•MIP) pull was distinctively larger than the discriminatory pulls in all conditions (see Table 4.3). If this means subjects were strongly influenced by consideration of fairness while consideration of group win was only weak, it is easy to understand why there were consistency and inconsistency, respectively, between the pull of F (on MD•MIP) and recognition of fairness, and the discriminatory pulls and recognition of them. When one attends to an event strongly, one can easily and accurately recognise it whereas when one does not attend to an event, it will not be recognised well.

For social desirability, fairness can be said to be socially quite acceptable while competitiveness (group win) is not too much so. There was a

slight tendency that subjects claimed to have tried to be fair to each group, rather than to have their group win (see Table 4.11). This pattern supports the difference in social desirability between the two strategies. Therefore, the results pattern can be paraphrased in such a way that the socially desirable strategy (fairness) was reported more accurately in relation to the actual use of the strategy while socially less desirable strategy (discrimination) was not honestly reported. However, this idea does not explain why subjects did not unanimously report in a socially desirable way both for fairness and discriminatory strategies. This explanation, thus, is less plausible.

Inconsistency between the discriminatory pulls and their recognition may be a problem, for either case, since recognition measures cannot be used as a check for the intentional process. If the former is true, the manipulation of group membership salience must be strengthened so as to enhance the absolute size of the discriminatory pulls. If the latter is the case, some measure should be taken to avoid social desirability concern among subjects.

Explanations of the pattern of the allocation biases

So far, prediction 1 concerning the allocation bias was made only on the basis of the experimental results of the previous work (Pilot study 1 and Experiment 1). In other words, it was attempted, for prediction 1, only to corroborate an interpretation, which helped to integrate the seemingly contradictory results from the two experiments in terms of the degree of distraction. Now that this pattern was reasonably confirmed, it would be useful to consider its underlying mechanism.

A proposed explanation The results of Pilot study 1 and Experiment 1, matched by the degree of distraction, and the results of the current study, commonly, seem to draw an inverted U-shape curve with the degree of distraction for the allocation bias (see Fig. 4.3). The following is an

explanation for this pattern, on the basis of the "noise" interference as well as the other assumptions of the thesis.

To recap briefly, the assumptions of the thesis are that a) both the category differentiation process and the social identity process are responsible for ingroup bias, b) the latter process is characterised as an intentional one, and c) point allocation indices capture the social identity process relatively more than the category differentiation process.

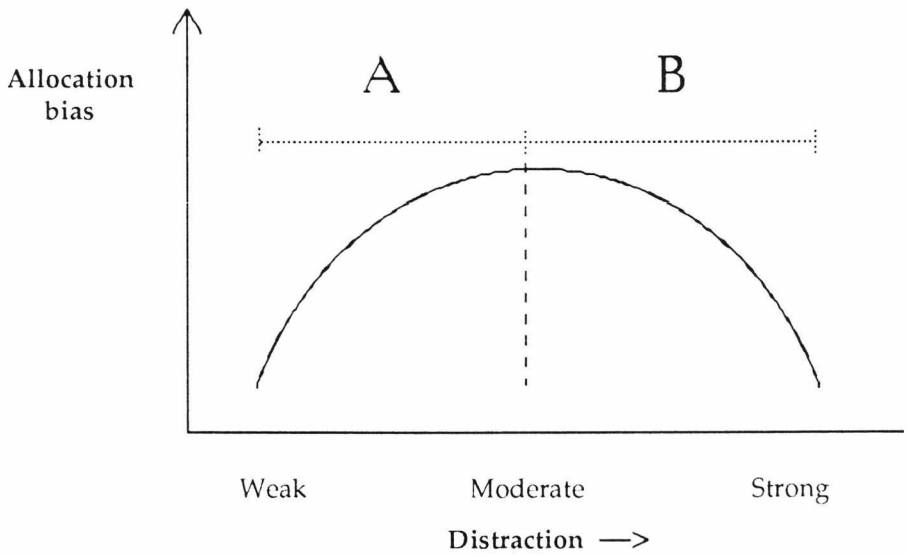


Fig. 4.3 Allocation bias as a function of distraction (a conceptual model)

Noise, the degree of distraction, and ingroup bias Firstly, from weak to moderate distraction, the intentional component of ingroup bias (*i.e.* outcome of the social identity process) is expected to increase as distraction increases, since "noise" from other intentions such as fairness, self-presentational concern, altruism etc., should be hindered by distraction, thus leaving ingroup enhancement (*i.e.* a goal of the social identity process) more and more dominant relative to the others (domain A in Fig. 4.3). Secondly,

from moderate to strong distraction, the intentional component of ingroup bias is hypothesized to decrease as distraction increases because distraction should, this time, start affecting the social identity process itself (domain B in Fig. 4.3). It is assumed that the intentional component of ingroup bias is represented well in the allocation indices. Note that this hypothesis concerns only the intentional component of ingroup bias. In other words, the automatic (or less intentional) component is thought to follow a different function (see hypothesis 2 in Chapter 2).[9]

One may wonder how it could be justified that ingroup enhancement intention comes to be affected by distraction last of all. It is impossible to answer this directly as there has been no relevant study, to the author's knowledge. However, indirect support comes from the fact that majority of previous reviews agree that ingroup bias is dominant in minimal group situations compared with fairness, out group bias etc. (see Brewer & Kramer, 1985; Messick & Mackie, 1989; Tajfel, 1982; Wilder, 1986). This fact can justify the proposition that ingroup enhancement intentions should be sustained under stronger distraction. That is, ingroup bias is a principal phenomenon throughout most minimal group experiments, *despite* all sorts of different research interests, and their experimental manipulations, as well as a variety of settings, which may well be distracting with various magnitudes. In order to draw this pattern, ingroup-esteem maintenance/enhancement intention should be sustained under stronger distraction.

Studies on individual-group discontinuity also document robustness of competitive nature of interaction (ingroup bias in the present context) in intergroup situations (e.g. Insko *et al*, 1988). This phenomenon also supports, in the same vein, the proposition that ingroup-esteem maintenance/

---

[9] That is, the simple increase of rating bias with distraction is thought to mirror the decrease of the inhibition of intentional processes to the expression of the cognitive process.

enhancement intention should be stronger in intergroup situations than the other intentions.

Differences from social cognition approach Recent studies on stereotyping have found that distraction facilitates use of stereotypes. If ingroup bias is equated with stereotype use, its increase can be explained also by the ideas such as "cognitive busyness" (Gilbert & Hixon, 1991) and "accuracy selectivity" (Stangor & Duan, 1992).[10]

It may be useful to point out the differences between these authors' ideas and the current "noise" explanation. Firstly, these authors' ideas would explain initial increase with distraction, but would not predict subsequent decrease of ingroup bias. They would predict a simple linear increase of stereotype use with distraction [though Gilbert & Hixon (1991) demonstrated that stereotype "activation" is a different matter], whereas the current hypothesis also predicts a decrease after a mid-point.

Secondly, the theoretical explanations provided by these authors are either only functional [survival value of stereotype use, for example, in Gilbert (1989)], or not given at all. In contrast, the current explanation specifically assumes dynamic mutual interference among different intentions. An advantage of the current explanation is not only that it gives a more visibly comprehensive explanation of the change of ingroup bias, but also that, with its specificity, it can contribute to construct the basis on which more specific hypotheses can be empirically tested.

Self-reported strategies The results of recognition of the point allocation strategies, on the other hand, did not necessarily give support to this "noise" explanation because recognised intentions (strategies) in point allocations were not always weak, especially for the fairness intentions, in the strong distraction condition. However, these self-reported strategy measures

---

[10] Similar idea is found also in the formulation of Fiske & Neuberg (1990). However, these explanations are not plausible since there is no previous stereotypes in a minimal group situation. Groups are created in minimal group situations at the spot.

were taken *after* the experimental tasks, so they may well have been affected by the actual allocation which subjects had administered. Furthermore, it is thought that the accuracy of self-reports may have decreased on the whole as distraction increased. Therefore, it could still be argued that distraction reduces the impact of many intentions as it becomes stronger. Together with the problem, discussed earlier, of inconsistency between the pulls and self-reports, it is hoped that better measures will be developed in the future studies.

Although this "noise" hypothesis needs further investigation, the present model explains the different results pattern obtained in Pilot study 1 and Experiment 1 in a consistent way, and in turn, supports the basic assumption of the research: intentionality of the social identity process of ingroup bias.

Alternative interpretation One might suggest that the pattern of allocation bias could be explained by social facilitation. Thus, it is argued that moderate distraction increases drive level resulting in better performance in certain types of tasks (Baron, 1986).

However, the other results in the present study are not consistent with this explanation because the other pulls such as F against MD•MJP would have followed the same pattern as the discriminatory pulls if the social facilitation explanation were correct. That was not the case (see Table 4.4). Therefore, the social facilitation explanation can provide at best a partial explanation for the effects of distraction in the minimal group situation.

Summary

Given the contradictory results of Pilot study 1 and Experiment 1, the aim of the present study was to clarify the effect of distraction more precisely, by varying the degree of distraction at three levels: no, moderate, and strong distraction. General findings in Experiment 2 were that ingroup bias in point

allocations was strongest in the moderate distraction condition while ingroup bias in rating tasks was strong equally in the strong and the moderate distraction conditions. These findings support the "noise" interpretation put forward in Study 1, allowing integration of the inconsistent results in Pilot study 1 and Experiment 1. However, results of correlational analyses were mixed concerning the relationship between group membership salience and ingroup bias, and several issues were raised for future research.

Chapter 5

Study 3. Digit rehearsal task and colour band scales

— Reports of Pilot study 2 and Experiment 3 —

Contents

5.1 Purposes of Study 3

5.2 Pilot study 2

5.3 Experiment 3: Method

5.4 Experiment 3: Results

5.5 Discussion

Chapters 3 and 4 reported the initial set of empirical studies (Studies 1 and 2) that examined the ideas set forth in chapter 2. Reported in the current chapter are the subsequent efforts of another stage of the research. The common empirical assumption in Studies 1 and 2 was that the point allocation indices could capture the social identity process better while the rating indices concerned the category differentiation process more. The present study endeavoured to develop, for the category differentiation process another, less evaluative, index: perceptual differentiation on colour bands. A new distracting technique was also employed as a validity test for the concept of "distraction".

Pilot study 2 was conducted to check the characteristics of the new measurement for category differentiation, and to choose appropriate materials for the new distracting task. Experiment 3 was designed to examine these new techniques in a minimal group situation.

5.1 Purposes of Study 3

This study is concerned broadly with two issues. The first pertains to a new measurement of the cognitive process of category differentiation. The second issue involves construct validity of distraction. A new distraction technique was introduced. The following two sub-sections discuss these issues in turn.

The measurement of category differentiation

It has been presupposed, in Studies 1 and 2, that rating indices reflect the cognitive process of category differentiation more than the motivational process of social identity, and that they do so better than the allocation indices. While this assumption will be tested in a later study, the present study aims to use another measure in an attempt to capture the effect of the cognitive process, closer to the theoretical assumption: pure category differentiation.

Although the cognitive process may also involve ingroup favouritism "as a result" (see the chapter 1 for discussion in this connection), the essential aspect of the cognitive process of category differentiation is thought to be differentiation between ingroup and outgroup. Moreover, because rating indices are not, in the absolute sense, responsible only for the cognitive process, the outcome on the rating indices are, it can be argued, confounded with other processes, espcecially with the social identity process. Therefore, it is necessary to find a way of detecting category differentiation using an index where the motivational process would not have an influence, in order to separate the effect of the cognitive process from that of the motivational process. This index must be a non-value laden one.

For non-value laden indices, one of the ways to realise value-free measures is to use a projective method. As an implementation of this type, "colour-gradation scales" was created for this study. Subjects were asked to

indicate the positions reflecting their images of the people in ingroup and outgroup, using scales showing a gradation of a colour (colours), (see the examples in Appendix 5.2). Several types of gradation colour band were included. One type of the band gradually changes from deep blue colour to deep red colour via white in the centre. This band was supposed to measure the perceptual differentiation between ingroup and outgroup ("blue" group and "red" group). Another measure is a colour band independent of the groups' colour; it varies from deep brown, via pale brown, to white, and is expected to be relatively unrelated to the degree of category differentiation. In one sense, the brown band is an analogue of the non-differential dimensions in Experiments 1 and 2, and the blue-red band of the differential dimension. Because the tint of the colours is thought to represent, projectively, perceptions of the groups, greater difference between colour images is taken to reflect more perceptual differentiation.

An advantage of the colour bands is that there is no strong reason to assume either of red or blue is better than the other apart from personal preferences. On the other hand, one of the problems of using colour gradation is that one can have any interpretation of the colour so that the use of colour does not guarantee equally non-value laden category differentiation for each individual. Another problem would be that identification with the ingroup may affect the distance of the two groups such that strong identification to the blue group, for example, may shift the location of the image to the extreme end of dense blue. This may be the case because the extreme end tends to represent maximum prototypicality out of the ingroup distribution (cf. Turner *et al.* 1987). It follows at least that the colour scale can not be absolutely independent from identity process. For the above two reasons, random assignment of subjects to conditions is especially important.

Construct validity of distraction

The second issue is related to the construct validity of distraction. The previous studies in the thesis used the concurrent italic-letter-finding task as the distraction manipulation. This manipulation for distraction seemed successful as argued in the preceding chapter. However, there is a possibility that the results pattern obtained might be indigeneous to the particular distracting task rather than due to distraction in general. To check this, therefore, another manipulation was introduced in this study: a digit rehearsal task.[1]

A digit rehearsal task was introduced in the current study as the new manipulation for distraction, following studies in social cognition (e.g. Gilbert & Osborne, 1989; Swann, Hixon, Stein-Seroussi & Gilbert, 1990). Subjects were asked to rehearse a number while they were engaging in experimental tasks. This manipulation has been documented as depriving subjects of some part of their mental resources. In Gilbert & Osborne (1989, Exp.1), for example, situational modification, *i.e.* the second stage of the impression formation (e.g. Trope, 1986) was shown to be impaired by an eight-digit number rehearsal task for college students while characterisation, the first stage which was hypothesised to need less mental resources, was intact. In another study, contrast effect of impression formation, which was assumed to derive from more demanding mental processes, was inhibited when college students had to recite tape-recoded numbers (Martin, Seta & Crelia, 1990). However, it has not been clear, so far, what proportion of mental resources is taken away by various loads of this task. Nor has there been any independent validating measure of distraction. Therefore, the impact of the number of digits to be rehearsed was examined in the pilot study.

---

[1] A small pilot test was earlier conducted, among postgraduate students, for another method of distraction: unclear printing. However, this method was found ineffective, thus was not adopted.

One of the problems about distraction is that there is no index, to the authors knowledge, to measure the objective degree of distraction. Consequently, the results of the pilot study, concerning the length of the digits may not be generalizable to the tasks of interest in the main experiment. In other words, it is difficult to make precise predictions as for the effect of the digit rehearsal manipulation on the dependent measures. Hence, the pilot test was designed simply to observe how distracting the task would be perceived, and at least to avoid prospective extreme manipulations.

Another issue about distraction is its by-products. It could be possible that distraction increases the general level of unwillingness. This may affect the degree of ingroup bias. Therefore, items to check affective consequences of the digit rehearsal task were included in the pilot study.

5.2 Pilot study 2

A pilot study was conducted firstly in order to construct the measure for category differentiation described earlier, and to examine its characteristics in relation with other similar measures. Secondly, the pilot study aimed to test the new distraction technique described in the previous section, and to select the adequate degree of the distraction manipulation for the main experiment.

Method

Forty-two boys and girls at a grammar school in Kent, England, participated in an experiment using a four factor repeated measures design. The study was conducted in two sessions: one session for a half of the subjects by a British male experimenter; the other session for the other half by a Japanese male experimenter. For a measure of category differentiation, "colour band scales" were created by photographically attaching and reducing gradation papers. They were a black-grey-white gradation and a

red-white-blue gradation. As another measure for category differentiation, a modified version of the psychological distance map method was adopted (Wapner, 1978). On both measures, subjects had to indicate the places that represent ingroup and outgroup members. Four direct similarity scales were also included (e.g. "How similar do you think British people are to French people?" : in their favourite food, 1. very similar – 9. very dissimilar). See Appendices 5.1 and 5.2 for details of the measures.

There were four sets of experimental materials (see Appendix 5.2 for an example). Each set was concerned with a different pair of target groups on which subjects had to make mainly differentiation/similarity judgements. These pairs were, Labour– Conservatives, American people–Chinese people, British people–French people, and Hawaiian people–Malaysian people. After the explanations of the tasks with an example set, subjects were asked to memorise a rehearsal number, provided in a small envelope, for a period of 25 seconds. Immediately after the memory task, set 1 was presented, at the end of which subjects had to write down the rehearsed number as well as to answer check items for distraction, affective consequences, morale to the tasks, etc. Likewise, sets 2 & 3 were presented, each preceded by a memory task. Set 4 was similarly administered except that there was no rehearsal number (see Appendix 5.3 for instructions). The rehearsal numbers were, three-, five-, and seven- digit numbers, respectively, for sets 1, 2, and 3. The target pair Labour–Conservatives was always in the set 1, but the other target pairs were counter-balanced across the sets 2, 3 and 4.

Results and discussion [2]

Interrelations among the category differentiation measures The differentiation/similarity scores on the measures revealed differential pattern of similarity among the scales. Specifically, the black-grey-white band scale

[2] See Appendix 5.1 for details of the results.

and the red-white-blue colour band scale showed different configurations. The pattern of the black-grey-white band scale for the different target pairs was similar to that of the psychological distance measure, while the red-white-blue colour band scale mapped closely onto the difference between the target pair, Labour and Conservatives (see Table A5.1.1 in Appendix A5.1).

Meanwhile, factor analyses showed that the colour band scales formed a single factor independent of the other scales quite consistently across the target pairs, and that the psychological distance measure, a seemingly similar scale, constituted a factor with the direct differentiation/ similarity scales (see Tables A5.1.4 ~ A5.1.11).

A possible interpretation of the above two sets of results is that the factor analyses captured similarity and differences among the measures, *i.e.* characteristics of the measures, whereas comparison of target pairs showed different sensitivity, or relevance, for the target groups among the measures.

Perceptions of the memory task Generally, the three- and the five-digit numbers were perceived to be easy to remember (*M*s =8.35 and 6.78, respectively, on the scale which could range 1. very difficult to 9. very easy), and not distracting (*M*s =7.60 and 5.73, respectively, on the scale which could range 1. very much [distracting] to 9. not at all). The seven-digit number was reported to be not very difficult to remember (*M* =4.93 on the above scale), but slightly distracting (*M* =4.58 on the above scale for distraction). Subjects were only slightly annoyed by remembering the seven-digit number, but were not annoyed very much by the three- and five-digit numbers (*M*s =4.40, 7.75 and 6.08, respectively, on the scale which could range 1. very much [annoyed] – 9. not at all). Subjects in all conditions reported being willing to participate in the research again (*M*s =3.10 ~ 3.55 on the scale which could range 1. very much [willing] – 9. not at all; see Tables A5.1.12 ~ A5.1.16).

These results may indicate that rehearsal of the seven-digit number only can be moderately distracting, at least so perceived. On the other hand, it

is difficult to predict what degree of distraction the present manipulation will evoke in the main experiment. The first reason is that there is no evidence of the perceptions having been good indices of inner distraction. The second reason is that the degree of distraction may interact with the main task in which subjects will be engaging, and the interaction may be different from that with the task used here: the differentiation/similarity judgements.

5.3 Experiment 3: Method

Because even the seven-digit number for the memory task — the longest number — was found, in Pilot study 2, to be perceived as only mildly distracting, a nine-digit number was added to the rehearsal numbers for the memory task. Therefore, four levels of distraction was manipulated in a minimal group experiment in Experiment 3. The general experimental procedure was similar to that of Experiments 1 and 2 except for the distraction manipulation.

Method

Subjects Three classes of pupils in year eight (13-14 years) at a grammar school in Kent, England, participated in the experiment. The experiment was conducted in a single session in the school hall by a British male experimenter. Actually 54 pupils (21 male and 33 female) out of originally 75 in the three classes served as subjects. Five or so other pupils served as assistants for the experimenter. The rest failed to turn up to the session. The session was held on the last Friday of the academic year and the day before the school athletics day.

Experimental design Subjects were randomly assigned to the four experimental conditions. These conditions differed in terms of the distraction manipulation: subjects in the four conditions were asked to remember,

respectively, a three-, five-, seven-, and nine-digit number during the main tasks.[3]

Procedure The procedure was identical to that of Experiments 1 and 2 except for the distraction manipulation and the related instructions. The whole session took about 25 minutes. To repeat just briefly, after the general instructions (see Appendix 5.4), subjects were asked to pick up a lot from a box. On the lot were a group name and a personal number. It was then explained, with posters (see Appendix 3.4), how subjects had been divided into the two groups and that they were going to play a game within the groups. Subsequently, the two major tasks, point allocations and evaluative ratings, were explained with examples on posters in the front and an explanation sheet at hand (see Appendix 5.5). The distraction manipulation was introduced at this point. Subjects had been given a small envelope in which was a rehearsal number slip. Subjects were asked to take out the rehearsal number from the envelope and to remember it. Twenty-five seconds was given to learn the number, then subjects put the number back to the envelope. After this memory task, subjects filled in the dependent measure booklet. Both during the explanations of the tasks and while subjects were completing the booklet, the manipulation of group membership salience was reinforced all the time in the same manner as in the salient conditions in Experiment 1. The subjects reported the recalled rehearsal number after the dependent measures and before the manipulation check items. After everybody finished the booklet, subjects were debriefed and dismissed.

The dependent measure booklet The dependent measure booklet was similar to that of Experiments 1 and 2. The major differences were that the current booklet contained differentiation/similarity measures and new check items (see Appendix 5.6 for an example).

---

[3] It was administratively impossible to include a control condition (no distraction) because it needed a separate instruction which could not be implemented in one session due to the availability of subjects.

There were boxes at the top of each page of the booklet in which subjects had to indicate their group name and personal code. There was also a warning, below the boxes, about the rehearsal number: "IMPORTANT: Don't forget the rehearsal number!". The main part of the booklet consisted of: a) point allocation matrices, b) direct differentiation/similarity measures, c) evaluative ratings for ingroup and outgroup members on social dimensions, and d) the colour band measures.

The point allocation matrices (a) and the evaluative rating scales (c) were identical to those in Experiments 1 and 2. The direct differentiation/ similarity scales (b) consisted of four items. To the question: "How similar do you think the red group people are to the blue group people?", subjects answered on the scales 1) in their favourite food, 2) in their favourite colour, 3) in their hobbies, and 4) in general (all could vary from 1. very similar to 9. very dissimilar).

Colour band scales For the colour band measures (d), there were two types. One scale had red at one extreme and blue at the other extreme. The colours gradually decrease in hue towards the centre, and is white in the centre of the scale. A blue and a red sheet of gradation paper ([Decadry DP214 and DP207) were photographically attached and reduced to the size of the scale (see Fig. 5.1 and also Appendix 5.6). Another colour band scale had dense brown at one extreme and pale brown at the other ([Decadry DP221]). This was also photographically reduced to the size of the scale. On the scales, the more category differentiation, the more distance was expected between the categories. The order of the bands, and the right-left direction of each band, were counter-balanced across the conditions.

There were three versions for the order of the above measures: 1) a-b-c-d, 2) a-d-c-b, and 3) c-b-a-d. Eight, 28, and 18 subjects filled in the booklet versions 1, 2, and 3 respectively. These measures were followed by the Collective Self-Regard Scale (Sigger, 1992), and manipulation check items.

Manipulation checks The first part of the manipulation checks concerned self-reported strategies in point allocation. The second part concerned items for group membership salience and distraction. These items were the same as in Experiment 1. The items in the second part were:

- "When you gave points to people, how much did you think about your own group?" (1 very much–7 not at all); and
- "When you gave your views about the other group, how much did you compare it with your own group?" (1 very much–7 not at all).
- "How much did you concentrate on the questions when you answered them?" (1 very much–7 not at all); and
- "How much were you distracted when you answered them?" (1 very much–7 not at all).

For the affective/morale consequence of the distracting task, the following new item was included:

- "How willing would you be to take part in the research again?" (1 very willing–7 not at all).

In regard of the digit rehearsal task, the following items were included:

- "How difficult was it to answer the questions?" (1 very difficult–7 very easy);
- "How difficult was it to try to remember the number?" (1 very difficult–7 very easy).

Band 1

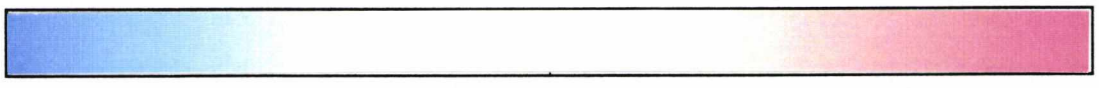


Fig. 5.1 An example of the colour gradation bands

5.4 Experiment 3: results

Manipulation checks

Distribution of subjects The number of subjects assigned to each condition is displayed in Appendex 5.7. The distribution of the booklet versions and the division into the "red" and the "blue" groups are also shown in the table. Chi square values of every pair of the independent variables were examined, showing no indication of dependency among variables.

Distraction manipulation[4] The results of the manipulation check items are shown in Table 5.1. There were no differences between conditions on the check items for the distraction manipulation except for one. The item was about difficulty in remembering the rehearsal number. The longer the digit number, the more difficult, relatively, it was reported to be to remember. However, even the longest rehearsal number (9-digit) was not perceived as difficult to remember (not significantly different from the neutral point). Moreover, this item did not constitute a direct check for the distraction manipulation since it asked about the property of the distracting task, but not of its impact on the main tasks.

Failure in completing the main tasks can be an index of distraction. However, the number of failures did not significantly differ among conditions, and was very low in all conditions. In addition, responses on the "distracted" item were around the neutral point and towards the "not at all distracted" extreme, across the conditions. Therefore, together with the results in Pilot study 2, it can be said that rehearsal of even the longest digit (9-digit) number was perceived only as moderately difficult to remember, and that there is no direct evidence, in this experiment, of strong distraction by the manipulation.

---

[4] Subjects did engage in the distraction task in the intended manner in each distraction condition. In the 3-digit and 5-digit conditions, all the subjects recalled the rehearsal numbers correctly. In the 7-digit and 9-digit conditions, slightly fewer subjects reported the rehearsal numbers correctly (12 and 9 respectively). See Appendix 5.7 for further details.

Other items The results of the check items indicated that there was no significant difference among conditions for group membership salience and morale for the tasks (see Table 5.1).

Point allocation indices

Total points As in Experiments 1 and 2, total points given to ingroup and outgroup were calculated from the point allocation matrices (Table 5.2). This index was subject to a 4 (distraction) x 2 (repeated measure: ingroup *vs.* outgroup) ANOVA. The effect of ingroup-outgroup factor was significant, showing the usual ingroup bias [F (1,46) = 7.43, $p < .01$]. Neither the main effect of distraction nor the interaction effect between distraction and ingroup-outgroup factor was significant [F (3,46)=.77, *n.s.*; F (3,46)=.53, *n.s.*].

Pull scores Pull scores of strategies were calculated and are displayed in Table 5.3. Consistent with the results of Experiments 1 and 2, the pull of F (on MD•MIP) was larger in size than those of the other strategies. However, the overall results pattern with distraction was not very clear. While the pull scores of MD•MIP (on MJP) and MD (on MJP•MIP) were largest in the 9-digit condition, the pull score of MD•MIP (on F) was largest in the 5-digit condition. Moreover, there were several negative pull scores. There was no effect of distraction on the pulls except for a tendency for the pull of MD (on MJP•MIP).

Table 5.1 Manipulation checks

Distraction: Items	3-digit (n =13)	5-digit (n =13)	7-digit (n =14)	9-digit (n =14)	F value
Distraction check					
"Concentrated"	5.00 (1.58)	4.85 (.99)	4.14 (1.51)	5.00 (1.22)	1.26
"Distracted"	3.08 (1.78)	3.50 (1.23)	3.25 (1.48)	3.08 (1.44)	.21
"Difficult to answer the questions"	4.58 (2.23)	3.00 (2.22)	3.58 (1.56)	3.92 (2.29)	1.19
"Difficult to remember the rehearsal number"	1.38_a (.65)	2.08_a (1.75)	3.00_a (2.00)	4.31_b (1.93)	7.34*
(N of subjects who failed to complete the tasks	1	1	2	0	N.A.)
Group membership salience					
group thoughts in allocations	3.92 (1.66)	3.92 (2.25)	3.71 (2.23)	4.00 (2.00)	.05
group comparison in ratings	4.08 (1.89)	3.00 (1.78)	3.71 (1.82)	3.31 (1.75)	.88
CSR scale score §	39. 66 (9.31)	40.08 (8.63)	36.29 (7.34)	38.15 (6.59)	.62
Others					
"Willing to participate in the research again"	4.50 (1.88)	5.17 (1.75)	5.50 (1.93)	5.00 (1.63)	.64

1) The figures are arranged such that the higher the figure, the more of the contents they indicate (range 1-7).
2) The figures in brackets are standard deviations.
3) The questions in manipulation checks were:
"How much did you concentrate on the questions when you answered them?",
"How much were you distracted when you answered them?",
"How difficult was it to answer the questions?",
"How difficult was it to try to remember the number?", and
"How willing would you be to take part in the research again?"

§ Chronbach's a for the nine items of the scale was .76. From the left, n =12, 13, 14 & 13.

* df =3/52, $p < .001$

Table 5.2 Total points in point allocation tasks

Recipients	3-digit (n =12)	5-digit (n =12)	7-digit (n =12)	9-digit (n =14)	F value:
Ingroup members	46.58 †	49.25	46.83	48.00 †	.44
Outgroup members	43.25	44.58	45.58	42.07	.82

† The difference between total points for ingroup and outgroup members: t (11)=1.82, $p < .10$, for the 3-digit condition; t (13)= 1.93, $p < .10$, for the 9-digit condition.

Table 5.3 The mean pull scores of each strategy

"pull"	3-digit (n =12)	5-digit (n =12)	7-digit (n =12)	9-digit (n =14)	F value
MD•MIP (on MJP)	.75	.83	.17	1.00	.23
MD•MIP (on F)	.33	$1.50^{\#}$	.00	.50	1.04
MD (on MJP•MIP)	.42	$-.83_a$	.75	$1.93_b{}^{\#}$	$2.35^{\dagger}$
F (on MD•MIP)	1.83	$2.17^{\#}$	$3.50_a{}^{\#}$	1.21_b	2.14
MJP•MIP (on MD)	-.75	.50	.58	-.64	.90
MJP (on MD•MIP)	.08	.33	$-1.33^{\#}$	.00	1.12

1) # denotes the figure is significantly different from zero point ($p < .05$)
2) Different subscripts on a line denotes they are significantly different ($p < .05$)
3) F value: † $p < .10$, df =3/46 for all effects.

Rating indices

Evaluative ratings [5] Rating ingroup bias was calculated by subtracting the outgroup rating score from the ingroup rating score for each of the five dimentions. The results are displayed by condition in Table 5.4.

[5] Factor analyses were conducted separately on the evaluative rating indices and on the pull scores as in Experiments 1 and 2. Factors from these analyses this time showed very different pattern from those in the previous studies. See Appendix 5.7 for detail.

These rating bias indices were subject to a 4 (distraction) x 5 (repeated measures: dimensions) ANOVA.[6] The effects of distraction, dimensions, and the interaction were not significant [F (3,45)=.11; F (4,184)=.44; F (12,184)=.74]. Separate ANOVAs were conducted for each dimension, indicating no significant effect of distraction for any rating dimension. There was no consistent tendency among dimensions. The grand mean of the composite score was significantly larger than the neutral point (M =3.16, p <.05).

The most differential dimension in rating [7] Rating bias on the most differential dimension (as chosen by the subject) and the mean rating bias of the other four dimensions were displayed in Table 5.5. These indices were subject to a 4 (distraction) x 2 (repeated measure) ANOVA. The effects of distraction, dimensions, and the interaction were not significant [F (3.47)= .01; F (1,47)= 2.01; F (3,47)= .01].

Preference rating of the person as a friend The preference score was calculated by subtracting the preference rating of outgroup members as a friend from that of ingroup members. The results are shown in Table 5.6 by condition. This index was subject to a oneway ANOVA with four levels of distraction (3-, 5-, 7-, and 9-digit numbers).[8] The main effect of distraction was not significant [F (3,45) =.82, $n.s.$]. The grand mean was significantly larger than the neutral point (M =.46, p <.05).

---

[6] Group division was entered as a covariate as it had a significant effect on the dimension, warmth [Ms =1.81, -.19, respectively for the "red", and the "blue" groups: F (1,55)=13.24, p <.001].

[7] 17, 10, 13, 7, and 4 subjects chose respectively warmth, honesty, friendliness, trustworthiness, and generosity as the most differential dimension. Three did not answer.

[8] Group division was entered as a covariate as it had a significant effect on this index [F (1,52)= 7.12, p <.05].

Table 5.4 The mean rating bias on each dimension

Distraction: dimension	3-digit (n =12)	5-digit (n =12)	7-digit (n =12)	9-digit (n =14)	F value
warmth	1.25#	.58	.50	1.07#	.31
honesty	.42	1.25	.50	.43	.64
friendliness	.58	.67	1.00#	.43	.26
trustworthiness	.25	.58	.50	.50	.13
generosity	.17	.42	1.33#	.29	1.22
Composite score	2.67	3.50	3.83#	2.71#	.13

1) The figure indicates ingroup bias. The higher the figure, the more in favour of ingroup.
2) # denotes the figure is significantly different from neutral point zero ($p < .05$).
3) F value: df =3/46. No effect was significant.

Table 5.5 Rating bias on the most differential dimension and the others

Distraction: dimension	3-digit (n =13)	5-digit (n =12)	7-digit (n =13)	9-digit (n =13)
The most differential	1.00	.92	.92	1.08
Mean of the others	.52	.48	.48	.46#

1) The figure indicates ingroup bias. The higher the figure, the more in favour of ingroup.
2) # denotes the figure is significantly different from the neutral point zero ($p < .05$)

Table 5.6 Ingroup bias in preference of the person as a friend

Distraction:	3-digit (n =12)	5-digit (n =12)	7-digit (n =12)	9-digit (n =14)	F value
Ingroup bias in preference	.50	.50	.83#	.07	.82

1) The figure indicates ingroup bias. The higher the figure, the more in favour of ingroup.
2) # denotes the figure is significantly different from the neutral point zero ($p < .05$)

The colour band scales

Three indices were calculated from the colour band scales. The first index is a simple distance in millimetres between the letters, each representing one of the two groups. The second and the third index are corrections of the first one concerning the reversed direction. See notes in Table 5.7 for details.

As can be seen from the upper half of Table 5.7, the expected significant correlations of the colour band indices with the Collective Self-Regard score and its cognitive component were not obtained.[9] Secondly, rating indices positively correlated with the brown colour band indices, but not with the red-blue band indices. The lower half of Table 5.7 displays the results of exploratory examinations made of each variable in the present study concerning the colour band indices.

Those variables that had significant correlations with the colour band indices are listed here. Ignoring indices A and B on the brown band for the reason in note ($) at Table 5.7, significant correlations were obtained: between Distance on the red-blue band and, respectively, group comparison in ratings and Thoughts factor score; and between Distance on the brown band and, respectively, concentration and Thoughts factor score. In short, the more subjects thought, the less distance there was between the groups.

[9] Cognitive component consists of two items of Sigger's (1992) CSR scale: "Right now, I do not feel close to this group." and "I feel strong ties to this group." The higher the number, the more salient the category is in subjects mind.

Table 5.7 Pearson's correlation coefficients between the colour band scale indices and other variables

Association	Red-blue band			Brown band		
	Distance	Index A	Index B	Distance	(Index A	Index B)[S]
Predicted						
Collective self-esteem score	.14	.05	.09	-.15	-.35*	-.34*
Its cognitive component	.07	-.24	-.14	.05	-.11	-.07
Composite score of rating bias	-.02	.08	.05	.35**	.11	.23
Its absolute value	.13	.18	.18	.27*	.08	.16
Not predicted [§]						
C 7 (group win)	-.08	-.01	-.04	-.00	-.32*	-.27
C 8 (nothing in particular)	.18	.17	.19	.21	.28*	.33*
C 11 (concentrated)	-.18	.04	.04	-.42**	-.40*	-.49*
C 13 (group comparison in ratings)	-.35**	-.17	-.26	-.05	-.33*	-.31*
C 14 (difficulty in answering)	-.08	.06	.01	.00	.28*	.25
Thoughts factor [§§]	-.35**	-.02	-.15	-.27*	-.40**	-.44**

* $p < .05$, ** $p < .01$.

1) Distance is the distance on the colour bands in mm. *M*s (*SD*s)= 88.80 (40.06) and 69.39 (39.36) respectively for Red-blue and Brown bands (n =54). The grand means were significantly larger than the distance on the example band (49mm) (two-tailed t-test, p <.05).
2) Direction of the colour by 12 subjects on the blue-red band out of 54 (22.2%), and 26 subjects on the brown band out of 53 (48.1 %) was reverse to the expectation (*i.e*, the red group point at the blue and the whiter side of the red-blue and the brown band respectively, compared with the blue group point)
3) Index A was corrected such that the distance was given a negative valence when the direction of the band colour and the group colour was reversed
4) Index B was corrected such that the distance was equated with zero when the direction of the band colour and the group colour was reversed

S These indices may not be appropriate since whether reversal or not was arbitrary.

§ The scale score has been arranged so that the positive valence of the correlation coefficients indicates the positive relation between the indices and the content of the item.

§§ A factor extracted from a factor analysis for the check items. Three items, C10 (group thoughts in allocation), C11 (concentrated), and C13 (group comparison in ratings) loaded heavily on this factor.

Analyses on the factors in differentiation/similarity scales

Factor analysis The differentiation/similarity scale scores were subject to a principal-components analysis. Two factors were extracted on the basis of eigenvalues (2.00 and 1.16 respectively; 33.3% and 19.3% of the total variance were explained respectively), and were obliquely rotated. The factor loadings of each scale are displayed in Table 5.8. As can be seen in the table, the first factor corresponds to the direct differentiation/similarity scales, and the second to the colour band scales. This pattern is consistent with the results in Pilot study 2.

Correlation between factors and ingroup bias indices Pearson's correlation coefficients were calculated between the factor scores and the indices for ingroup bias. The ingroup bias indices were calculated in the same way as in Experiments 1 and 2. That is, the allocation index is from three competitive pull scores, and the rating index from ingroup bias on the five dimensions. These correlation coefficients are shown in Table 5.9. The direct differentiation/similarity scales factor correlated negatively with the allocation index, while the colour bands factor correlated positively with the rating index.

The factor scores for differentiation/similarity were subject to a 4 (distraction) x 2 (factors: repeated measure) ANOVA. Neither effect of distraction, factors, or the interaction was significant [F (3,50)=1.43; F (1,50)=.00; F (3,50)=.13; all *n.s.*]. Mean factor scores are shown in Table 5.10 by condition.

Table 5.8 The factor loadings of the differentiation/similarity scales

scale	Factor 1	Factor 2
direct scale 2	.758	
direct scale 1	.711	
direct scale 4	.676	-.393
direct scale 3	.672	
Brown band scale (distance)		.742
Red-blue band scale (distance)		.651

1) The figure is the factor loading of the item. Absolute loading value less than .30 are omitted.
2) 52.6% of the total variance is explained by the two factors.
3) The correlation between the factors was .04 (*n.s.*).

Table 5.9 Correlation coefficients involving differentiation/similarity scale factors#

Factor	Rating index §	Allocation index	CSE
Direct scales factor	-.02	-.35*	-.20
Colour band scales factor	.31*	.01	.03

The figure is pearson's correlation coefficient. The higher the figure, the stronger relationship it indicates between differentiation and ingroup bias. *$p < .05$ (two-tailed), $n = 54$ (pairwise deletion).

§ The rating index is a composite score of rating bias on the five dimensions, and the allocation index of the pull scores of MD (on MJP•MIP), MD•MIP (on MJP) and MD•MIP (on F).

Table 5.10 Differentiation factor scores by condition

Distraction: Factor §	3-digit (n =13)	5-digit (n =13)	7-digit (n =14)	9-digit (n =14)
Direct scales factor	.35	-.12	-.01	-.20
Colour band scales factor	.21	-.01	.13	-.31

§ The figure indicates differentiation between the groups.

5.5 Discussion

Digit rehearsal task

The results of the manipulation checks did not indicate success in distraction manipulation (Table 5.1). This was unexpected in view of the reasonable success in the manipulation in Pilot study 2 and in Gilbert & Hixon (1991) *etc.* This difference can be attributed to the experimental designs employed in the two experiments. That is, length of the rehearsal numbers was manipulated with a within-subjects design in Pilot study 2 whereas it was varied with a between-subjects design in the present experiment. It is thought that subjects in the within-subject design more easily realised subtle differences caused by the length of numbers by comparing the change of their own states.

Not surprisingly, the effect of the rehearsal number length in the present experiment was not observed on any of the dependent variables.

One possibility may be that the memory tasks do not interfere with either the cognitive or motivational processes in minimal group situations. Another possibility can be that the rehearsal task was not effective in the manner it was conducted. Only one number was given in the beginning of the entire session in the current study. While this was also the case in Gilbert and other's studies (Gilbert & Hixon, 1991; Swann *et al.*, 1990), the main tasks in their studies were impression formation. Therefore, the nature of the main tasks may have required stronger and constant distraction in the current experiment for the distraction manipulation to affect the dependent variables. Techniques will therefore need to be improved for the distraction manipulation in future studies.

Colour band scales

Correlational results indicated that the more subjects thought, the less distance there was between the groups on the colour band scales (Table 5.7).

This constitutes a good contrast to the positive correlation between Distance on the brown band and the rating indices. One interpretation of this result would be that the distance on the brown band reflects perceptual differentiation between the groups, and that subjects did not need to think about the group when the differentiation was clear enough, whereas subjects thought more about the groups when there was not enough differentiation between the groups. Thus, it is construed that subjects' thoughts were *reaction* to the situation while the results in ratings were *reflection* of the situation.

This negative relationship between differentiation on the colour bands and the amount of thoughts may appear contradictory to the assertion of automaticity of the category differentiation process. However, this is not necessarily the case. The relationship may indicate that those subjects who failed to differentiate between the groups had to think about them, whereas those who succeeded did not think about the groups.[10] This argument stands on the assumption that differentiation led to thoughts about the groups. Therefore, the direction of causality — thoughts and differentiation — ought to be investigated in the future studies.

Note that the negative correlation between the amount of thought and differentiation between the groups in the present experiment does not comply with the idea of attitude polarising effects of thinking (Tesser, 1978). One of the differences between the current suggestion and those of the attitude polarisation studies is the direction of causality. The present suggestion assumes that differentiation affects the thought (and ingroup bias) while the polarisation model assumes thoughts affect differentiation. Moreover, it is emphasised in the current study that those who *did not* differentiate thought about the groups while the idea of polarisation would underline that those who *thought* should polarise their attitudes. Another difference involves

[10] This interpretation in turn raises an issue of individual differences in engagement of the category differentiation process– why some people tend to differentiate more than others do. However, it is not in the scope of the present thesis.

whether there is a persuasive message (Mackie, Worth & Asuncion, 1990) or not. In the present experiment, there was no explicit message. Therefore, the attitude polarisation studies and the present experiment are not comparable.

Differentiation factors It may be useful to consider differences between the two types of differentiation/similarity measures. Thus, the direct measures are thought to reflect conscious aspects of differentiation/similarity between the groups, while the colour band measures are assumed to tap relatively unconscious outcome.

One of the findings was that the colour bands factor correlated positively with the rating indices while the direct scales factor negatively correlated with the allocation index (Table 5.9). Having the above distinction between the measures in mind, this patten of results is consistent with the idea that category differentiation can be captured with the rating indices, and is consistent with the prediction from the dual process model of the perceptual process and the motivational process.

Thus, the negative correlation of direct scales with the allocation index may be an illustration of the motivational process. That is, the closer one 'thinks' ingroup and outgroup are, the more one is motivated to establish the difference between the two in point allocations (cf. Brown, 1984).

The positive correlation between the colour band scale and the rating index may indicate the functioning of the perceptual process: the perceptual differentiation on the colour band between the groups may appear in ratings since they too are assumed to capture perceptual differentiation. This illustrates an advantage of the colour band scales because conscious similarity, which is assumed to be tapped on the direct scales, is likely, it is thought, to evoke the need for positive distinctiveness, thus is thought to lead to intentional processes, perhaps including the social identity process. In other words, it tends to be confounded with the social identity process. In contrast, the differentiation measures on the colour bands does not

necessarily tap conscious events. Therefore, the colour band measure may be a better index for category differentiation process as an automatic process. It should be noted, however, that the above discussion is based on the correlational analyses. Strictly speaking, therefore, causal relations among those elements are not clear, and requires further investigation.

Conclusion

The distraction manipulation used in the main experiment was not effective. No moderating effect of distraction was shown on ingroup bias indices, either. The reason may be that the way the memory task was conducted did not interfere with the cognitive or motivational processes in the minimal group situation.

The results of correlational analyses concerning differentiation/ similarity measures and the ingroup bias indices demonstrated that the colour band scales could be measuring perceptual differentiation, differently from the direct similarity scales. The correlational pattern gave support to an assumption of the thesis: automaticity of the category differentiation process and intentionality of the social identity process.

Chapter 6

Study 4. The noise hypothesis: digit rehearsal and colour band scales

— A report of Experiment 4 —

Contents

6.1 Aims

6.2 Method

6.3 Results

6.4 Discussion

This chapter reports Experiment 4. Study 3 introduced a new distracting task and a new measure for category differentiation: the digit rehearsal task and the colour band scales. While the study indicated some validity of the new category differentiation measure— it showed similarity to rating indices and differences from direct similarity scales— manipulation of the distracting task did not cause the expected differences among the conditions. This was presumably due to the way distraction was effected. Hence, the present study was designed first to improve the distraction technique in Experiment 3, second, to examine characteristics of the colour band scales and third to manipulate category salience. Finally, the noise hypothesis was further explored utilising individual differences in various allocation strategies.

6.1 Aims

Digit rehearsal task

The first purpose of the current study is to provide a further test of the digit rehearsal task as a distraction manipulation in a minimal group

situation. As reviewed earlier, digit rehearsal tasks have been used and have proved to be an effective method to disrupt cognitive activities in studies of impression formation. However, Study 3 indicated that the digit rehearsal task did not have effects on intergroup discrimination in a minimal group. Two alternative interpretations were suggested. First, memory tasks in general do not interfere with processes in a minimal group situation. Second, the memory task was not administered effectively in Experiment 3. Hence, to examine these possibilities, the current experiment was designed to elicit a stronger impact of digit rehearsal by giving subjects even longer strings of digits, repeatedly. Although it is expected that distraction will have effects on both allocation bias indices and rating bias indices, it is again difficult to predict the direction of the distraction effect as the degree of distraction produced by the digit rehearsal task is not known. (See earlier chapters for the hypothesized relationship between the degree of distraction and allocation and rating bias.)

Colour band scales and category differentiation

A second purpose of the study was to test an assumption about the colour band scales: that the distance between the letters (which represent the two groups on the colour band) reflects the degree of category differentiation. To check this assumption, an attempt was made to vary the degree of category salience. It is expected that the distance between the groups on the band scale will be greater in the salient category condition than in the non-salient category condition. Note that category salience is distinguished theoretically from group membership salience. Category salience refers to the degree of distinction between the categories (*i.e.* ingroup *vs.* outgroup) whereas group membership salience relates more directly to ingroup membership.[1] Therefore, it is emphasised that this prediction does not

[1] For example, take a national category and its membership. An international level of comparison may make one's national category salient while reference to and emphasis on

concern group membership salience, but category salience (cf. hypothesis 3 in Chapter 2).

Another prediction concerns effects of distraction on differentiation measures from colour band scales. Colour band measures are thought to reflect closely the category differentiation process, and thus to be less vulnerable to intentional processes. Therefore, responses on the colour bands are expected to be relatively free from inhibition by intentional processes (see assumption 4b in Chapter 2). It is hypothesized that distraction will not affect category differentiation measures on colour band scales.

Investigating the noise hypothesis

Another purpose of the study is to test the noise hypothesis put forward in Chapter 4. The noise hypothesis refers to the explanation that the initial increase of the allocation ingroup bias with distraction is caused by interfering noise from other intentions such as fairness, self-presentational concern, and so on in a weaker distraction situation.[2] Moderate distraction removes the noise, leading to greater allocation bias. However, direct evidence for this explanation is required. Therefore, these other intentions are examined directly by the inclusion of items about self-presentational concerns. It is expected: a) that subjects will express more concern about fairness and/or self-presentation in less distracting conditions than more distracting conditions, and b) that there will be no increased allocation bias with distraction among subjects who do not adopt fairness/self-presentational allocation strategies. The reason of the first prediction is that stronger distraction is assumed to remove social desirability concerns. The

---

national tradition, culture, and so on may make one's national membership salient in one's mind. Though these two concepts are practically similar to each other, they can be theoretically distinguished.

[2] It seems that fairness is the largest rival intention in a minimal group situation (Ng, 1986; Wilder, 1986). Meanwhile, self-presentational concern strongly relates to fairness, and is thought to interfere with the ingroup maintenance/enhancement intentions. Therefore, there is a good reason to analyse noise from these intentions.

second prediction is based on the assumption that, among those subjects with less concern for social desirability, there will be little noise from such intentions as fair allocation, self-presentation etc., even in weaker distraction situations.

6.2 Method

Subjects, the venue, and the language

The experiment was conducted at a junior high school in Osaka, Japan (the same school as in, and approximately a year after, Pilot study 1), using two classes of male and female school pupils at their first year (12-13 year old).[3] The language of instructions, a questionnaire, and other experimental materials was Japanese. Thus, quotations from the experimental materials, instructions etc. for Experiment 4 are translations from Japanese (see appendices for original texts). The experimental sessions were administered by a Japanese male experimenter (the author) with a class teacher's assistance in a room which was not usually used for the class.[4] So, the room presumably felt new to them.

Experimental design

The two classes were assigned respectively to Salient and Non-salient category conditions. Within each condition, subjects were randomly assigned to three distraction conditions: Weak, Moderate, and Strong.

---

[3] The cohort of Pilot study 1 were at their second year at the time of this experiment. Pupils were divided into classes at the beginning of the academic year, April 1992, taking account of their origin of primary school and their academic level: each class consisted of roughly equal number of pupils from three primary-school districts, and in a way that each class's academic achievement was even.

[4] There were two group sessions: each session for one class. The first session was on Thursday, 11 December, 1992; and the second on Tuesday, 22 December, 1992, the last day of the term but one. With the presence of the (male) class teacher, the order was kept fairly well, probably to the extent at Dover Boys Grammar School, but not as much as at Queen Elizabeth's School.

Procedure

The procedure was similar to previous experiments, but this time, the entire procedure was divided into four stages, and subjects started each set together.

Subjects were introduced into the experimental room and were seated in order of the class name list, boys and girls separately (There were separate name lists for boys and girls). The desks were separated from each other so as to prevent interaction between subjects. A dependent measure booklet, an explanation sheet, a large envelope, four small envelopes, a black ball-point pen, and a white card (127 mm x 76 mm) had been placed on each of the desk where subjects were seated. The whole session took about 50 minutes.

After the general instructions (Appendix 6.1), each subject drew a lot from a box while the experimenter and the assistant were walking around with the box. The lot gave subjects a personal code and a name of the group to which they were to be assigned. The numbers were all unique and none appeared in the dependent booklet or the explanation sheet. The group name was either "red" or "white".[5] Subjects put the lot into the large envelope, and wrote down the number and the group name in the boxes on the front page of the dependent measure booklet. They were also asked to write them down on the top of each page. Subjects were told to keep the number and the group name secret. It was then explained, with posters (Appendix 6.2), how subjects had been divided "roughly half and half", into the two groups, and that they were going to play a game within the groups.

At this point, subjects in the salient category conditions were asked to visualise, with their eyes closed, their own group and the other group as they were divided into two groups in the room. Colouring of the group names in the experimental materials according to the group labels (see descriptions of

---

[5] "Red" and "blue" are typically used in minimal group experiments which originated in Britain. It is thought that this pair corresponds generally to two opposing parties in British society. The author thinks that the pair "red" and "white" is a Japanese equivalent.

Experiments 1, 2, and 3) was not adopted in the current study, as a method of salience manipulation, for the following two reasons. First, it would have anchored subjects' image of the groups to the particular colours used on the materials, which would have been confronted with the colour band differentiation measures. Second, choice of "white" as one of the groups' colour made colouring inappropriate since "white" cannot be "coloured".

Subsequently, the two major tasks, point allocations and trait ratings, were explained with examples on posters in the front and an explanation sheet at hand (see Appendix 6.3). The distraction manipulation was introduced at this point. Subjects had been given four small envelopes numbered from 1 to 4, in each of which was a rehearsal number slip. Subjects were asked to take out the rehearsal number from the first envelope and to remember it. Twenty-five seconds was given to learn the number, then subjects put the number back to the envelope. Before opening the envelope, it was emphasised that subjects should not cheat as "this memory task is not a test, so it doesn't matter if you forgot the number." However, subjects were advised to "recall the number from time to time as this helps to remember a number for a longer time, according to studies on memory." In addition, they were asked to recall the number when there was a cue on the dependent measure booklet. The cue was "Attention: Please recall the rehearsal number, now". It was emphasised that subjects must not write the number down until they were asked to do so.

After this memory task, subjects filled in the first set of the dependent measures, at the end of which was a further request to write down the rehearsal number. To indicate to the experimenter that they had finished the set, subjects stood a "completion card" (the white card) on the desk. When everyone had finished the first set, the second set was administered together, preceded by the memory task with the rehearsal numbers from the second envelope.

Subjects similarly completed the third and the fourth set. After everyone had finished this last set, subjects were debriefed and dismissed. In the non-salient category condition only, an extra measurement was conducted, before the debriefing, as a manipulation check for distraction. Subjects were presented with the same, but unused, six allocation matrices, and were asked to indicate, on the basis of their recall, which pair of points they had chosen.

The three distraction conditions differed in terms of the length of the rehearsal numbers for subjects to remember during the session. Five-, nine-, and eleven- digit numbers in the non-salient category condition, and three-, nine-, and eleven- digit numbers in the salient category condition were given, respectively, for the weak, moderate, and strong distraction conditions (see Appendix 6.4 for actual numbers).[6]

The dependent measure booklet

There were boxes at the top of each page of the booklet in which subjects had to indicate their group name and personal code. There was also a cue, below the boxes, about the rehearsal number mentioned earlier. The sets of the booklet and their contents were as follows:

The first set —— point allocation matrices [A] (or [B]),
The second set — rating scales for the red group and the colour band scales,
The third set —— point allocation matrices [B] (or [A]),
The fourth set —— rating scales for the white group, Collective Self-Regard scale, and manipulation check items.

---

6 After the first group session where the length of the rehearsal numbers for the weak distraction was five (the non-salient category conditions), it was decided that the length should be shorter in order to achieve "weak distraction"(the salient category conditions). While this change made the experimental design non-factorial in a strict sense, the author believes that the difference between the three- and five-digits conditions is not a serious problem since, as will be seen in the results section, there was no significant difference in subjects' self-reports concerning distraction, and moreover, the category salience conditions were collapsed in the following analyses.

There were two types of booklets. One had the point allocation matrices [A] in the first set and the matrices [B] in the third set. The other had the matrices [B] in the first set and the matrices [A] in the third set. These two types of booklet were distributed randomly in each condition. The point allocation matrices were essentially the same as those of Experiments 1, 2, and 3 (see Appendices 3.7 and 6.5). Matrices [A] correspond to the first three matrices, and matrices [B] to the last three, of these experiments. The rating scales were equivalent to those five scales in Experiments 1, 2 and 3.

The colour band scales utilised brown and red gradation. Each had dense colour at one end and gradually reducing the hue to the other end on a 8mm wide, 148mm long band. The brown and the red bands were cut out from the gradation sheets (*Yunion-Kemikā Co.* : DP221A and DP207A respectively), leaving 61mm from the dense part and 87mm from the pale end for the brown band, and 107mm from the dense end and 41mm from the pale end for the red band. The direction of gradation, and order of the bands were counter-balanced for each of the two booklet types. Therefore, there were eight variations of the colour band scales in each type of the booklet.

The Collective Self-Regard scale (Sigger, 1992) was included. It was translated into Japanese by the author. Wordings of each item were checked and modified with the help of five Japanese post graduate students in social psychology (see Appendix 6.5 for items). Two of the items of the scale are considered to capture the aspect of its cognitive component (English equivalents are: "I feel strong ties to this group" and "Right now, I do not feel close to this group"). Therefore, they are used as a check for category salience.

Items of manipulation checks were mostly the Japanese equivalent to those in Experiment 3. The first part concerned self-reported strategies of point allocation. Those items were: "I tried to be fair to two people", "I tried to be fair to the two groups", "I tried to be self-interested", "I tried to give more points to my group", "I tried to give points to everyone as many as

possible", "I tried to make my group win", "I did it without thinking" [all answer forms (back translated): 1. I did not do so at all– 7. I did so very much].

The second part was related mainly to manipulation checks for experimental conditions. They were: "how much did you think of your own group when you gave points to two people?", "how much did you concentrate on the questionnaire booklet?", "how busy did you feel in rehearsing numbers?", "when you gave impressions of the other group, how much did you compare it with your own group?", "when you answered the questionnaire booklet, how much were you distracted?", "how difficult were the questions in the booklet?", "how much do you think 'I am willing to join the research again, if possible?", "how difficult was it to remember rehearsal numbers?" [all answer forms (back translated): 1. not at all ...– 7. very ...].

In addition to these items carried over from Experiment 3, two new items were included to measure subjects' self presentational concern. One was "I gave points in the way that others wouldn't think I am unfair" [self-presentational allocation strategy] (1. did not do so at all– 7. did so very much). The other was "when you gave points to two people, were you concerned as to how others would think of you?" [self-presentational concern] (1. not at all worried– 7. very much worried).

6.3 Results

Manipulation checks

Distribution of subjects The number of subjects assigned to each of the conditions is displayed in Table A6.6.1 (Appendix 6.6), along with the distribution of the booklet types (allocation matrices order: A-B or B-A) and the division into the "red" and "white" groups. Chi square value for the combination of group division and booklet type was nearly significant [χ^2

(1)= 3.30, p =.069]. Among those who completed the booklet type A-B, 22 subjects picked up the "red" lot, and 17 the "white" lot; among those who completed the booklet type B-A, 14 subjects picked up the "red" lot and 25 the "white" lot. Chi squares for other combinations were not significant.[7]

Distribution of male and female subjects in each condition is shown in Table A6.6.8 (Appendix 6.6). There was no significant dependency between sex and distraction conditions [$\chi^2(2)$= 2.34, *n.s.*], and sex and salience conditions [$\chi^2(1)$= .05, *n.s.*]. Nor was there a dependency between sex and group division [$\chi^2(1)$= 1.28, *n.s.*] and sex and booklet type [$\chi^2(1)$= .77, *n.s.*].

Experimental manipulations The results of the manipulation check items are displayed in Table 6.1. For the distraction manipulation, two items showed the expected significant difference between the distraction conditions. As distraction increased, the more subjects felt busy and found it difficult to remember the numbers [*F*s (2,72) =6.54 and 10.48, p <.01].

Another check for distraction was the number of correctly recalled point allocation decisions. This index ranges from 0 to 6. The higher the number, the more accurate is the recall. Inaccuracy is assumed to reflect the degree of distraction. Contrary to expectation, moderate distraction led to the most accurate recall of point allocation: nearly two thirds of allocations, on average, were recalled correctly in the moderate distraction condition

---

[7] The effects of group division were significant on the Collective Self-Regard score, its cognitive component ("tie" and "close"), and the distance of the two groups on the red-white colour band [in the red and the white group samples: *M* s= 37.31 and 40.88, *F* (1,75)= 3.35, p < .10; *M* s =7.48 and 8.97, *F* (1,68) =6.42, p < .05; *M*s =74.00 and 86.44, *F* (1,69) =4.69, p < .05, respectively]. It seems the white group subjects were more sensitive to the ingroup-outgroup distinction. On the Collective Self-Regard scale score, the interaction between group division and salience was also significant [*F* (1,73)=4.63, p < .05. *M* s = 35.0, 39.76, 42.62, and 39.14 in Non-salient/Red, Salient/Red, Non-salient/White, and Salient/White condition respectively]. In analysing these indices, group division was entered as a covariate.

The effect of booklet types was significant on manipulation check item "distracted" [*M* s =2.72 and 3.64, in the A-B and B-A versions. *F* (1,68) =6.67,p < .05], and on items: "self-interested", "more points to my group", and "to make my group win" [for the A-B and B-A versions, *M* s =2.72 and 3.47, *F* (1, 75) =4.35, p < .05; *M* s =2.67 and 3.82, *F* (1, 75) =9.51, p < .01; *M* s=2.59 and 3.34, *F* (1, 75) =3.46, p < 10]. Subjects with the booklet type A-B had these intentions less than those with the version B-A. Booklet type was entered as a covariate in the analyses of these indices.

whereas correct recalls remained less than a half of allocations in the weak and the strong conditions (see Table 6.1 for statistics).

For category salience, there was no expected significant difference in check items. However, an unexpected significant difference was obtained between the category salience conditions on "willingness to join the research again". Subjects in the salient category conditions were less willing than those in the non-salient conditions [F (1, 72) =6.69, $p < .05$].

Effects of distraction

Point allocation indices *Total points* Total points that subjects gave to ingroup and outgroup members were calculated from the point allocation matrices. This index was subject to a 2 (category salience) x 3 (distraction) x 2 (repeated measure: ingroup *vs.* outgroup) ANOVA. No main and interaction effects were significant. This means even simple ingroup bias was not evident in this index [ingroup-outgroup main effect: F (1,72)=.92, *n.s.*]. The means are displayed by distraction conditions in Table 6.2.

Pull scores As in the previous experiments, the pull scores were calculated from the data on the point allocation tasks. These scores were subject to separate 2 (salience) x 3 (distraction) ANOVAs. No main and interaction effects were significant for any pull scores. The mean pull scores are displayed in Table 6.3 by distraction conditions.

Rating indices [8] Rating ingroup bias were calculated by subtracting outgroup ratings from ingroup ratings for each dimension. These indices were subject to separate 2 (category salience) x 3 (distraction) ANOVAs. No main and interaction effects were significant. The means are displayed by distraction conditions in Table 6.4. The grand mean of the composite score was not significantly different from zero (M =.37, SD = 6.35).

---

[8] Both point allocation bias scores (pull scores) and rating bias scores were subject to separate factor analyses. The pattern matrices are shown in Table A6.6.2 and Table A6.6.3. Unlike Experiments 1 and 2, three competitive pulls did not form a single factor; nor did rating bias scores form a single factor. The reasons for this are not clear.

Table 6.1 Manipulation checks

Category salience:	Salient			Non-salient		
Distraction:	Weak	Moderate	Strong	Weak	Moderate	Strong
Items	(n =13)	(n =13)	(n =13)	(n =12)	(n =13)	(n =14)
For distraction						
"Concentrated"	4.92#	4.31	4.46	5.33#	4.54	4.36
"Busy remembering numbers" S1	2.85_a#	4.69_{bc}	4.92_{bc}	3.67_{ac}	4.38	5.57_b#
"Distracted"	3.46	3.62	3.23	3.33	2.77#	2.71#
"Difficult to answer the questions"	3.54	3.62	2.92	3.42	3.23	3.21
"Difficult to remember numbers" S2	3.15_a#	5.23_b#	5.46_b#	3.33_a	4.23	5.57_b#
Correct recall of allocation ¢	–	–	–	2.67	3.92_a	2.43_b
For group membership salience						
CSR scale score *	37.54	38.92	42.00	38.17	38.46	40.50#
Cognitive component *§	8.08	8.46	9.00	7.83	7.62	8.93
thinking-about-group in allocation	2.92#	3.15	3.39	3.67	2.77	3.14
group comparison in rating	3.75	3.31	3.39	3.00#	4.08	3.43
Others						
self-presentational concern	2.42#	3.08	3.15	3.17	1.92#	3.21
willingness to participate in the research again §§	3.85	2.85_a#	3.62	4.67_b	4.38_b	4.14
[No. of missing cases in rating & allocation	0	0	0	3	0	0]

1) The figures are mean ratings on the scale from 1. not at all - 7. very ..., except for GSR scale score (range 9-63), Cognitive component (2-14), and correct recall of allocation(0-6).
2) # denotes means significantly different from neutral point ($p < .05$, two-tailed)
3) Different subscripts on a line denote means which are significantly different (Duncan's test $p < .05$)

$ The effect of distraction: 1. F (2,72) =6.54, $p < .01$; 2. F (2,72) =10.48, $p < .001$

¢ The effect of distraction: F(2,36) =3.29, $p < .05$

* The number of subjects who completed the scale was 13, 13, 12, 12, 13, and 14 from the left.

§ No single pair was significantly different, but the contrast between the weak and moderate conditions on one hand, and the strong conditions on the other was marginally significant. t (75) = -1.89, $p < .10$. Scores in salient conditions were less variable than in non salient conditions [Cochran's C= .588, $p < .05$].

§§ The effect of salience: F(1,72) =6.69, $p < .05$

Table 6.2 Total points in point allocation tasks

Distraction: Recipients	Weak (n =25)	Moderate (n =26)	Strong (n =27)	F value (df =2/72)
Ingroup members	47.00	48.69	46.33	.80
Outgroup members	44.84	47.65	46.30	1.17
Ingroup bias in total points	2.16 (8.26)	1.04 (10.88)	.04 (10.11)	.30

1) The figures in brackets are standard deviations.

Table 6.3 The mean pull scores of allocation strategies

Distraction: "pull"	Weak (n =25)	Moderate (n =26)	Strong (n =27)	F value (df =2/75)
MD•MIP (on MJP)	.28	-.19	-.85	1.20
MD•MIP (on F)	.68	.42	1.48#	.91
MD (on MJP•MIP)	-.04	.77	-.37	1.34
F (on MD•MIP)	1.40#	1.42#	.67	.65
MJP•MIP (on MD)	.12	1.31#	.07	1.58
MJP (on MD•MIP)	-.52	.42	.41	1.19

1) # denotes the figure is significantly different from zero point ($p < .05$, two-tailed)
2) No pair of means were significantly different for any pulls (Duncan's range test)

Table 6.4 The mean rating bias on each dimension

Distraction: dimension	Weak (n=22)	Moderate (n=26)	Strong (n=27)	F value (df =2/72)
warmth	.27	.23	.78	.51
honesty	-.23	-.46	.33	1.54
friendliness	-.14	-.12	1.15#	2.32
trustworthiness	.36	-.04	-.41	.85
generosity	-.23	-.58	.07	.54
Composite score	.05	-.96	1.93	1.43

1) The figure indicates ingroup bias. The more, the more in favour of ingroup.
2) # denotes the figure is significantly different from zero ($p < .05$, two-tailed).
3) No pair of means were significantly different for any dimension.

Colour band scales [9]

Differentiation indices Two indices were derived from the colour band scales. The first index is the simple distance between the groups on each band. The second index is represented as a vector: it takes into account the relative location of the groups on the bands. Namely, positive valence was accorded to the distance when the relative location of the groups corresponded to the direction of colour gradation while negative valence was ascribed when it did not. For example, if the "red" group is located on the side of the red extreme of the red-white band, relative to the "white" group, and the distance between the groups is 45mm, the index value for the band is +45. And if the "red" group is on the side of white extreme relative to the "white" group, the index value for the band is -45.[10] Thus, a positive value of the index represents differentiation consistent with the direction of colour

[9] Results of correlational analyses are shown in Appendix 6.7
[10] For the brown-white band, the brown extreme was regarded equivalent to the red extreme of the red-white band. This index is the same as Index A in Chapter 5.

gradation, while a negative value represents differentiation inconsistent with the direction of colour gradation. These two indices are displayed in Table 6.5 by condition. No effect of distraction, salience and interaction was significant on any indices. However, grand means of all indices were significantly larger than the neutral point (see notes in Table 6.5 for statistics and the definition of the neutral point).

Table 6.5 Colour band scale indices by distraction and category salience

Index	Category salience:	Salient			Non-salient		
	Distraction:	Weak (n =12)	Moderate (n =13)	Strong (n =13)	Weak (n =11)	Moderate (n =12)	Strong (n =12)
Distance on Red-white band [S]		78.75	94.08#	75.39	82.64#	69.42	91.50#
		(37.47)	(22.01)	(36.14)	(26.85)	(25.45)	(31.71)
Distance on Brown-white band [S]		72.33	77.92#	83.54	96.36	79.33	81.00#
		(29.91)	(19.67)	(35.41)	(23.68)	(32.37)	(25.13)
Vector on Red-white band [§]		57.75#	38.08	51.54#	42.27	27.25	79.17#
		(67.32)	(92.21)	(67.71)	(79.16)	(71.37)	(57.46)
Vector on Brown-white band [§]		18.33	2.85	37.08	40.73	42.83	6.00
		(78.97)	(83.40)	(85.58)	(96.61)	(76.89)	(88.03)

1) # denotes the figure is significantly different from neutral point: 63mm (distance on the example band) for the upper two indices, and zero for the lower two indices ($p < .05$, two-tailed).
2) The effects of distraction, salience, and interaction were: F (2,66)=.07, F (1,66)=.04, F (2,66) =1.96, all $n.s.$ for the top index; F (2,66)=.48, F (1,66)=1.41, F (2,66) =2.08 all $n.s$ for the second index; F (2,66)=1.27, F (1,66)=.00, F (2,66)=.44, all $n.s.$ for the third index; and F (2,66) =.07, F (1,66)=.28, F (2,66)=1.14, all $n.s.$ for the last index. Group division was entered as a covariate in the analyses here.
3) The grand mean of each index (SD) was from the top, 82.03 (30.71), 81.52 (28.22), 49.32 (72.80), and 24.29 (83.28). All are significantly larger than the neutral point mentioned in the above note 1 ($p < .05$, two-tailed t-test).

[S] The higher the number, the more differentiation between the groups.
[§] The higher the number, the more consistency with the direction of gradation.

Analyses concerning the noise hypothesis

Self-presentation Two items can be treated as checks on self-presentational concern. The first is "I gave points the way others wouldn't think I am unfair (1. I did so very much– 7. I did not do so at all)" (translated) [self-presentational allocation strategy]. The other is "Were you concerned about how others would think of you when you gave points? (1. not at all– 7. very much)" (translated) [self-presentational concern]. The means (*SD*) of these items were 3.39 (1.64) and 2.83 (2.01), respectively. Both means were significantly smaller than neutral point (two-tailed). The distribution of subjects' actual response to each item is also shown by condition in Tables A6.6.4 and A6.6.5. There were no differences among distraction conditions (χ^2= 12.33 and 7.84; *df* =12, *n.s.* for both).

Fairness intention Self-reported Fairness allocation strategy to groups can be treated as a fairness intention check (range 1-7). Overall fairness intention was low. The mean score on this check item was significantly less than the neutral point (*M* =3.56, *SD* =1.84, two-tailed *t*-test). The distribution of subjects' actual response on the check item is shown in Table A6.6.6 (Appendix 6.6). There were no differences among distraction conditions (χ^2=7.66, *df* =12, *n.s.*).

Factors from self-reported strategy measures The noise hypothesis assumes interfering noise to ingroup-maintenance/enhancement from other intentions in a weaker distraction situation. A preliminary analysis was conducted to check whether such intentions were held by subjects. Self-reported strategy measures in point allocation were subject to a principal-components analysis.[11] Three factors were extracted on the basis of eigen-values (2.43, 1.94 and 1.07, for factor 1, 2 and 3), and obliquely rotated. 30.4%, 24.2% and 13.4% of the total variance was explained by factors 1, 2 and 3 respectively. The factor loadings are shown in Table 6.6. The first factor

[11] See Appendix 6.6 for means of self-reported allocation strategies by condition.

chiefly consisted of two self-reported fairness strategies and self-reported strategy of a Maximum Joint Profit. The second factor was mainly loaded by self-reported ingroup-interested strategies. The third factor was ambiguously made of self-reported strategy of self-presentational allocation and another item. It is thought that the second factor corresponds to ingroup-maintenance/enhancement intentions. And it could be argued that there were broadly two other intentions in point allocation: fairness/joint-profit and self-presentational allocation.

Analyses of subjects with low interfering intentions Three typical ingroup bias indices — total points bias index, allocation bias index, rating bias index[12] — were subject to separate oneway ANOVAs with three distraction levels, using those subjects whose fairness/joint-profit intentions were weak. Firstly, a scale was constructed from those three items which loaded heavily on factor 1 in Table 6.6 (Cronbach's α=.77, n =78). The scale score ranges in theory from 3 to 21. Next, subjects whose scale score was less than 9 was selected, taking account of its distribution (lower 35.9%). The means by distraction conditions and relevant statistics are shown in Table 6.7. There was a significant effect of distraction both for total points bias index and allocation bias index [Fs (2,25) = 5.50 and 4.17 respectively, $p < .05$]. There was also a significant linear trend with distraction for total points bias index and allocation bias index [F (1,25) = 8.49, $p < .01$; F (1,25) = 6.31, $p < .05$]. In short, among those subjects who had weak fairness/joint-profit intentions, ingroup bias in point allocation linearly decreased with distraction. A similar pattern of results was obtained also for those subjects whose self-report of self-presentational allocation strategy was weak (see Table 6.8).[13] See

---

[12] These indices are: difference in total points (ingroup total points minus outgroup total points), a composite score of three competitive pulls (MD•MIP against MJP, MD•MIP against F, and MD against MJP•MIP), and a composite score of rating bias on five dimension.

[13] For this analysis, those subjects were selected who marked on 1, 2, and 3 on the self-presentational allocation intention check which ranges from 1 (I did not do so at all)– 7 (I did so very much) [47.4% of the total sample. Twenty subjects overlapped the sample of the low fair/joint-profit intentions in Table 6.7].

Appendix 6.9 for the discussion of the analyses using subjects with high and low fairness/joint-profit intentions.

Table 6.6 The factor loadings of self-reported allocation strategies

reported intention items	Factor 1	Factor 2	Factor 3
"To be fair to two people"	.894		
"To be fair to two groups"	.841		
"As many as possible to everyone"	.671		
"More points to my group"		.891	
"To make my group win"		.873	
"To be of my interest"		.538	.425
"The way others wouldn't think I am unfair"	.511		.650
"Without thinking"	-.354	-.361	.642

1) The figure is the factor loading of the item. Absolute loading value less than .30 are omitted.
2) The correlation between the factors 1 & 2, 2 & 3, and 3 & 1 were .11, .05, & -.04.

Table 6.7 Indices of ingroup bias among subjects with low self-reported Fairness/Joint Profit intentions

Distraction: Index	Weak (n=7)	Moderate (n=11)	Strong (n=10)	F value
Total points bias index §1	8.71_a#	6.64_a#	-4.20_b	5.50 *
Allocation bias index §2	1.33_a#	1.06_a	$-.57_b$	4.17 *
Rating bias index S	-.08	-.60	.62	1.42

1) # denotes the figure is significantly different from zero point ($p < .05$).
2) Different subscripts on a line denotes means which are significantly different (Duncan's test, $p < .05$).
3) F value: * $p < .05$; df =2/25 for the top two, and 2/23 for the third.
§ Unweighted linear trend tests: 1. F (1,25)=8.49, $p < .01$; 2. F (1,25)=6.31, $p < .05$
S The number of subjects: 5, 11, and 10 from the left.

Table 6.8 Indices of ingroup bias among subjects with low self-reported self-presentational allocation strategy

Distraction: Index	Weak (n=8)	Moderate (n=16)	Strong (n=11)	F value
Total points bias index §1	4.40_a	3.19_a	-6.55_b#	3.95 *
Allocation bias index §2	.60	.67	-.64	2.27
Rating bias index	-.08	-.48	.64	1.96

1) # denotes the figure is significantly different from zero point ($p < .05$).
2) Different subscripts on a line denotes means which are significantly different (Duncan's test, $p < .05$).
3) F value: † $p < .10$; * $p < .05$; df =2/34 for the top two, and 2/32 for the third.
§ Unweighted linear trend test: 1. F (1,34)=6.10, $p < .05$; 2. F (1,34)=2.88, $p < .10$.

Other results

Self-reported allocation strategies Mean self-reported allocation strategies are displayed by condition in Table A6.6.7 (Appendix 6.6). A separate 2 (salience) x 3 (distraction) ANOVA was conducted on each self-reported strategy. There were neither main nor interaction effects on any item except that the main effect of category salience was marginally significant on the item, "as many points as possible to everyone". Furthermore, most of the grand means were significantly less than the neutral point (4). This may indicate that a substantial number of subjects did not adopt any of the allocation strategies.

Effects of time on allocation matrices The six allocation matrices were separated into the first three set (time 1) and the second three set (time 2). Analyses involving time 1 and time 2 are reported in Appendix 6.8.

Sex differences Although sex difference was not in the theoretical scope in this study, supplementary analyses were conducted to observe its possible effects on the dependent variables. The effects of sex were significant on: the Collective Self-Regard scale score [for male and female: Ms=37.05 and

42.26, F (1,74)= 5.15, $p < .05$], the composite index of three competitive pulls [*Ms*= -.22 and .59, F (1,69)=3.63, $p < .05$], and ingroup bias in total points [*Ms*= -2.62 and 3.50, F (1,69)= 6.31, $p < .05$]. Overall, female subjects were more discriminatory than male subjects.[14] Note that these sex differences are counterbalanced for the experimental design since there were no dependency involving sex (see Manipulation checks sub-section).

6.4 Discussion

Experimental manipulations

Digit rehearsal task The results of distraction manipulation checks showed that, as expected, the digit rehearsal task occupied subjects differently among the distraction conditions. Three digit numbers were reported being easy to rehearse, and made subjects feel significantly less busy (the weak distraction/salient condition: see Table 6.1). The consequence of multiple rehearsal numbers in the current experiment was also evident. Thus, subjects who rehearsed different three-digit numbers four times during the experimental session reported the rehearsal to be more difficult than those who rehearsed a single three digit number.[15] Therefore, the current distraction manipulation using continually changing rehearsal numbers achieved not only the expected difference between the conditions but also increased the overall level of distraction.

The data on correct recall of point allocation revealed an interesting effect (see Table 6.1). It was assumed that inaccurate recall reflects the degree of distraction. However, subjects in the moderate distraction condition

---

[14] On the Collective Self-Regard scale score, the three way interaction effect of sex with salience and distraction was also significant [F (2,65)= 4.42, $p < .05$]. See Table A6.6.9.

[15] Namely, there was a significant difference in self-reports between the three-digit conditions in Experiment 3 and Experiment 4, though wordings between the two check items were slightly different, not to mention the difference in language [*Ms*= 1.38 and 3.15, t =2.93, df =14.33, p <.05, separate variance estimate]. Repetition of 9-digit numbers, however, led to increased self-reported difficulty only non-significantly [*Ms*= 4.31 and 4.73, respectively, in Experiments 3 and 4, t (37)= .68, *n.s.*].

(rehearsal of 9-digit numbers) recalled the allocation more correctly than those in the weak and the strong distraction conditions. This seemingly contradictory result may be attributed to the conceptual difference between distraction and attention. A moderate degree of distraction can increase attention in some cases (Baron, 1986). This was also mentioned earlier in Chapter 3 in relation to the check item of "concentration".

Category salience manipulation Subjects in the salient category conditions were asked to imagine, with the experimenter's instruction, the picture of the room where they were divided into two groups of "red" and "white". This manipulation was found ineffective. There was no significant difference in check items but one, "willingness to participate in the research again". Subjects were less willing in the salient than the non-salient category conditions. This was an unexpected result and it is not clear why this happened or what it means. It may be due to the effect of session rather than salience since these were in fact confounded in the current experiment: one entire group session was assigned to the salient category conditions and the other entire session to the non-salient category conditions. From the results of the other manipulation check items, moreover, it is difficult to conclude that category salience manipulation produced the expected impact on subjects. It still could be said, as argued in Chapter 3, that category salience is a characteristic of the setting, and subjects perceptions may not reflect it.

In short, the distraction manipulation did, unlike Experiment 3, produce significant differences in perceived distraction while the category salience manipulation did not result in perceptible subjective effects.

Effects of distraction

In the current experiment, no allocation and rating indices showed significant ingroup bias in any condition (Tables 6.2~6.4). Therefore, it is inappropriate to consider the effects of distraction as it stands, despite the

expected results of manipulation checks for distraction. The distraction effects will be discussed in later sub-sections with some qualifications.

Absence of ingroup bias The result that there was no significant ingroup bias in any condition was unexpected in view of the results in the previous experiments which used an equivalent experimental procedure. Several causes and mediating factors are conceivable. First, one of the differences of the current procedure from all the preceding experiments (Pilot study 1, Experiments 1, 2, and 3) is that the main part of the current procedure was divided into four separate stages by the memory tasks. This modification was introduced to strengthen and control the degree of distraction. This procedural difference, however, may have caused either lowered category salience, lowered ingroup maintenance/enhancement intentions, too strong overall distraction, too strong noise from other counteracting intentions, or any combination of these, which in turn might well lessen the degree of ingroup bias. Another possibility is that small but nearly significant dependency between group division ("red" *vs.* "white") and booklet type (see Results section) may have caused this absence of significant ingroup bias through either of the above factors.[16] The relevance of these factors to the current study will be discussed shortly.

Category differentiation measures on colour band scales

Consistent with the category salience manipulation check, no effects of category salience were observed on category differentiation measures from colour band scales. Nor was there an effect of distraction. Hence, the prediction of category salience effect was not supported, and therefore, the second prediction about absence of moderating effect of distraction is

---

[16] This may be the case especially because these two independent variables, group division and booklet type, for unknown reasons, had impact respectively on category salience and ingroup enhancement intentions (see footnotes 6 of this chapter). That is, "red" subjects' category was not comparatively made salient, and subjects with booklet type A-B did not relatively have ingroup enhancing intentions. This means that 53 subjects out of 78 (68%) had either less category salience or less ingroup enhancing intention.

irrelevant. However, it should be noted that the overall level of category differentiation and its consistency with the group labels was significantly higher than chance on the both colour band scales. That is, for both the red-white and brown-white bands: the mean distance between the "red" and "white" groups was larger than that in the example band (63mm), and the mean of vector index was significantly positive (see Table 6.5). This result constitutes evidence of perceptual category differentiation between the groups. Subjects were only instructed to write down the letters (X and Y) which respectively correspond to the two groups, according to where they feel the groups belong. Recall also that the order of the two colour bands and right-left direction of colour gradation were counter-balanced across the conditions. Therefore, (vector indices') consistency of the direction with the colour gradation cannot be an artifact of the experimental procedure. Moreover, the greater mean distance between the groups than the distance on the example band may arguably indicate that subjects' view of the two groups in the minimal group situation was *perceptually* differentiated beyond a chance level.[17]

This result is interesting because overall level of ingroup bias was not significantly larger than neutral point even in rating indices in the current experiment (see Table 6.4). One interpretation of these contrasting results is that there is a certain range of category salience, in which the present experiment falls, where category differentiation operates but is not strong enough to produce ingroup bias in rating or allocation bias. The small amount of category differentiation on the colour bands supports this idea. This result, however, should be treated carefully. Replication will be attempted in later studies and the overall results will be discussed in a later part of the thesis.

---

[17] This differentiation corresponds one of the two elements of hypothesized categorisation effects: interclass differentiation (McGarty & Penny, 1988).

The noise hypothesis

The noise hypothesis (Chapter 4) refers to the explanation that the initial increase of the allocation ingroup bias with distraction is caused by interfering noise from other intentions such as fairness, self-presentational concern, and so on in a weaker distraction situation. The first prediction was that there would be more subjects, in the weak distraction condition, who would report that they intended to be fair and concerned about others' criticism. However, there was no difference, among distraction conditions, of subjects' distribution on the corresponding check items.

The second prediction was that there would be no increased allocation bias with distraction among subjects who had little fairness/joint-profit/self-presentational allocation strategies. This prediction was supported among those selected subjects. In fact, among those subjects who had weak fairness/joint-profit intentions, ingroup bias in point allocation indices linearly decreased with distraction (Table 6.7). Similar results were obtained also among those subjects who had little self-presentational allocation strategy (Table 6.8).

These results not only support the prediction from the noise hypothesis but also were consistent with hypothesis 5 (in Chapter 3) that predicts decreased allocation bias in the distraction compared with the no distraction conditions. Specifically, this declining tendency with distraction firstly gives strong support for the noise hypothesis because it indicates that what impeded ingroup bias in the no distraction conditions of Experiments 1 and 2 were fairness/joint-profit and/or self-presentational allocation strategies. Secondly, this declining tendency supports general assumption 7 of the present thesis (Chapter 2) that distraction hinders intentional processes, and thus the social identity process. It also supports the assumption concerning the nature of allocation indices (Chapter 3) that point allocations

are relatively more concerned with the social identity process. The pattern of results cannot be explained unless these assumptions are accepted.

Another point to be made here concerns the fact that the above pattern was observed only among those who reported not holding the fairness/self-presentation intentions. In other words, an overall level of noise from those counteracting intentions seems to hinder the function of the social identity process in the current experiment. This possibility was mentioned briefly in an earlier sub-section with regard to the reasons of non-significant ingroup bias of the current experiment. The present results endorse the idea that a relatively high level of noise could diminish ingroup bias.

Lastly, it may be worth mentioning that the analytic procedure adopted here is justified by the result of the factor analysis on self-reported allocation strategies (see Table 6.6). The two classes of self-reported strategies formed separate factors. If a factor means a dimension that is semantically orthogonal to another factor's dimension, it is a reasonable to analyse different factors separately.

Role of ingroup-maintenance/enhancement intention

Ingroup-maintenance/enhancement intention was not prevalent in this experiment. First, category salience was insufficient (see discussion on colour band measures). Second, self-reported allocation strategies were generally lower than the neutral points (Table A6.6.7). Third, ingroup bias was not significant on any index across the conditions (Tables 6.2~6.4). Finally, there was no effect of distraction on allocation bias despite the fact that the distraction manipulation checks indicated expected differences among conditions.

The current theorising presumes that the social identity process is characterised as a motivational process (assumptions 1 and 2 in Chapter 2). Consequently, awareness of goals is important to this process. This is where

the role of intention comes into play. Moreover, the hypotheses in the previous studies concerning the distraction effects depend highly on the presence of intentions to be biased. Those hypotheses cannot be tested when subjects do not hold such intentions, especially those of ingroup-maintenance/enhancement.[18] Therefore, partly to test the importance of ingroup enhancing intention especially, and partly to test the effects of distraction for those not-satisfactory data, the following analyses were conducted.

Additional analyses

Subjects with high ingroup enhancement intention As shown in Table 6.6, three factors were extracted from the factor analysis on self-reported intentions in point allocation. The second factor was interpreted as showing ingroup/self-interest allocation strategies. Since responses on those items which loaded heavily on the second factor were generally towards the "not at all" extreme, subjects whose responses were greater than the neutral point (4) on either of the three items were selected for the analyses to preserve the number of subjects in each condition.

Total points Ingroup bias in total points decreased with distraction, but the trend was not significant (Table 6.9).

Pull scores A oneway ANOVA with three levels of distraction was conducted on each pull score. The means and *F*s were presented in Table 6.10. Comparing Table 6.10 (for selected subjects) and Table 6.3 (for entire subjects), several differences emerge. First, *F* values were clearly increased on two out of three competitive pulls in Table 6.10, and decreased on the Fairness pull. Second, increase of *F* values on the MJP (on MD •MIP) and

---

[18] When there is no intention of ingroup maintenance/enhancement, only the category differentiation process is likely to operate according to the current theorising (see assumptions 1 and 2 in Chapter 2). And the pattern of results in the present experiment seems to support the idea: there was a slight sign of category differentiation only measured by the colour band scales.

MJP•MIP (on MD) pulls was also noticeable. Note that the increased effect of distraction on competitive allocations and the decreased effect on the Fairness pull, among subjects with high ingroup enhancing intentions, generally endorse the utility of this analytic technique using individual differences. However, the increase of *F* values for MJP (on MD •MIP) and MJP•MIP (on MD) may simply show overlap of different intentions.

The pattern of distraction effects across the pulls was mixed. The MD•MIP (on MJP) pull, which can be treated as an index of allocation ingroup bias, showed a linear decrease with distraction. This is consistent with prediction 5 in Chapter 3 as well as the results in Tables 6.7 and 6.8 in the present chapter. Meanwhile, the results on the MD•MIP (on F) and MD (on MJP•MIP) pulls were rather quadratic with distraction, and do not conform to the first result.

Rating bias indices Table 6.11 shows the mean rating bias on each dimension by condition among those selected sample of this analysis. No effect was significant. The mean of the composite score in the strong distraction condition was significantly larger than the neutral point.

Judging from the analyses in this sub-section, it is difficult to reach clear conclusions regarding the role of ingroup maintenance/enhancement intention in the social identity process. One problem was that there were not enough subjects holding the stated intentions. Selection of subjects using the separate three items corresponding to the intention was problematic, and yet the cell size and hence power, was fairly small (n =7~10). This problem could perhaps be attributed to the generally low level of group membership salience in the current experimental setting

Table 6.9 The mean total points allocated to ingroup and outgroup members by subjects with ingroup/self-interest intentions

Distraction:	Weak (n =10)	Moderate (n =7)	Strong (n =10)
Ingroup	45.60 (6.79)	50.29 (8.30)	46.70 (7.20)
Outgroup	41.20 (6.84)	48.43 (8.89)	46.90 (7.61)
Ingroup bias [S]	4.40 (7.65)	1.86 (14.02)	-.20 (11.25)

1) The multivariate effect of distraction for points to ingroup and outgroup was marginally significant. F (2,24)=2.83, $p < .10$.
2) Cochran's C for ingroup bias was .52, *n.s.*.
$ Unweighted linear trend test: F (1,24)=.89, *n.s.*

Table 6.10 The mean "pull" scores of each strategy among subjects with ingroup/self-interest intentions

Distraction: "pull"	Weak (n =10)	Moderate (n =7)	Strong (n =10)	F value
MD•MIP (on MJP) [S1]	1.50_a#	.86	-1.30_b	$2.59^{\dagger}$
MD•MIP (on F) [S2]	.00	$-.71_a$	2.30_b#	$2.62^{\dagger}$
MD (on MJP•MIP)	-.10	.71	-.90	.61
F (on MD•MIP)	.80#	.43	.50	.06
MJP•MIP (on MD)	$-.90_a$	2.43_b	.50	2.16
MJP (on MD•MIP)	-2.50#	-.57	$.10_b$	$2.77^{\dagger}$

1) # denotes the figure is significantly different from zero point ($p < .05$)
2) Different subscripts on a line denotes they are significantly different (Duncan's $p < .05$)
3) F value: $\dagger p < .10$; df =2/24 for all effects.
$ Unweighted linear trend test: 1. F (1,24)=4.81, $p < .05$; 2. F (1,24)=3.12, $p < .10$.

Table 6.11 The mean rating bias on each dimension among subjects with ingroup/self-interest intentions

Distraction: dimension	(n)	Weak (8)	Moderate (7)	Strong (10)	F value
warmth		.88	-.14	1.10	.47
honesty		.00	-.57	.40	.49
friendliness		.88	.00	1.90	.98
trustworthiness		.63	.43	-.30	.38
generosity		.38	.57	.90	.15
Composite score		2.75 (4.80)	.29 (12.42)	4.00# (5.25)	.47

1) The figure indicates ingroup bias. The more, the more in favour of ingroup.
2) # denotes the figure is significantly different from neutral point zero ($p < .05$).
3) F value: df =2/22. No effect was significant.
4) No pair was significantly different on any dimension (Duncan's range test)
5) Cochran's C for composite score was .753 ($P < .01$).

Sex difference

There were fairly consistent sex differences on intergroup differentiation in the current experiment. That is, female subjects had higher ingroup evaluation and showed more intergroup discrimination. Note that the British sample of the same age in Experiment 1 showed the opposite direction: male subjects were more discriminating. It is, however, difficult to say whether these contrasting results reflect cultural differences or other idiosyncrasies.

Summary

The continual rehearsal task produced expected differences among conditions in subjects' self-reports of distraction. However, overall ingroup bias was not significant on any index. Therefore, it was inappropriate to consider the effects of distraction on ingroup bias indices as it stood, nor were they observed.

Colour band scale measures indicated evidence of perceptual category differentiation: there was a significantly larger distance between the groups than neutral on the colour bands, in the direction consistent with the group labels. However, there was no effect of the category salient manipulation on the colour band measures, nor were there differences in category salience check items.

The noise hypothesis was clearly supported in the secondary analyses, selecting subjects according to the theoretical consideration of the noise hypothesis. That is, among those subjects who had low fairness/joint-profit allocation intentions, there was a significant linear trend of *decreased* bias with distraction in allocation indices. This tendency was obtained also among those who had low intention of self presentational allocation. The results of the secondary analyses using subjects with higher self-reported intentions of ingroup/self-interest, were mixed. Finally, there were sex differences on several indices. Overall, female subjects were more discriminatory than male subjects among the Japanese sample. Implications of these results were discussed.

Chapter 7

Study 5. Causal relationship between category differentiation and allocation bias

— A report of Pilot study 3 —

Contents

7.1 Aims

7.2 Method

7.3 Results

7.4 Discussion

This chapter reports Pilot study 3, which employs and examines a new method for categorisation as an experimental manipulation: right-eye/left-eye test. This study also explores the causal relationship between the category differentiation process and the social identity process. Finally, the subjective difficulty of the various measures used in the previous experiments is assessed.

7.1 Aims

Right-eye/left-eye test

The first purpose of the present study was to develop a new method for categorisation as an experimental manipulation in a minimal group situation. This was to ensure that ingroup bias and distraction effects in the preceding experiments were not linked only with the particular categorisation method. At the same time, it was aimed to develop a more convenient and rapid, but meaningful categorisation technique. It became necessary to shorten the entire experimental procedure since the modification of the digit

rehearsal task in Experiment 4 prolonged the entire session from about 25 minutes in Experiments 1, 2, and 3 to 50 minutes. As mentioned earlier, it is difficult for young children to engage in a long session, and this may affect reliability of the measurements. Therefore, this method must be easy to conduct in a short time, and effective enough to induce subjects' categorisation of themselves into two groups. One way to achieve these requisites is to utilise a pre-existing category: a category very evident to everyone but trivial so that nobody in everyday situation identifies with it even to a slight degree. This will fulfil criteria of the minimal group situation: triviality and transience.[1] The actual categorisation and its method will be explained in Method section.

Causal relationship between the category differentiation process and the social identity process

The second purpose of this study was to examine the causal relationship between the category differentiation process and the social identity process. The former is best represented so far by the colour band measures and the latter by allocation bias indices. A similar question was raised in Chapter 5 as regards the negative correlation between the thinking check items and the colour band measures. The interpretation was that those subjects who fail to differentiate between the groups subsequently think about the groups, whereas those who succeed do not think about the groups. It was thus argued that the negative correlation did not mean category differentiation being controlled. It was further pointed out that the interpretation stands only on the assumption that differentiation leads to thinking about the groups. In other words, the issue was essentially the same

---

[1] Tajfel *et al.* (1971) specified conditions of a minimal group. They were: 1. no face-to-face interaction, 2. anonymity, 3. no link between subjects' responses and the group division, 4. subjects' responses having no value to the subjects making it, 5. strategies of responding to the situation are in competition, and 6. the responses constitute "real decisions about the distribution of concrete rewards(and/or penalties) to others rather than some form of evaluation of others." Triviality and transience fulfil criterion 3.

as in the present study: which comes first, the category differentiation process or the social identity process, and what is the relationship between them?

Tajfel presented his idea of the logical sequence in intergroup differentiation as the CIC theory (social Categorisation- social Identity- social Comparison: Tajfel, 1982a). This can be described as follows. That is, category differentiation between groups leads to identification with ingroup, and identification with the ingroup in turn gives rise to social comparison between the groups because of the need for positive ingroup distinctiveness.[2] Since the sequence from identification to social comparison (inclusive) is thought to correspond to the social identity process suggested in the present thesis, what Tajfel would say is that the category differentiation process leads to the social identity process. A similar idea was more explicitly presented by Turner (1981). To quote him:

> "... ... the categorization and the social comparison process are complementary. There are many possible complexities in such complementarity, but we shall do not more than suggest that the former is the necessary and the latter the sufficient conditions for competitive intergroup differentiation... . The categorization process produces the perceptual accentuation of intragroup similarities and intergroup differences and thus makes salient or perceptually prominent the criterial or relevant aspects of ingroup-outgroup membership. ... ... The social comparison process transforms simple perceptual or cognitive discriminations into differential attitudes and actions favouring the ingroup over the outgroup. It motivates the competitive enhancement of criterial differences between the groups and other strategies apart from direct discrimination to achieve positive distinctiveness." (Turner, 1981, p.82)

To paraphrase with the present terminology, it is proposed that intergroup differences are initiated by the category differentiation process at the first stage, and then the differences are magnified by the social identity process

---

[2] And Brewer and Kramer (1985) pointed out a circularity aspect of this sequence. Namely, it is proposed that social comparison goes back to, and strengthens category differentiation.

towards ingroup favouring direction. Other variations of the relationship between the two processes are available in Vanbeselaere's (1991) review.

However, implicitly common in all these suggestions is a positive relationship between the category differentiation process and the social identity process. Namely, the more the outcome of the category differentiation process, the greater it is predicted the effect of the social identity process is.

Contrary to the above views, Brown (1984) deduced from social identity theory (Tajfel & Turner, 1979) that similarity should lead to greater intergroup discrimination because "similarity between groups are likely to be important in instigating a search for distinctiveness" (p.22). Since similarity between groups can be interpreted as undifferentiated categories, it is predicted from his deduction that there will be a negative correlation between the category differentiation process and the social identity process. More recently, Brewer's (1991) contention about an optimal level of social identity implies that a highly inclusive (less differentiated) social category, for example, increases the need for differentiation. The need for differentiation can be arguably regarded as a part of the social identity process. If so, what is implied is a negative relationship, at least partly, between the category differentiation process and the social identity process. This negative correlation is also implied by an idea of self-evaluation in intergroup situations (Abrams and Hogg, 1988). They suggested that there may be "a drive for 'self-evaluation' *per se* , in addition to a need for 'self-enhancement" in intergroup situations. That is, it is claimed that one would seek for meaning in an intergroup situation concerning who one is. Therefore, it follows that when cognitive category differentiation is not clear enough, one might engage in stronger discrimination.

From above discussion, two issues can be identified. First, the causal relationship between the two processes: does the outcome of the category

differentiation process lead to the social identity process? Second, the direction of the relationship: is the relationship between the two positive or negative? Supposing that the colour band measures and the allocation indices respectively correspond to the category differentiation process and the social identity process, it was aimed to answer these questions. Colour band scales were used twice, before and after the point allocation tasks.

Subjective difficulty of the measures

One of the important assumptions in the thesis is that the allocation bias indices capture the intentional process of social identity and that the colour band measures, and to a less degree rating bias indices, reflect the automatic process of category differentiation (see the empirical assumptions in Chapter 3). Although the effect of distraction in the experiments seems to corroborate this assumption, there is still a possibility that colour band measures and evaluative ratings are less vulnerable to distraction simply because they are easy to answer, not because the response is based on the automatic process. Since the direction of the distraction effect would then be the same on both the intentional and non-intentional processes, this argument is not very plausible. It is important, however, to rule out this possibility. Therefore, it was attempted to measure the subjective difficulty of completing each index.

7.2 Method

Subjects

Twenty-five boys and girls (12-13 year old; 7 male and 18 female) from one class in a grammar school in Kent, England, participated in the study in a single group session in a classroom.

Procedure

Subjects were provided with a dependent measure booklet and an explanation sheet. The experimental procedure followed steps in the dependent measure booklet. Each step was conducted according to the experimenter's instructions. General instructions in the beginning of the dependent measure booklet introduced the study as research on decision making. It was also explained that making judgements about the difficulty of each task was another aim of the session.

Categorisation A categorisation based on a right-eyed/left-eyed distinction was then explained:

> There are many distinctions among us. Some have fairer hair colour, others have darker one. Some are taller, and others shorter. Here is a relatively new distinction: RIGHT EYE users or LEFT EYE users. ... ... This means which eye one uses more. You may not be aware of it, but you surely use one of your eyes more than the other. According to a survey, about half people are right eye users, and the other half left eye users. For now, let us call the first group as RIGHT EYE GROUP, and the second as LEFT EYE GROUP. In this study, we would like you to make series of decisions on the two groups. ... ...

Subjects were subsequently assigned to Right Eye group or Left Eye group according to the self-examinination in the "right eye/left eye test" (see Appendix 7.1). Those several subjects who could not find which eye they use more were asked to try different ways they could think of, and if they were still unable to find, just to choose one of the two arbitrarily.

After everyone had decided which eye group they belong to, subjects were told "As half of the population are said to be right-eyed and the other half left-eyed, this class will be divided into half and half." Next, a personal number was given in the dependent measure booklet. The numbers were all unique and none appeared in the dependent measure booklet or the explanation sheet. Subjects were told to keep their group name and the

personal number secret. After the experimenter explained how to do the tasks, using the explanation sheet (Appendix 7.2), subjects completed the dependent measure booklet. The entire session took about 30 minutes.

Dependent measure booklet

The main part of the dependent measure booklet consisted of the point allocation and rating tasks. Although these were similar to those used in Experiment 1, there were some differences. First, the group names were "right eye group" and "left eye group" in the current study. Second, each rating scale was placed on separate pages. Third, the order of the measures was:

1. Three point allocation matrices: matrices set [A] (or [B])
2. Five rating scales of the right eye group
3. The other three matrices: matrices set [B] (or [A]), and
4. Five rating scales of the left eye group.

There were two booklet types depending on the order of the point allocation matrices sets (A-B and B-A). The matrices set [A] and [B] contained the first and the last three matrices that appeared in the dependent measure booklets in Experiments 1, 2 and 3.[3] In the current study, new matrices were also included. These were different versions of the matrix type MD•MIP *vs.* MJP (see Fig. A3.7.2 in Appendix 3.7). Tens were added to the numbers of the original matrix type MD•MIP vs. MJP. The pull scores of MD•MIP (against MJP) and MJP (against MD•MIP) are calculated from these types. They were included to check if the complexity of numbers in the matrices affects difficulty judgements.

The colour band scales were placed before (Time 1) and after (Time 2) the other measures. The colour band scales utilised brown, blue and red

[3] Though the group names in the present study were "right eye" and "left eye" groups.

gradation. Each had dense colour at one end and gradually reducing the hue to the other end on a 8mm wide, 143mm long band. The brown, blue and red bands were cut out from the gradation sheets (Decadry: DP221, DP214 and DP207 respectively), leaving 52mm, 29mm and 27mm, respectively, from the pale end of each gradation sheet. The direction of gradation was always the same. The pale side was on the left and the dense side on the right. The instruction says "Imagine people of the two groups. Please put down letters R and L on the colour band according to where you feel that group belongs." and a black-white gradation band was presented, as an example, with the letters R and L on it, 51mm apart from each other around the centre.

The combination of the colour band scales were the brown and blue band scales for one set [set X], and the brown and red band scales for another set [set Y]. There were two versions depending on the order of the sets: X-Y and Y-X.

At the top of each page, there was a column to indicate subjects' group name. The difficulty measure was placed at the bottom of each page. The item was "How difficult was it to decide which box to circle?"(1. not at all- 7. very difficult) for the point allocation tasks, "How difficult was it to choose?"(1. not at all- 7. very difficult) for the rating scales, and "How difficult was it to decide?"(1. not at all- 7. very difficult) for the colour band scales.

After the second colour band scale set, the Collective Self-Regard scale (Sigger, 1992) was placed followed by check items for self-reported allocation strategies, experimental manipulations, and others (see Appendix 7.1 for details).

7.3 Results

Manipulation checks

Distribution of subjects Out of 25 subjects, 19 turned out to be in Right eye group, and 6 in Left eye group. While this proportion was far from even, subjects did not know about the real distribution before the experimental session ended. Therefore, the majority/minority factor need not be taken into account. Distributions of other independent variables are shown in Table A7.3.1 (Appendix 7.3).

Group membership salience The grand means of Collective Self-Regard scale (range 9-63) score and its cognitive component (range 2-14) were 44.04 and 8.54 respectively. CSR score was significantly larger than the neutral point (two-tailed *t*-test). The mean responses on the items "Thinking about group membership in allocation" (range 1-7) and "Group comparison in rating" (range 1-7) were respectively 4.00 and 3.44. See Table A7.3.2 for the results of other check items.

Dependent measures [4]

Colour band measures Two differentiation indices were calculated from the colour band scales: simple distance between the groups and the vector index (see Chapter 6 for detail of the indices). The grand mean of the distance index for each colour band was 75.54, 80.64, and 75.80 for the brown, red, and blue band scales respectively. Similarly, the grand mean of the vector index for each colour band was 37.98, 45.76, and 55.40 respectively. All these means were significantly larger than the neutral point [two-tailed *t* -test, $p < .05$; the neutral point: for the distance, 51mm (the distance on the example band); for the vector index, zero]. The means and standard deviations of the

[4] For the details of the results, especially concerning group division (right eye/left eye groups), see Appendix 7.3.

two indices for each colour band are shown in Table A7.3.3 by Time and Booklet types.

Point allocation indices *Total points* The mean total points that subjects gave to ingroup and outgroup members across the eight allocation matrices were 81.36 and 79.24 respectively for ingroup and outgroup members (Table A7.3.4). The difference was not significant (two-tailed *t*-test).

Pull scores Pull scores of strategies were calculated and displayed in Table A7.3.5. No pull score except that of F (vs. MD•MIP) was significantly larger than the neutral point (two-tailed *t*-test).

Evaluative ratings Rating ingroup bias was calculated by subtracting outgroup rating score from ingroup rating score for each of the five dimensions. The results are shown in Table A7.3.6 (Appendix 7.3). No single bias index was significantly larger than the neutral point (two-tailed *t*-test).

Causal analysis The causal relationship between the colour band measures and allocation bias was examined by calculating the correlations between them. To represent the colour band scales at Time 1, the averaged distance index was calculated from whichever of the band sets X and Y were presented at Time 1. The representative index was similarly calculated for Time 2. The allocation bias index was represented by the pull scores of MD (vs. MJP•MIP) because this is thought to reflect the differentiation aspect of the social identity process better than the other discriminatory pulls.[5] Fig 7.1 shows Pearson's correlation coefficients among the relevant variables. The correlation between the colour band index at Time 1 and the allocation index was negative and marginally significant (r = -.32,p =.061, two-tailed) while the partial correlation between the allocation index and the colour band index at Time 2, controlled by the colour band index at Time 1, was positive, large and significant (r = .55, p <.01, two-tailed). That is, the less differentiated on the

---

[5] The pull scores of MD•MIP (*vs.* F), MD•MIP (*vs.* MJP), and MD•MIP (*vs.* MIP, version 2), and a composite score of all the four discriminatory pulls were also examined similarly. See Appendix 7.4 for the results.

colour band measures at Time 1, the more discriminatory the point allocation was, whereas the more discriminatory the allocation was, the more differentiated the groups were on the colour band measures at Time 2.

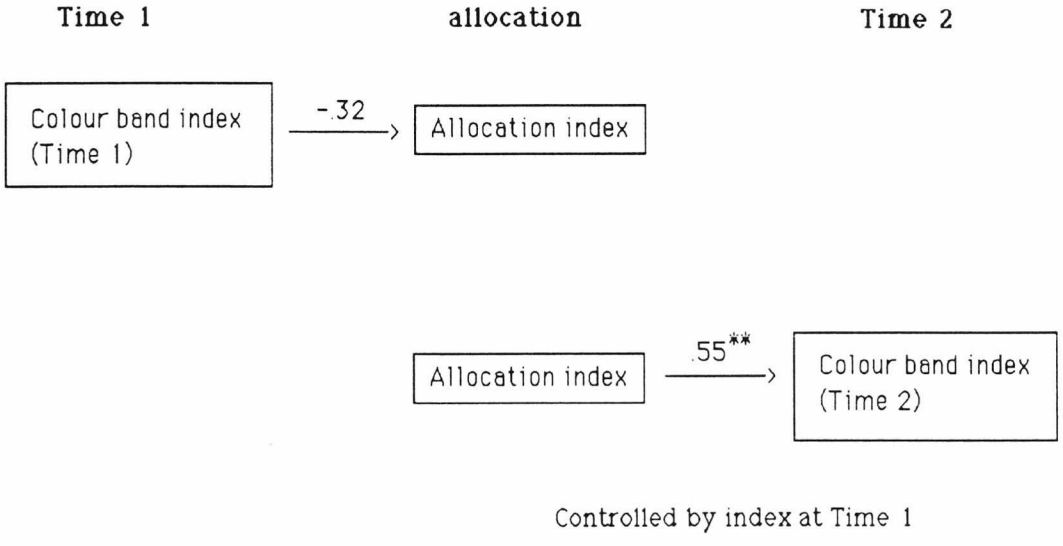


Fig. 7.1 Causal relationship between colour band and allocation indices

The colour band indices at Time 1 and 2 are composite scores of two colour band measures. The allocation index is the pull score of MD (*vs.* MJP•MIP). The figures are Pearson's correlation coefficient (left) and partial correlation coefficient (right).
** $p < .01$, $n = 25$, (two-tailed)

Difficulty judgement The mean subjective difficulty in answering each measure is displayed in Table A7.3.7. Most of the means were significantly smaller than the neutral point on the 7-point scales. Averaged difficulty scores were calculated to compare among the rating, point allocation, and colour band scale measures (Table 7.1). The means of the three representative indices were all significantly smaller than the neutral point (two-tailed *t*-test). Comparatively, however, the colour band scales were, on average, judged to be difficult more than the point allocation [t (22)= -2.58, p <.05] and the rating tasks [t (22)= 2.33, p <.05]. There was no difference

between the difficulty judgements on the rating and the point allocation tasks [t (24)=-.80, *n.s.*].

The difficulty ratings of the new versions of the matrix type MD•MIP *vs.* MJP were not significantly different from those of the orginal versions (for the sub-type [$^{in}_{out}$] and the sub-type [$^{out}_{in}$] respectively, the new versions: *M*s=2.48 and 2.80; the original versions: *M*s=2.56 and 3.00).

Table 7.1 Difficulty judgements on rating, point allocation, and colour band tasks.

Difficulty index	averaged difficulty	
Rating scales	2.56	t (22) = 2.33 *
Allocation tasks	2.74	t (22) = -2.58 *
Colour band scales	3.24	

* $p < .05$

7.4 Discussion

Impact of right eye/left eye categorisation

This new method of dividing subjects into groups— the right eye/left eye test— did not produce significant ingroup bias either in rating indices or point allocation indices. One reason may be the inclusion of the difficulty judgements which were required after every group-related measure. This may have induced subjects to treat the rating and allocation measures more as abstract psychometric problems and not as intergroup tasks.

Another possibility may be that the right eye/left eye categorisation was not strong enough to induce perceptual differentiation on subjects' part. This possibility, however, seems less plausible because the perceived distance

between the groups which subjects indicated was significantly larger than that of the example band, and the position of the groups, captured by the vector index, was consistent with the group labels (*i.e.* right *vs.* left). This result may indicate that the groups *were* perceptually differentiated by subjects. The pattern is similar to Experiment 4, which revealed differentiation on colour band scales but not on rating indices or point allocation indices. It should be noted that the connotation of the colour band scales in the present study and those in Experiments 3 and 4 is slightly different. The colour band scales in Experiments 3 and 4 were assumed to tap perceptual differentiation in terms of colour as well as distance. The colour bands in the present study were designed to measure differentiation only in terms of the distance (covarying with gradation) since there was no direct link between the group labels and the colours of the bands.

In short, it is thought that the right eye/left eye categorisation did induce perceptual categorisation among subjects, but either it was not strong enough or the difficulty judgement tasks may have caused subjects to perceive the setting as a non-intergroup situation. This problematic issue will be considered in the following chapters.

Causal relationship between the category differentiation and social identity processes

Correlational analyses, *i.e.* utilising individual differences, of the colour band indices and the allocation bias index indicated that the social identity process, represented by the allocation index, was strong when the initial category differentiation was weak, and was weak when the initial category differentiation was strong (left part of Fig. 7.1). Secondly, the stronger the social identity process was, the greater the subsequent category differentiation was (right part of Fig. 7.1). The negative correlation of the first part is consistent with the ideas of optimal level of categorisation (Brewer,

1991) and a drive for self-evaluation (Abrams and Hogg, 1988), assuming that social identity in a minimal group situation is minimal. Thus, in an undifferentiated situation, it is thought that subjects were motivated to achieve more distinctive social identity by point allocation where the Maximum Differentiation strategy happened to be the most differentiating. The negative correlation is also consistent with the results of Brown and Abrams (1986). In their study, similarity in status, when combined with attitudinal similarity, increased evaluative ingroup bias. Similar results were obtained in the secondary analysis of competitive subjects in Brown's work (Brown, 1984, Experiment 2). In other words, when groups were less differentiated, there was more ingroup bias.

In contrast, the correlation between the social identity process, represented by the allocation bias index, and the subsequent category differentiation index was highly positive. First of all, this direction from the social identity process to category differentiation was predicted by Brewer and Kramer (1985) as a circular loop of Tajfel's (1982) CIC sequence. Secondly, the positive relationship between the two is the prediction most often proposed in recent theorising (e.g. Stephan, 1985; Turner *et al.*, 1987) though the causal direction is not necessarily so. With regard to the difference in valence of correlation, it can be suggested, as in Chapter 5, that the social identity process is a motivational *reaction* to the initial category differentiation process, whereas the subsequent category differentiation is a cognitive *reflection* of the social identity process. Note that this argument stands only when Brewer and Kramer's (1985) loop interpretation of the CIC theory is true.

Lastly, it should be noted that there is little possibility that an exogenous factor produced the correlational pattern and that these correlations were artifacts. The reason is that the valences of the two

correlations were different. If there had been an influence from an exogenous factor, it should have had the same directional effect on both correlations.

Difficulty of each intergroup measure

An unexpected result was that colour band scales were judged to be more difficult than the rating scales and point allocation tasks. A likely reason may be that an explanation of how to complete the rating scales and the allocation tasks, but not the colour bands, had been given before subjects started the dependent measure booklet. Therefore, it is difficult to conclude that the colour band scales themselves are more difficult than the rating scales and the allocation tasks. However, this relative difficulty of the colour band scales and the fact that the rating scales and the allocation tasks were judged to be similarly easy, are consistent with the current assumptions about each index: the allocation indices reflect the social identity process and the colour band and rating scale measures reflect the category differentiation process. The present results indicate that the pattern of results obtained in the earlier experiments is not attributable to the ease with which subjects can complete the different types of measure.

Chapter 8

Study 6. Social orientations and the effects of distraction on intergroup biases

— A report of Experiment 5 —

Contents

8.1 Background

8.2 Method

8.3 Results

8.4 Discussion

So far, the effects of distraction have been examined to demonstrate intentionality and automaticity of different components of intergroup discrimination in a minimal group situation. In short, it was found, as predicted, that distraction hindered the social identity process more than the category differentiation process. Additionally, the *degree* of distraction was also found to be important because the impact of noise from counteracting intentions seems to depend upon the degree. Furthermore, the effects of distraction appear fairly robust since two different implementations of distraction (italic letter finding in Experiments 1 and 2 and digit rehearsal in Experiments 3 and 4) produced similar results: the intentional component of intergroup discrimination decreased with distraction when noise was removed.

The results of Experiment 4 and Pilot study 3 (reported in Chapters 6 and 7), however, pose a problem. Overall ingroup bias was not significant. It is thought that the intention of ingroup enhancement— a goal of the intentional process of social identity— was not strong enough among subjects in those experimental settings, presumably due to weak group membership

salience. Group membership salience was considered in Chapter 2 as an important dimension in the current investigation for various reasons. One of these reasons was that group membership salience is assumed to affect likely intentions in the setting. Whereas distraction is important because it is hypothesised to usurp cognitive resources necessary for the intentional process to operate, group membership salience is an important dimension because it maps directly onto the social identity process by providing the intention to begin with.

While the importance of this dimension was fully recognised, research interests have been centred, after Chapter 3, around unravelling the initially puzzling effects of distraction, thus leaving group membership salience relatively unstudied. Two experiments (5 and 6) were therefore designed to study intentions in the experimental setting. It was hoped that the results of previous studies would be replicated, especially the effects of distraction on ingroup bias— but this time more clearly. The present chapter reports the first of these experiments.

8.1 Background

Group membership salience and social orientation

Group membership salience plays a central role in the social identity approach to the studies of intergroup relations (Hogg & Abrams, 1988). Social identity theory posits that intergroup behaviour is "*fully* determined by [people's] respective memberships in various social groups or categories, and not at all affected by the interindividual personal relationships between the people involved" (Tajfel & Turner, 1979, p. 34, word in square brackets modified). Also according to self-categorisation theory, factors which enhance group membership salience depersonalise people's self-perception, and thus lead to intergroup discrimination as one of the consequences (Turner *et al.*,

1987, p. 50 and p. 57). In other words, group membership salience is posited to be essential to intergroup behaviour.

Meanwhile, it is not clear what factors increase group membership salience. In their meta-analytic investigation of the salience effect and others, Mullen, Brown, and Smith (1992) operationalised category salience as group composition and reality of the group.[1] For group composition, they hypothesised, with reservation, that a smaller group is more salient (see also Howard & Rothbart, 1980; Mullen, 1987). Turner *et al.* (1987) on the other hand suggested that category salience is determined as a product of the accessibility of the category and the fit of the category to the situation. Oakes & Turner (1986) demonstrated that in one condition, the group composition of equal numbers (hypothesised to bear the largest fit) led to the most salience, indicated by the most stereotypic perception of targets. Furthermore, Abrams, Thomas, and Hogg (1990) showed that as long as an ingroup member was present, subjects' spontaneous mention of the ingroup category, a measure of salience, was highlighted regardless of the particular ratios of the ingroup targets.

These results concerning group composition seem inconsistent. One reason for this inconsistency may be differences in dependent measures among these studies. Related to this, it seems that the concept of category salience is not identical across the studies. The narrower conceptualization characterises salience as a situational property of stimuli while the wider conceptualisation includes also its cognitive impact (see Chapter 1; also Oakes, 1987). This confusion demonstrates the elusive nature of the concept.

In this connection, rather than being trapped in the web of speculation, it was decided to manipulate group membership salience by utilising a

---

[1] Note that the present thesis conceptually distinguishes category salience from group membership salience. Category salience is a prerequisite of group membership salience. While studies referred in this section seem to equate them to one another, it is acceptable since these studies seem to assume that category salience naturally induces group membership salience.

variable which has a functional relationship with group membership salience. One such variable is intergroup competitiveness. It is intuitively and empirically expected that this variable increases group membership salience (Judd & Park, 1988; Oakes, 1987; Stephan, 1985). In contrast to competitiveness, the impact of intergroup cooperativeness on group membership salience is not straightforward (Oakes, 1987). It may or may not decrease group membership salience. However, a cooperative situation is expected to enhance at least intentions of cooperative behaviour. In the present experimental context, subjects are expected to take strategies to maximise joint profit between the groups. Therefore, the situational variable of competitiveness *vs.* cooperativeness was introduced in the present experiment in order to control group membership salience, and/or intentions in a minimal group situation.

Distraction was also manipulated to the two degrees using the digit rehearsal task. From the previous experiments, it seems that continual 3-digit number rehearsal constitutes "weak" distraction which distracts subjects significantly but not strongly, while continual 11-digit number rehearsal is strong enough to occupy subjects. Note that these subjective discriptions of the distraction level derive from an absence of objective measure of "distraction" as mentioned in Chapter 5.

8.2 Method

Subjects and design

Thirty-four school pupils (24 male and 10 female) aged 12-13 from two French classes at a private secondary school in Kent, England, participated in the experiment in a 2 (social orientation: competitive *vs.* cooperative) x 2

(distraction: weak *vs.* strong) between-subjects design.[2] Pupils from one class were assigned to the competitive condition and those from another class to the cooperative condition. Within each social orientation condition, they were randomly assigned to the weak or strong distraction conditions.

Procedure

The procedure was similar to that of Experiment 4. Major differences from Experiment 4 were the language, the experimental procedure of social categorisation, and presence of the social orientation manipulation.

The experiment was conducted in a group session, each social orientation condition separately. Experimental materials and instructions were in English. Subjects were introduced into a classroom and were seated. Desks were located apart from each other so as to prevent interaction between subjects. A dependent measure booklet, an explanation sheet, a large envelope, four small envelopes, and a black ball-point pen were placed on each of the desks where the subjects were seated. The main part of the procedure consisted of four sets of measurements, and the subjects started each set together, following instructions by the experimenter. The whole session took about 40 minutes.

After the general instructions (Appendix 8.1), social orientation was manipulated using a verbal instruction. The instruction gave either a competitive or cooperative intergroup context depending on the condition.[3] The instruction for the competitive condition was:

---

[2] The number of subjects was fairly small, due to administrative constraints. One of the main constraints was the availability of subjects at the school. The private school had only a small number of pupils in the target year group to start with.

[3] The current manipulation for competitiveness and cooperativeness was different, in nature, from that of most previous studies. That is, those studies usually utilised (anticipation of) the task nature, *i.e.* reward structure and/or evaluative method being based on comparison or joint products (see Brewer and Silver, 1978; Brown, 1984; Brown and Abrams, 1986; Deschamps and Brown, 1983; and Rabbie, Benoist, Oosterbaan, and Visser, 1974).

What is the meaning of groups in our life? To illustrate, let me give you an example of groups. Probably, team sports such as football and rugby are good examples.

If you are in a football team, you play a game against the other team, most probably trying your best to win the game. And the people in the other team would also do the same, to try to beat your team. In this case your team is your group and the other team is another group. What it means here is that teams, or groups are, essentially, competing with each other.

Sports teams are not the only groups of course. ... ...

And the instruction for the cooperative condition was:

What is the meaning of groups in our life? To illustrate, let me give you an example of groups. Think of hospital staff and, what groups there are in hospitals. Probably, doctors and nurses are the most common groups.

What they do is apparently different from each other. But, both of them are working for the same aim: to help patients. And doctors and nurses have to cooperate with each other in order to help patients most. What it means here is that different groups are, essentially, cooperating with each other.

Apart from this example, ...

The right eyed/left eyed distinction was then introduced as a group division. Subjects were subsequently assigned to the Right Eye group or Left Eye group according to the self-examination in the "right eye/left eye test" (see Appendix 8.2; also Pilot study 3). Those several subjects who could not find which eye they use more were asked to try different ways they could think of, and if they were still unable to find it, just to choose one of the two arbitrarily.

After everyone had decided which eye group they belong to, subjects were told "As half of the population are said to be right-eyed and the other half left-eyed, this class will be divided into half and half." Next, a personal number was given in the dependent measure booklet. The numbers were all unique and none appeared in the dependent measure booklet or the explanation sheet. Subjects were told to keep their group name and the

personal number secret. They were also asked to write the group name down on the top of each page every time they turned to it.

Subsequently, the two major tasks, point allocations and trait ratings, were explained with examples on an explanation sheet at hand (see Appendix 8.3). The distraction manipulation was introduced at this point. Subjects had been given four small envelopes numbered from 1 to 4, in each of which was a rehearsal number slip. Subjects were asked to take out the rehearsal number from the first envelope and to remember it. Twenty-five seconds were given to learn the number, then subjects put the number back to the envelope. Before opening the envelope, it was emphasised that subjects should not cheat as "this is not a test. ... ... If you forget the number, it's alright." However, they were informed that "according to studies on memory, one can remember it (the rehearsal number) longer if one recalls it from time to time." Subjects were then advised "to recall the rehearsal number when" they came "across the statement in the booklet, 'Attention: Please recall the rehearsal number'". Subjects were advised not to write the number down until they were asked to do so.

After this memory task, subjects filled in the first set of the dependent measures, at the end of which they wrote down the rehearsal number. When everyone had finished, the second set was administered together, preceded by the memory task with the rehearsal numbers from the second envelope. Subjects similarly completed the third and the fourth sets. After everyone had finished the fourth set, and a subsequent Collective Self-Regard scale and manipulation checks, subjects were debriefed and dismissed.

The distraction conditions differed in terms of the length of the rehearsal numbers for subjects to remember during the session. Three- and eleven- digit numbers were given, respectively, for the weak and strong distraction conditions (see Appendix 8.4 for the actual numbers).

The dependent measure booklet

There were three parts in the dependent measure booklet. The first part contained an introduction and the right eye/left eye test. The main part consisted of four sets of dependent measures. The last part contained the Collective Self-Regard scale and manipulation check items.

There was a box at the top of each page in the main part of the booklet in which subjects had to indicate their group name. There was also a cue, below the box, about the rehearsal number mentioned earlier. The sets in the main part of the booklet and their contents were as follows:

The first set —— point allocation matrices [A],
The second set — rating scales for the right eye group,
The third set —— point allocation matrices [B],
The fourth set —— rating scales for the left eye group, and the colour band scales.

The point allocation matrices were the same as those of Pilot study 3 (reported in Chapter 7; see also Appendix 8.2). Matrix sets [A] and [B] contained the first and the second three matrices that appeared in the dependent measure booklets in Experiments 1, 2, and 3. Like Pilot study 3, versions of the matrix type MD•MIP *vs.* MJP were also included in the sets [A] and [B]. The rating scales were the same as those five scales in Experiments 1, 2 and 3 and Pilot study 3.

The colour band scales utilised brown, red and blue gradation. Each had dense colour at one end, gradually reducing the hue to the other end on a 8mm wide, 143mm long band. The brown, red and blue bands were cut out from the gradation sheets (Decadry: DP221, DP207 and DP214 respectively), leaving 52mm, 27mm and 29mm, respectively, from the pale end of each gradation sheet. The direction of gradation was always the same. The pale side was on the left and the dense side on the right. The instruction reads

"Imagine people of the two groups. Please put down letters R and L on the colour band according to where you feel that group belongs." and a black-white gradation band was presented, as an example, with the letters R and L on it, 51mm apart from each other around the centre.

The last part of the booklet followed immediately after the fourth set. It contained the Collective Self-Regard scale (Sigger, 1992) and manipulation check items. Two of the CSR scale items are considered to capture the aspect of its cognitive component ("I feel strong ties to this group" and "Right now, I do not feel close to this group"). Therefore, a scale consisting of the two items was used as a check for category salience.

The manipulation check items were classified into two parts. Both parts were the same as those in Pilot study 3. The first part was concerned with self-reported strategies in point allocation. To the question "when you gave points to people, how much did you try to do each of the things listed below?", subjects answered, for each item, on a scale from 1 (not at all) to 7 (very much). The items were: "to be fair to each person", "to be fair to each group", "to give yourself most points", "to give your group most points", "to give everyone as much as possible", "to give points such that others won't think you are unfair", "to try to make your group win", and "nothing in particular".

The second part was related mainly to manipulation checks for experimental conditions. Most items were carried over from Experiment 3. They were: "when you gave points to people, how much did you think about your own group?" (1. not at all– 7. very much), "how much did you concentrate on the questions when you answered them?" (1. not at all– 7. very much), "how busy were you in keeping rehearsal numbers in mind?" (1. not at all– 7. very busy), "when you gave your views about the other group, how much did you compare it with your own group?" (1. not at all– 7. very much), "how much were you distracted when you answered the booklet?" (1. not at

all– 7. very much), "how difficult was it to answer the questions?" (1. very easy– 7. very difficult), "how willing would you be to take part in the research again?" (1. not at all– 7. very willing), "how difficult was it to try to remember the number?" (1. very easy– 7. very difficult). A new check item for social orientation was taken from Brown (1984): "How competitive do you feel towards the other group?" (1. not at all– 7. very competitive).

In addition to these items, two items were included to measure subjects' self presentational concern. They were English equivalents of those items in Experiment 4 conducted in Japan. One was, as already described in the self-reported strategies section, "to give points such that others won't think you are unfair" [self-presentational allocation strategy] (1. not at all– 7. very much). Another was, in the experimental manipulation checks section, "when you gave points to two people, were you concerned about how others would think of you?" [self-presentational concern] (1. not at all– 7. very much).

8.3 Results

Manipulation checks

Distribution of subjects Seven, eight, ten, and nine subjects were assigned respectively to the competitive/weak, competitive/strong, cooperative/weak, and cooperative/strong distraction conditions. Chi squares of subjects' sex [$\chi^2(3) = .91$] and group division [$\chi^2(3) = 1.80$] with condition were not significant (see Table A8.5.1).

Experimental manipulations For the distraction manipulation, the "busy" item showed no difference between the distraction conditions, unlike Experiment 4. Subjects in the strong distraction conditions reported more difficulty in remembering numbers than those in the weak distraction conditions [$F(1,30) = 34.12$, $p < .001$]. This is consistent with Experiments 3

and 4, and Pilot study 2. However, as mentioned earlier, this item is just an indirect index for distraction. For social orientation, there was no difference among conditions in the response on the "competitiveness" check item. This was also the case with Brown's (1984) study.

There were unexpected interactions between distraction and social orientation on the "difficult to answer" item [F (1,30) = 4.63, $p < .05$] and the Collective Self-Regard scale score [F (1,30) = 4.11, $p < .06$]. Subjects in the competitive/weak and cooperative/strong conditions had higher collective self-regard and felt the tasks easier than those in the competitive/strong and cooperative/weak conditions. The "thinking about the group in allocation" item showed one significant and another marginally significant effect. Subjects in the competitive conditions reported having thought about the group more than those in the cooperative conditions did [F (1,30) = 4.51, $p < .05$]. And reported thinking was marginally larger in the strong distraction condition than in the weak distraction condition [F (1,30) = 4.02, $p < .10$]. The former result was in the expected direction for social orientation while the latter shows an opposite direction for distraction. The mean responses on all manipulation check items and relevant indices are shown in Table 8.1. In short, the results from manipulation checks are mixed both for the distraction and social orientation manipulations.

Table 8.1 Manipulation checks

Social orientation:	Competitive		Cooperative	
Distraction:	Weak (n = 7)	Strong (n = 8)	Weak (n =10)	Strong (n = 9)
For distraction*				
"Concentrated" ^{S1}	4.00	4.00	4.50	5.33#
"Busy keeping numbers"	5.00	4.88	5.10	5.00
"Distracted"	3.71	4.75	3.90	3.33
"Difficult to answer the questions" ^{S2}	2.43#	4.13	3.40	2.44#
"Difficult to remember numbers" ^{S3}	2.71_a	6.00_b#	2.70_a	6.22_b#
For intergroup situation*				
"Competitive to the other group"	3.14	4.25	3.60	3.44
Group membership salience				
CSR scale score ^{S4}	41.14	37.38	37.70_a	47.22_b
Cognitive component	8.00	8.38	8.70	9.89
Others*				
Thinking about the group in allocation ^{S5}	4.29	5.50_a#	3.30_b	4.22
Group comparison in rating	3.14	3.63	4.00	3.78
Self-presentational concern	2.29#	2.75#	2.60#	2.44#
"Willing to participate in the research again" ^{S6}	6.00#	5.00_a	6.10#	6.67_b#

* The figures are mean ratings on the scale from 1 not at all- 7 very much

\# The figure is significantly different from the neutral point ($p < .05$, two-tailed). Means with different subscripts on a line are significantly different ($p < .05$, two-tailed)

$ 1. The effect of situation: F (1,30) =3.07, $p < .10$; 2. The interaction effect of distraction and situation: F (1,30) =4.63, $p < .05$; 3. The effect of distraction: F (1,30) =34.12, $p < .001$; 4. The interaction effect of distraction and situation: F (1,30) =4.11, $p < .10$; 5. The effect of situation: F (1,30) =4.51, $p < .05$; The effect of distraction: F (1,30) =4.02, $p < .10$; 6. The effect of situation: F (1,30) =4.17, $p < .05$; The interaction effect of distraction and situation: F (1,30) =3.28, $p < .10$

Point allocation indices

Total points Total points which subjects gave to ingroup and outgroup members were calculated from the eight point allocation matrices. The mean total points are displayed by condition in Table 8.2. This index was subject to a 2 (social orientation: competitive *vs.* cooperative) x 2 (distraction: weak *vs.* strong) x 2 (repeated measure: ingroup *vs.* outgroup) ANOVA.

Firstly, the effect of ingroup-outgroup factor was significant, showing overall ingroup bias [F (1,30) = 9.85, $p < .01$]. This effect was qualified by a significant interaction between social orientation and ingroup-outgroup factor [F (1,30) = 10.38, $p < .01$]. Ingroup bias in total points was evident only in the competitive situation.

Pull scores The mean pull score of each strategy is shown in Table 8.3 by condition. On the whole, the effects of social orientation were significant. Pull scores of all the four discriminatory strategies were significantly larger in the competitive conditions than in the cooperative conditions [Fs (1,30) = 7.61, 6.68, 11.63 and 5.48 respectively for the pull scores of MD•MIP (on MJP), MD•MIP (on MJP, version 2), MD•MIP (on F), and MD (on MJP•MIP)]. Meanwhile, the pull of F against MD•MIP was larger in the cooperative conditions than in the competitive conditions [F (1,30) = 3.05, $p < .10$]. Curiously, the pull score of MJP (on MD•MIP, version 2) was significantly smaller in the cooperative conditions than in the competitive conditions [F (1,30) = 8.28, $p < .01$]. There was no effect of distraction or interaction for any pull score.

A composite index for the allocation ingroup bias was created from the four discriminatory pull scores by simply summing the scores.[4] The means by condition are shown in Fig. 8.1, along with a composite score from the other four pulls. For the discriminatory pulls index, the effect of social orientation only was significant [F (1,30)= 10.46, $p <.01$]. There was no significant effect for the other composite index.

---

[4] In a factor analysis on the pull scores, the four discriminatory pulls formed a single factor (see, for detail, Table A8.5.2 in Appendix 8.5).

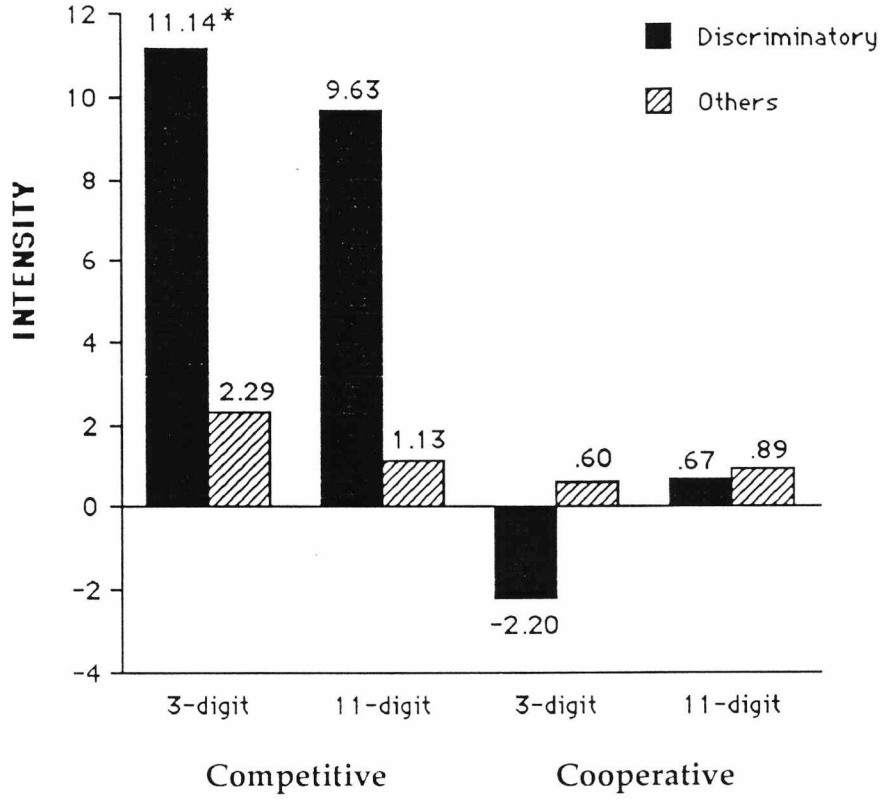


Fig. 8.1 Allocation strategies: Composite discriminatory pulls index and others by social orientation and distraction

* Significantly larger than zero

Rating indices

Evaluative ratings Rating ingroup bias was calculated by subtracting the outgroup rating score from the ingroup rating score on each of the five dimensions. The means were displayed by condition in Table 8.4. There was no significant main or interaction effect for any dimension. However, the interaction effect between social orientation and distraction was nearly significant for generosity [F (1.29)=3.27, $p < .10$]. This bias index was larger in the weak distraction condition under the competitive situation, but larger in the strong distraction condition under the cooperative situation. The grand mean of the composite score was significantly larger than zero (M = 4.33, $p < .05$, two-tailed).

Colour band measures

As a category differentiation index, the simple distance between the groups was calculated on each colour band, and is displayed in Table 8.5 by condition. There was no significant effect for any measure. The grand means for the brown, red, and blue band measures were 72.06, 75.79, and 76.74 respectively. All grand means were significantly larger than the distance on the example band ($p < .05$, two-tailed).[5]

Table 8.2 Total points in point allocation tasks

Social orientation:	Competitive		Cooperative	
Distraction:	Weak	Strong	Weak	Strong
Items	(n = 7)	(n = 8)	(n =10)	(n = 9)
Ingroup members	94.14 (11.78)	92.38 (17.20)	75.90 (7.53)	81.11 (13.20)
Outgroup members	67.43 (12.90)	69.75 (16.39)	80.00 (8.23)	77.67 (7.38)
Ingroup bias in total points	26.71# (23.63)	22.63 (32.56)	-4.10 (13.38)	3.44 (18.58)

1) # denotes the figure is significantly different from zero point ($p < .05$, two-tailed)
2) Means with different subscripts on a line are significantly different ($p < .05$)
3) The figures in brackets are standard deviations.
4) The ingroup-outgroup factor effect, F (1,30)=9.85, $p < .01$; the interaction effect between situation and ingroup-outgroup factor, F (1,30)=10.38, $p < .01$.

[5] Correlations between the colour band measures and other relevant variables are shown in Table A8.5.4 (in Appendix 8.5).

Table 8.3 The mean pull scores of each strategy

Social orientation:	Competitive		Cooperative	
Distraction:	Weak (n = 7)	Strong (n = 8)	Weak (n =10)	Strong (n = 9)
Items				
MD•MIP (on MJP) S1	2.71# (2.93)	2.63 (3.16)	.30 (2.06)	-.11 (2.71)
MD•MIP (on MJP, version2) S2	3.86_a# (2.34)	2.38 (4.75)	$-.50_b$ (2.01)	1.33 (2.40)
MD•MIP (on F) S3	2.43_a (2.76)	3.00_a# (3.30)	-1.50_b (2.42)	.33 (2.74)
MD (on MJP•MIP) S4	2.14 (3.53)	1.63 (4.44)	-.50 (2.07)	-.89 (2.57)
F (on MD•MIP) S5	1.57 (3.21)	.25 (1.49)	2.90# (2.89)	2.11# (2.67)
MJP•MIP (on MD)	.43 (3.10)	.63 (2.39)	-.90 (2.23)	.00 (3.24)
MJP (on MD•MIP)	-.14 (1.77)	-.13 (1.89)	.10 (1.10)	.11 (1.54)
MJP (on MD•MIP, version2) S6	.43 (1.13)	$.38_a$ (.92)	-1.50_b (2.84)	-1.33# (1.32)

1) The figures in brackets are standard deviations.
2) Means with different subscripts on a line are significantly different ($p < .05$)
The figure is significantly different from zero point ($p < .05$, two-tailed).
$ The effect of situation: 1. F (1,30) =7.61, $p < .05$; 2. F (1,30) =6.68, $p < .05$; 3. F (1,30) =11.63, $p < .01$; 4. F (1,30) =5.48, $p < .05$; 5. F (1,30) =3.05, $p < .10$; 6. F (1,30) =8.28, $p < .01$

Table 8.4 The mean rating bias on each dimension

Social orientation:	Competitive		Cooperative	
Distraction:	Weak	Strong	Weak	Strong
Items	(n = 7)	(n = 8)	(n =10)	(n = 9)
warmth	1.29	1.38	.44	1.56#
	(2.29)	(1.69)	(2.30)	(1.59)
honesty	.71	1.63	.67	.44
	(1.80)	(2.26)	(1.41)	(2.01)
friendliness $	1.00	1.00	.11	.89
	(2.94)	(2.00)	(.33)	(1.54)
trustworthiness	.86	1.00	.56	1.00
	(2.19)	(1.60)	(1.81)	(2.24)
generosity ¢	2.00	-.13	.33	1.00
	(3.06)	(1.64)	(1.50)	(2.45)
Composite score §	5.86	4.88	2.11	4.89
	(9.58)	(7.57)	(5.18)	(7.67)

1) The figure indicates ingroup bias. The higher the figure, the more in favour of ingroup.
2) Multiple range tests showed no difference among means on any dimension.
The figure is significantly different from neutral point zero ($p < .05$).
$ Bartlett-Box F =7.62, $p < .01$.
¢ The interaction effect between situation and distraction: F (1.29)=3.27, $p < .10$
§ The grand means for competitive and cooperative conditions were 5.35 and 3.50 respectively, both being significantly bigger than zero ($p < .05$, two-tailed).

Table 8.5 Colour band measures (distance between the groups)

Social orientation:	Competitive		Cooperative	
Distraction:	Weak	Strong	Weak	Strong
Items	(n = 7)	(n = 8)	(n =10)	(n = 9)
Brown band [S]	86.14[#] (32.12)	82.13[#] (26.74)	60.20 (31.81)	65.33 (24.46)
Red band	63.86 (44.21)	98.63[#] (23.65)	71.50 (34.36)	69.56 (25.65)
Blue band	81.57[#] (29.84)	84.75[#] (25.91)	77.70[#] (36.98)	64.78 (30.52)
Composite index	77.19 (30.72)	88.50 (20.29)	69.80 (29.50)	66.56 (25.46)

1 Distance is in mm between the two letters representing the groups. The figure in brackets is a standard deviation.

The figure is significantly different from the distance on the example band (51mm, $p <$ .05, two-tailed).

S The effect of social orientation: F (1,30)=4.56, $p < .05$

Self-reported allocation strategies

The means of each self-reported allocation strategy are displayed in Table 8.6 by condition. Generally, the effect of social orientation was significant. As expected, subjects in the competitive conditions reported, more than those in the cooperative conditions, that they had tried to give more points to their group [F (1,30)=7.92, p <.01], and to make their group win [F (1,30)=9.48, p <.01]. Meanwhile, subjects in the cooperative conditions reported, more than those in the competitive conditions, that they had tried to be fair to each person [F (1,30)=12.56, p <.001], to be fair to each group [F (1,30)=12.53, p <.001], and to give everyone as much as possible [F (1,30)=6.42, p <.05]. Self-reports of the competitive strategies in the competitive conditions, as well as self-reports of the cooperative strategies in the cooperative conditions, tended to be significantly larger than the neutral point

of the scale, unlike the previous studies (see Experiments 1 and 2). There was no significant effect of distraction or interaction for any self-reported strategy.

Self-reported and actual allocation strategies Correlations between "pulls" and self-reports of allocation strategies were calculated by social orientation (see Table 8.7). This can be treated as an index of intentionality of the allocation strategies (see also Chapters 3 and 4). There was a fairly clear pattern for social orientation. Correlation for Fair allocation was positive and significant in the cooperative (r =.61, p<.01), but not significant in the competitive condition. Correlations for both Ingroup Profit (MIP) and Ingroup Win (MD) were highly positive and significant in the competitive (rs= .59~.81, p<.01), but not significant in the cooperative condition. Finally, the correlations for Joint Profit were not significant across conditions.

Table 8.6 Intentions in allocations

Social orientation:	Competitive		Cooperative	
Distraction:	Weak	Strong	Weak	Strong
Items	(n = 7)	(n = 8)	(n =10)	(n = 9)
"To be fair to each person" $1	3.57_a	3.63_a	5.20_b#	5.67_b#
"To be fair to each group" $2	3.14_{ac}	3.50_c	5.70_b#	4.89_{bc}
"To give yourself most points" §	4.00	5.14	3.60	3.78
"To give your group most points" $3	5.43#	5.50#	3.60	3.67
"To give everyone as much as possible" $4	3.57	3.38	5.00	4.89
"the way others won't think you are unfair"	3.57	2.88	3.30	3.22
"To make my group win" $5	4.43	6.00_a#	3.10_b	3.11_b
"Nothing in particular"	4.71	3.38	4.80	4.33

* The figure is a mean response on the scale 1. not at all— 7. very much
\# The figure is significantly different from the neutral point (p < .05).
$ The effect of situation: 1. F (1,30)=12.56, p < .001; 2. F (1,30)=12.53, p < .001; 3. F (1,30)=7.92, p < .01; 4. F (1,30)=6.42, p < .05; 5. F (1,30)=9.48, p < .01
§ Only on this item, the number of subjects were from the left 7, 7, 10 and 9.

Table 8.7 Correlation between self-reported and actual point allocation strategies ("pull" scores)

Social orientation: Items	Competitive (n = 15)	Cooperative (n =19)	Total (n = 34)
"Fairness" with F *vs.* MD•MIP	-.06	.61**	.41*
"Joint Profit" with MJP *vs.* MD•MIP	-.07	.12	.07
with MJP *vs.* MD•MIP (2)	.20	.09	-.11
with MJP•MIP *vs.* MD	.35	.16	.11
"Ingroup Profit" with MD•MIP *vs.* MJP	.67**	-.04	.40*
with MD•MIP *vs.* MJP (2)	.74**	-.17	.39*
with MD•MIP *vs.* F	.81**	.08	.51**
"Group win" with MD *vs.* MJP•MIP	.59*	-.30	.33

The figures are Pearson's correlation coefficients.
* $p < .05$; ** $p < .01$; (two-tailed)

8.4 Discussion

Summary of the results

A reliable degree of ingroup bias was observed, in an expected manner for social orientation, both in point allocation indices and rating indices. Specifically, allocation ingroup bias was significant in the competitive conditions, but not in the cooperative conditions, as expected. There was, however, no significant effect of distraction in any index (see Fig. 8.1, Tables 8.2 and 8.3). Self-reports of allocation strategies showed mostly corresponding tendencies to the actual point allocations, indicating that control of intentions by the social orientation manipulation were successful. Meanwhile, rating ingroup bias and colour band measures showed overall evaluative bias and

category differentiation respectively, but they were not affected by the manipulations of social orientation or distraction (see Tables 8.4 and 8.5).

Point allocation indices

The effects of social orientation The results of the discriminatory allocation indices may be demonstrating that the competitive situation facilitated the intentional process of social identity, presumably through greater group membership salience.[6] This inference is supported by increased self-reported allocation strategies of Ingroup Win and Ingroup Profit in the competitive conditions (Table 8.6).

For cooperativeness, there were increased self-reports not only of Joint Profit, but also of Fairness, in the cooperative conditions. The cooperation instruction may have induced the norm of fairness also. The pull of Fairness was accordingly greater in the cooperative conditions, whereas the results of the Joint Profit pulls— indices for intergroup cooperation— were mixed. One pull score of Joint Profit was even considerably decreased (see Table 8.3). That is, correspondence between self-reports and actual allocations was not stable for Joint Profit.[7] This was also the case in the subsequent correlational analyses (Table 8.7).

Overall, however, it can be said that the manipulation of social orientation (competition *vs.* cooperation) achieved the initial goal of the experiment: to control intentions in a minimal group situation, especially those of ingroup enhancement.

Correlation between self-reported and actual allocation strategies For Fairness, Ingroup Profit, and Ingroup Win as shown in Table 8.7, correlations between self-reports and actual "pulls" were large and significant in the corresponding social orientation conditions: the cooperative condition

---

[6] There was no such sign in the manipulation checks of group membership salience. See, however, Chapter 3 for a discussion about fundamental problems in the measurement.

[7] Another issue involves responsive correspondence between versions of the allocation matrix type of MD•MIP *vs.* MJP. See Table A8.5.6 for details.

for Fairness, and the competitive condition for Ingroup Profit and Ingroup Win. In contrast, the correlation for Joint Profit was not significant in either social orientation condition. As suggested in Chapters 3 and 4, the small sizes of the pull scores seem to be responsible for non-correspondence. Thus, the pull scores of Fairness, Ingroup Profit, and Ingroup Win in the competitive conditions were all large, whereas those of Joint Profit were generally small (Table 8.3). Note that the correspondence for Ingroup Win (MD) was not evident in Experiments 1 and 2, where the size of the pull scores were small. This shows that what is important for the correspondence is the size of the bias, rather than its content (see the social desirability argument in Chapter 4).

Absence of the distraction effects There was no effect of distraction in any allocation index. Two reasons are suggested. First, there is a possibility that the cell sizes were not large enough to detect the effect (n= 7-10). In fact, three out of the four discriminatory allocation pulls in the competitive conditions showed the hypothesised direction: decrease with distraction (Table 8.3). Probably along with this reason, subtlety in the procedural conduct of the digit rehearsal task may be another reason as demonstrated in the differential impact between Experiments 3 (single rehearsal number) and 4 (continual and multiple rehearsal numbers).

As a check, the original dependent measure booklets were examined, and it was found that a considerable number of subjects in fact had written down the rehearsal numbers *before* they were asked to do so. Nearly half of the subjects (16 out of 34) had written them down more than once (see Fig. 8.2). The number of cheating subjects in each condition (more than 7), *i.e.* those who heavily violated the experimental instruction, was 1, 5, 2 and 1 respectively in the competitive/weak, competitive/strong, cooperative/weak, and cooperative/strong distraction condition. The second number is distinctively large. It may be that in the competitive situation, more

subjects may have been tempted to do better in the rehearsal task even when the task was difficult (rehearsal of eleven digit numbers).

This result indicates *post hoc* that nearly half of the subjects may not have been distracted in an expected manner in the present experiment. The absence of the distraction effects may be attributable to this fact and the small cell size.[8] Therefore, it is necessary to use larger sample size and more stringent control for distraction in the next experiment.

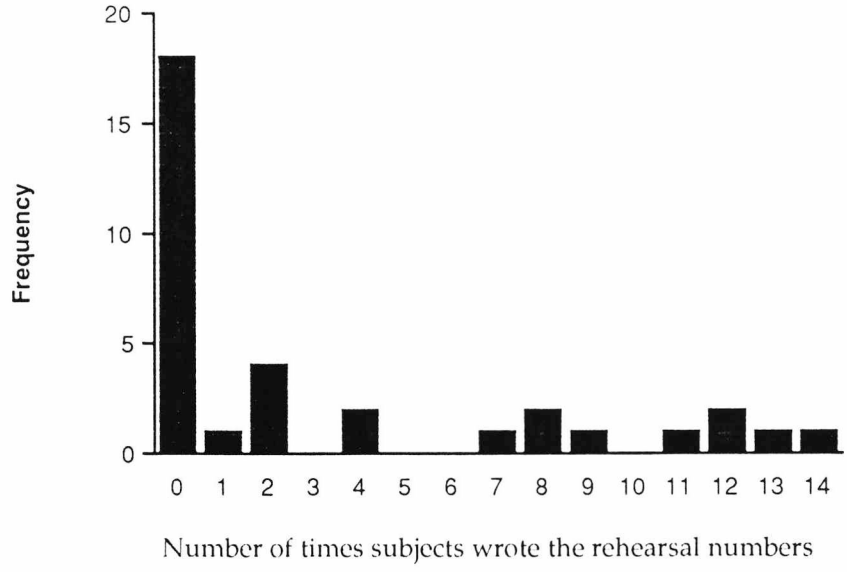


Fig. 8.2 Extent of the recording of the rehearsal numbers by subjects

Rating ingroup bias indices and colour band measures

The results of rating indices and colour band differentiation measures deserve two comments. Firstly, the absence of the social orientation effect on evaluative rating bias is consistent with the results in Brewer and Silver (1978), Brown (1984: Experiment 2), and Brown & Abrams (1986). In the current experiment, it was assumed that the competitive situation increases

[8] Secondary analyses were conducted, despite the even smaller cell size, excluding those subjects who had written down the rehearsal numbers at inappropriate places. See Tables A8.5.7-A8.5.10 for detail.

group membership salience. Therefore, the absence of the social orientation effect in the present study is also consistent conceptually with the results of Experiment 1 and Pilot study 1 of the present thesis where little or no effect of salience was obtained.[9]

One interpretation is that these results, in general, show an automatic aspect of intergroup discrimination, independent of the intentional processes; in particular, it could be argued that the absence of the effect on evaluative rating bias demonstrates an automatic component in ingroup bias, while absence of the effect on colour differentiation measures demonstrates the automaticity of the category differentiation process (see Chapter 1 for clarification of the concepts). An alternative interpretation is that the absence of the social orientation effect was due to the possibility that the evaluative rating and colour band measures were judged to be irrelevant to the goals of the minimal intergroup situation. If the latter is the case, it is natural that no effect of social orientation should be obtained, but in this case, for different reasons. This issue will be returned to in the following chapters.

The second comment concerns the overall significance level of rating bias and colour differentiation. Though small, the evaluative rating bias and colour band differentiation measures were both significantly larger than chance, despite the small number of the entire sample (n=34). This contrasts with the non-significant evaluative rating bias in Experiment 4 where the sample size was relatively large (n=78). There could be unknown cultural factors since Experiment 4 was conducted using a Japanese sample whereas the current experiment used a British sample. However, a more plausible interpretation may be that the social orientation manipulation in this experiment may have caused sufficient category salience to induce category differentiation. This manipulation emphasised, at the very beginning of the

---

[9] The results of Sachdev & Bourhis (1988) also suggest the same pattern. The effects of power relationship and category salience were significant on allocation, but not on perception measures.

experimental session, the distinction of groups, whether in the competitive or cooperative condition. No such manipulation was used in Experiment 4, where a similar procedure was employed, but which yielded no overall rating bias.

Summary

Competitive and cooperative social orientations were introduced to control intentions in the minimal group situation. As expected, subjects in the competitive and cooperative conditions showed increased self-reports of, respectively, discriminatory allocations, and fairness and joint profit allocations. Furthermore, actual point allocations corresponded well to the self-reports for discriminatory and fairness allocation strategies though rather less so for joint profit strategies. It can be said that subjects formed expected intentions in each social orientation condition. Strangely however, no effect of distraction was observed on any index of ingroup bias. Procedural flaws were suspected and a close examination in fact revealed that nearly half of the subjects violated the instruction of the distraction manipulation. A stringent manipulation would be demanded in future research.

Overall levels of rating ingroup bias and category differentiation on the colour bands were significantly greater than neutral. Moreover, the effects of social orientation and distraction on these indices were negligible, confirming the results of previous research. These results were interpreted in terms of an automatic aspect of intergroup discrimination.

Chapter 9

Study 7. Social values and the effects of distraction on ingroup bias

— A report of Experiment 6 —

Contents

9.1 Background

9.2 Method

9.3 Results

9.4 Discussion

This chapter reports Experiment 6 which, together with Experiment 5, firstly concerned controlling likely intentions in a minimal group situation, and secondly, obtaining reliable effects of distraction on ingroup bias in the controlled conditions.

Experiment 5 showed that experimentally manipulated social orientation (competition *vs.* cooperation) led to distinct intergroup consequences in point allocation indices. This demonstrates the importance, as argued in Chapters 2 and 8, of controlling the experimental situation in order to examine the effect of distraction since it renders the basic condition to the analysis: the intergroup situation must be strong enough to produce ingroup bias to start with. The first purpose of the current study is to corroborate this proposition by utilising *dispositional* differences in social orientations.

The second purpose concerns the distraction manipulation. The effect of distraction was not prominent in Experiment 5, and it was suggested that the experimental control of distraction was not efficient. Therefore, it was

aimed in the current study to repeat the same procedure for the distraction manipulation but with additional control in order to produce more reliable effects.

9.1 Background

Group membership salience and dispositional social orientation

It is argued, in this thesis, that group membership salience gives rise to the social identity process. A further assumption is that the effect of the social identity process on intergroup allocations is intentional. This is why the concept of distraction has been introduced because it is thought to obstruct the operation of the intentional process, and thus it enables one to assess the contribution of the social identity process to intergroup outcomes. In this connection, it is a necessary condition that the social identity process is operating, for a start, so as to observe the effect of distraction on ingroup bias. To do so, group membership salience must be somehow enhanced in the experimental situation.

One way to achieve this aim is to manipulate subjects' social orientations as in Experiment 5. This produced the expected differences in point allocations between competitive and cooperative orientations. The experimental manipulation, however, utilised verbal instructions at the beginning of the session to form the corresponding norms, competitiveness and cooperativeness. This manipulation cannot escape from an interpretation of demand characteristics for the obtained results. To avoid this criticism of demand characteristics, the present experiment employed dispositional difference in social orientations.

Social value orientations in intergroup settings

For interpersonal relations, the research in social values distinguishes traditionally four distinctive social values: altruism, cooperation, competition,

and individualism (Liebrand, Jansen, Rijken, & Suhre, 1986). Social values are "defined as preferences for particular distributions of outcomes to self and other, preferences that may be motivational (goal oriented) or strategic in intent" (McClintock & Van Avermaet, 1982, pp.48-49). And different distribution rules are defined for corresponding social values in outcome-interdependent situations. This research tradition has been confronted, and/or introduced into, intergroup research previously. Van Avermaet & McClintock (1988), for example, extended this tradition conceptually to an intergroup setting in a developmental context, and argued that fairness was also an important allocation rule in intergroup, just as in interpersonal situations. Platow, McClintock, & Liebrand (1990) more directly examined the effect of social values on allocation behaviour in a minimal group situation, and found that "relative dominance of these two choice preferences [*i.e.* of ingroup bias and fairness] ... was strongly influenced by subjects' social value orientations" (words in parentheses by the author). And most recently, interactions between social value and allocation behaviour were examined on resultant self-esteem in minimal group situations (Chin & McClintock, 1993). While they replicated Platow *et al*'s (1990) result that allocation behaviour was influenced by subjects' social values, no interaction was obtained between social value and allocation on collective self-esteem. Subjects' collective self-esteem was heightened regardless of their social values in a forced discriminatory allocation condition.

Importantly, the latter two studies both employed dispositional social value orientations and obtained significant effects on allocation behaviour. In both studies, while prosocial (cooperative) subjects showed no ingroup bias in total points, competitive (and individualist) subjects exhibited clear ingroup bias in point allocations. This finding is highly relevant in the present context of controlling (or rather selecting) likely intentions in a minimal group situation. That is, the intentionality assumption of the social identity process

cannot be tested in the condition where one does not exhibit significant ingroup bias, especially in allocation. In other words, the effect of distraction can be reliably interpreted only when the intentional process of social identity is thought to be operating. In this context, the present study examined the influence of dispositional social value orientations on the effect of distraction. It was predicted that cooperative subjects would not be susceptible to the distraction effect since no significant allocation bias was expected for those subjects anyway. In contrast, distraction was predicted to result in decreased allocation bias among other subjects (Non-cooperators) including subjects with a competitive social value orientation.

The levels of distraction

The present study adopted the levels of distraction from Experiment 5: continual 3- and 11-digit number rehearsals. The continual 3- and 11-digit number rehearsals are assumed to constitute, respectively, "weak" and "strong" distraction conditions.[1] In the present experiment, however, extra caution was used to ensure that subjects would not write down the rehearsal numbers until they were asked to do so. This was because absence of the distraction effect in Experiment 5 may have been because writing down the numbers cancelled out the necessary cognitive load which digit rehearsal should have otherwise brought about. By making subjects rehearse the numbers by heart, it was expected that a reliable effect of distraction would be obtained.

[1] A "no distraction" condition was not incorporated into the design due to administrative constraints: a "no distraction" condition would have needed a separate session from the two experimental sessions described in the method section.

9.2 Method

Subjects and design

Fifty-five pupils aged from 12 to 13 (21 male and 34 female) participated in the research, from two classes at a grammar school in Kent, England. The research consisted of two stages: a measurement of social value orientations and a minimal group experiment. Four subjects completed only the social value orientation measurement. Thus, data of these four subjects were excluded from the analyses, leaving 51 subjects.[2] The remaining subjects were randomly assigned to the weak and strong distraction conditions. In addition, dispositional differences in social value orientations were incorporated into the design. Prosocials (Cooperators) and Non-prosocials (Non-cooperators) were compared.

Procedure

Social value orientation measurement The research consisted of two stages. At the first stage, social value orientations were measured using nine three-choice decomposed games, following the procedure of Chin & McClintock (1993) and Platow *et al* (1990).[3] Subjects were asked to rank order their preferences among three alternatives of hypothetical self-other reward allocations (see Appendix 9.1). The three alternatives corresponded, respectively, competitive, individualistic, and cooperative social value orientations. The first stage took about ten minutes including explanation of the material. Those who consistently chose competitive, individualistic, and cooperative combinations six times and more, as their first preference, were

---

[2] Furthermore, eight out of 51 subjects completed the social value orientation measurement after the minimal group experiment. Therefore, data of these eight subjects were excluded from the analyses involving social value orientations. However, data of these eight subjects were included in the analysis only involving distraction, in view of the relatively small size of the entire sample. Data from further two subjects in the strong distraction condition who wrote down the rehearsal numbers were also excluded from all the analyses on the dependent measures.

[3] The author wishes to thank Matthew G. Chin for his providing the original decomposed games in Chin & McClintock's (1993) study.

classified as Competitors, Individualists, and Cooperators. Therefore, for the purpose of the comparison, Non-cooperators included Competitors, Individualists, and those who did not fall in any of these categories.

Minimal group experiment The minimal group experiment was conducted at the second stage, two weeks after the social orientation pretest. The procedure was virtually the same as Experiment 5 except that social orientation was not manipulated in the present experiment.

The experiment was conducted in a group session.[4] Subjects were introduced into a classroom and were seated. The desks were located at a distance from each other so as to prevent interaction between subjects. A dependent measure booklet, an explanation sheet, a large envelope, and four small envelopes were placed on each of the desks where the subjects were seated. The main part of the procedure consisted of four sets of measurement, and the subjects started each set together, with the experimenter's cue. The whole session took about 40 minutes.

After the general instruction (Appendix 8.1), the right eyed/left eyed distinction was introduced as a group division. Subjects were subsequently assigned to the Right Eye group or Left Eye group according to the self-examination in the "right eye/left eye test" (see Appendix 8.2; also Pilot study 3). Those several subjects who could not find which eye they use more were asked to try different ways they could think of, and if they were still unable to find their "preferred eyes", just to choose one of the two arbitrarily.

After everyone had decided which eye group they belong to, subjects were told "As half of the population are said to be right-eyed and the other half left-eyed, this class will be divided into half and half." Next, a personal number was given in the dependent measure booklet. The numbers were all unique and none appeared in the dependent measure booklet or the

---

[4] There were two sessions, within which subjects were randomly assigned to the two distraction conditions. Each session was conducted by class.

explanation sheet. Subjects were told to keep their group name and the personal number secret. They were also asked to write the group name down on the top of each page every time they turned to it.

Subsequently, the two major tasks, point allocations and trait ratings, were explained with examples on an explanation sheet at hand (see Appendix 8.3). The distraction manipulation was introduced at this point. Subjects had been given four small envelopes numbered from 1 to 4, in each of which was a rehearsal number slip. Subjects were asked to take out the rehearsal number from the first envelope and to remember it. Twenty-five seconds were given to learn the number, then subjects put the number back into the envelope. Before opening the envelope, it was emphasised that subjects should not cheat as "this is not a test. ... ... If you forget the number, it's alright." However, it was stated that "according to studies on memory, one can remember it (the rehearsal number) longer if one recalls it from time to time." Subjects were then advised "to recall the rehearsal number when" they came "across the sign in the booklet, 'Attention: Please recall the rehearsal number". As extra caution for the distraction manipulation, it was emphasised that subjects must not write the number down until they were asked to do so.

After this memory task, subjects filled in the first set of the dependent measures, at the end of which they were asked to write down the rehearsal number. When everyone had finished the set, the second set was administered together, preceded by the memory task with the rehearsal numbers from the second envelope. Subjects similarly completed the third and the fourth sets. After everyone had finished the fourth set, and a subsequent Collective Self-Regard scale and manipulation checks, subjects were debriefed and dismissed.

The distraction conditions differed in terms of the length of the rehearsal numbers for subjects to remember during the session. Three- and

eleven- digit numbers were given, respectively, for the weak and strong distraction conditions (see Appendix 8.4 for the actual numbers). The dependent measure booklet was exactly the same as that of Experiment 5.

9.3 Results

Manipulation checks

Distribution of subjects Out of the 51 subjects, 25 and 26 were respectively assigned to the weak and strong distraction conditions. After excluding 8 subjects who completed the decomposed games after the minimal group experiment, 9 and 12 subjects were classified, respectively, as Cooperators and Non-cooperators in the weak distraction condition. Similarly, 11 and 11 subjects were classified, respectively, as Cooperators and Non-cooperators in the strong distraction condition. (See Table A9.2.2) Incidentally, 23%, 14%, 44%, and 19% of the sample which completed the decomposed games were Competitors, Individualists, Cooperators, and those who did not fall in any of the above, respectively. This distribution is similar to that of the American college population reported in Chin & McClintock (1993). Other distributions concerning sex and the right-eye/left-eye groups are also displayed in Tables A9.2.1~A9.2.4.

Experimental manipulations For the distraction manipulation, two items revealed significant differences between the distraction conditions in the expected direction. Subjects in the weak distraction condition reported concentrating more than those in the strong distraction condition [F (1,49)=6.04, p <.05], and their self-report of difficulty in remembering the rehearsal numbers was higher in the strong distraction condition than in the weak distraction condition [F (1,49)=93.96, p <.001](see Table 9.1). The two items are not direct indices for the distraction manipulation as argued previously. However, together with the result of the "thinking about the

group" item where subjects in the strong distraction condition reported less thinking (M =3.85) than those in the weak distraction condition [M =4.92; F (1.49)=4.48, p <.05], it is thought that the distraction manipulation achieved the expected impact on the subjects. It should also be noted that subjects' self-report of self-presentational concern in the strong distraction condition was significantly smaller (M =2.54) than those in the weak distraction condition [M =3.79; F (1.49)=4.75, p <.05], and significantly smaller than the neutral point.[5]

[5] The Collective Self-Regard scale score was subject to a 2 (weak *vs.* strong distraction) x 2 (Cooperators *vs.* Non-cooperators) ANOVA. No effect was significant (see Table A9.2.6). The absence of a social value orientation effect is consistent with Chin & McClintock (1993).

Table 9.1 Manipulation checks

Distraction:	Weak (n = 24)	Strong (n = 26)	F value (df=1/49)
For distraction §			
"Concentrated"	5.25#	4.23	6.04*
"Felt busy keeping the numbers" S1	4.29	5.00#	1.21
"Distracted"	2.83#	3.42	1.47
"Difficult to answer the questions" S2	2.67#	2.81#	.09
"Difficult to remember the numbers"	1.63#	5.42#	93.96**
For social value orientation §			
"Competitive to the other group"	3.21	2.69#	.79
Group membership salience			
CSR scale score	44.88#	42.73#	.67
Cognitive component	8.63	9.00	.20
Others §			
Thinking about the group in allocation	4.92#	3.85	4.48*
Group comparison in rating	3.92	3.35	1.22
Self-presentational concern	3.79	2.54#	4.79*
"Willing to participate in the research again"	5.58	5.46	.06

§ The figures are mean ratings on the scale (1 not at all- 7 very much). See Table A9.2.5.
# The figure is significantly different from the neutral point ($p < .05$, two-tailed). Means with different subscripts on a line are significantly different ($p < .05$, two-tailed)
$ There was a tendency of an interaction between social value orientation and distraction: 1. F (1,34) =2.87, $p < .10$; 2. F (1,34) =4.43, $p < .05$; see Table A9.2.7 for detail)
* $p < .05$; ** $p < .001$

Point allocation indices

Total points As an index for allocation bias, total points allocated to ingroup and outgroup members were calculated from the eight allocation matrices. This index was subjected to a 2 (distraction: weak *vs.* strong) x 2 (repeated measure: ingroup *vs.* outgroup) ANOVA. The effect of the ingroup-outgroup factor was significant [F (1,48) =15.19, $p < .001$], showing highly significant ingroup bias. There was also a weak tendency of an interaction between the ingroup-outgroup factor and distraction [F (1,45) =2.80, $p = .101$].

For the weak distraction condition, the mean of total points to ingroup was significantly larger than that to outgroup [t (1,23) =3.48, $p < .05$], while the difference was not significant for the strong distraction condition [t (1,23) =1.59, *n.s.*]. (See Table 9.2).

Pull scores The pull scores of allocation strategies were calculated from the data on the allocation tasks. The mean pull scores of each strategy are shown by distraction condition (Table 9.3). A general tendency was that discriminatory pulls tended to be significant in the weak condition and they were reduced in the strong distraction condition. Specifically, the effect of distraction was significant for the pull scores of MD•MIP (against F) [F (1,45) =4.39, $p < .05$], and of MD (against MJP•MIP) [F (1,45) =4.88, $p < .05$]. Another general tendency was that in both distraction conditions, the cooperative pull scores (*i.e.* those of MJP) were small in size while the pull score of Fairness was large and significant. There was a tendency of the distraction effect on the pull score of MJP (against MD•MIP, version 2) [Ms= .17 and -.78, respectively, for the weak and strong distraction conditions: F (1,45) =3.15, $p < .10$].

Rating indices

Evaluative ratings Rating ingroup bias was calculated by subtracting the outgroup rating score from the ingroup rating score on each of the five dimensions (Table 9.4). There was no effect of distraction on any dimension while all means were significantly larger than the neutral point ($p < .05$, two-tailed).

Colour band measures

As a category differentiation index, the simple distance between the groups on each colour band was calculated, and is displayed in Table 9.5 by distraction condition. There was no effect of distraction on any index. The index on the brown colour band only was not significantly different from the

neutral point (51mm: the distance on the example band), though the grand mean index averaged across the three bands was significantly larger (M =65.31, SD =32.02, p <.05, two-tailed).

Table 9.2 Total points in point allocation tasks

Distraction: / Items	Weak (n = 24)		Strong (n = 23)	
Ingroup members	87.08 (10.20)	t (23) = 3.48 *	82.57 (7.84)	t (22) = 1.59
Outgroup members	74.79 (7.81)		77.96 (7.96)	
Ingroup bias in total points	12.29# (17.28)		4.61 (13.94)	

Significantly different from zero (p < .05, two-tailed)

1. The figures in brackets are standard deviations.
2. The ingroup-outgroup factor effect, F (1,45)=13.54, p < .001; the distraction effect, F (1,45)=1.50, *n.s.*; the interaction effect, F (1,45)=2.80, p =.101.

* p <.05

Table 9.3 The mean pull scores of each strategy

Distraction: Pulls	Weak (n = 24)	Strong (n = 23)	F value (df=1/45)
MD•MIP (on MJP)	1.33# (2.50)	.52 (2.17)	1.41
MD•MIP (on MJP, version2)	1.25# (2.40)	.87 (2.12)	.33
MD•MIP (on F)	1.54 (2.11)	.17 (2.37)	4.39*
MD (on MJP•MIP)	1.46# (1.98)	.09 (2.28)	4.88*
F (on MD•MIP)	3.38# (2.68)	3.48# (2.64)	.02
MJP•MIP (on MD)	.46 (1.56)	.61 (2.27)	.07
MJP (on MD•MIP)	.33 (1.81)	-.52 (1.70)	2.78
MJP (on MD•MIP, version2)	.17 (1.27)	-.78 (2.28)	3.15†

1. The figures in brackets are standard deviations.
The figure is significantly different from zero point ($p < .05$, two-tailed).
$ The multivariate effect of situation: F (8,38) =1.91, p =.088
† p <.10; * p <.05

Table 9.4 The mean rating bias on each dimension

Distraction: Dimension	Weak (n = 25)	Strong (n = 23)	F value (df=1/46)
warmth	1.24# (1.88)	1.26# (1.89)	.00
honesty	1.12# (1.76)	1.04# (2.21)	.02
friendliness	1.32# (1.87)	1.39# (2.19)	.01
trustworthiness	1.28# (1.86)	1.35# (1.75)	.02
generosity	1.36# (1.71)	1.44# (2.06)	.02
Composite score (summed)	6.32# (8.20)	6.48# (7.57)	.00

1 The figure indicates ingroup bias. The larger the figure, the more in favour of ingroup.
2 The figures in brackets are standard deviations.
All means are significantly larger than the neutral point ($p < .05$, two-tailed).

Table 9.5 Colour band measures (distance between the groups)

Distraction: Bands	Weak (n = 25)	Strong (n = 22)	F value (df=1/45)
Brown band	57.48 (39.19)	59.56 (31.58)	.01
Red band	68.00# (37.79)	73.18# (35.37)	.23
Blue band	65.88# (33.42)	67.32# (33.97)	.02
Composite score S (averaged)	64.12 (34.26)	66.67# (30.01)	.07

1 Distance is in mm between the two letters representing the groups. The figure in brackets is a standard deviation.
The figure is significantly different from the distance on the example band (51mm, $p <$ .05, two-tailed).
S The grand mean=65.31, SD =32.02: significantly larger than 51mm ($p < .05$, two-tailed).

Interaction between distraction and social value orientation

Interactions between dispositional differences in social value orientations and the experimental condition of distraction were investigated on the dependent measures. For social value orientation, Cooperators and Non-cooperators were compared. Those subjects who completed the decomposed games after the minimal group experiment were excluded from the analyses.[6]

Pull scores and total points Table 9.6 shows means and standard deviations of the pull scores, and ingroup bias in total points, by distraction and social value orientation. The effects of social value orientation were (nearly) significant for most indices. For discriminatory pull scores [MD•MIP (against MJP), MD•MIP (against MJP, version 2), MD•MIP (against F), and MD (against MJP•MIP): see Fig. 9.1] and ingroup bias in total points, the scores were larger among Non-cooperators than Cooperators (see Table 9.6 for statistics). For the Fairness pull, the scores were larger among Cooperators than Non-cooperators. There were nearly significant effects of distraction [F (1,33)=3.66, $p < .10$] and social value orientations [F (1,33)=3.66, $p < .10$] for the pull score of MJP (against MD•MIP, version 2). There was a significant interaction between distraction and social value orientation only on the pull score of MJP•MIP (against MD). Whereas the mean pull score was (non-significantly) smaller in the strong than the weak distraction condition among Non-cooperators, the reverse was the case among Cooperators [t (18)=-2.14, p <.10].

There were significant differences in variance between the weak and strong distraction conditions in some indices.[7] First, among Non-cooperators, the pull score of MD (against MJP•MIP) was more varied in the strong than in the weak distraction condition (F =6.18, p <.05). It was, however, varied

---

[6] The analyses which included these subjects are displayed in Appendix 9.3.

[7] It was expected that the variance would be larger in the strong than the weak distraction condition (see Abrams, 1985).

more in the weak than in the strong distraction condition among Cooperators (F =3.37, p <.10). Second, the pull score of MD•MIP (against MJP) was more varied in the weak than in the strong distraction condition among Cooperators (F =4.38, p <.05). For this index, the mean was larger in the weak than in the strong distraction condition [t (10.96)=2.14, p <.10, separate variance estimate]. Third, ingroup bias in total points also varied more in the weak than in the strong distraction condition among Cooperators (F =5.38, p <.05). Incidentally, the mean pull score of MD•MIP (against F) was larger in the weak than the strong distraction condition among Cooperators [t (18)=1.77, p <.10].

Rating bias and colour band differentiation indices Table 9.7 displays means and standard deviations of composite rating bias and colour band indices (see Tables 9.4 and 9.5) by distraction condition and social value orientation. For both indices, index values were larger among Non-cooperators than Cooperators [F (1,34)=8.07, p < .01; F (1,33)=5.43, p <.05]. There was no significant interaction between distraction and social value orientation on either index.[8]

Self-reported allocation strategies

The means of each self-reported allocation strategy are displayed in Table 9.8 by condition. Like Experiment 5, the effects of social value orientation were generally significant. As expected, Non-cooperators reported, more than Cooperators, that they had tried to give more points to themselves and to their group [F s(1,34)=23.52 and 12.45, p <.01, respectively], and to make their group win [F (1,34)=9.09, p <.01]. Meanwhile, Cooperative subjects reported, more than Non-cooperative subjects, that they had tried to be fair to each person [F (1,34)=23.77, p <.001], to be fair to each group [F (1,34)=22.43, p <.001], and to give everyone as much as possible [F

[8] Correlational analyses involving these indices and social value orientations are reported in Appendix 9.4.

(1,34)=19.20, p <.001]. There was no significant effect of distraction or interaction on any self-reported allocation strategy. Among Cooperators, self-reports of the fairness strategies were significantly larger than the neutral point, whereas self-reports of the non-cooperative strategies (*i.e.* self/ingroup-profit and group win) were significantly smaller than the neutral point. No mean was significantly different from the neutral point among Non-cooperators.[9]

[9] Correlational analyses were conducted, like in Chapter 8, concerning the relationship between self-reported and actual allocation strategies. Results are reported in Appendix 9.5.

Table 9.6 Mean pull scores and ingroup bias in total points by distraction and social value orientations

Social orientation:	Non-cooperators		Cooperators	
Distraction:	Weak	Strong	Weak	Strong
Pull	(n = 11)	(n = 6)	(n =9)	(n =11)
MD•MIP (on MJP) *1	2.00#	2.00	1.44# –+1–	.09
	(2.65)	(3.10)	(1.74) –¢1–	(.83)
MD•MIP (on MJP, version2) *2	1.91	1.67	.67	.46
	(2.91)	(2.25)	(1.00)	(1.29)
MD•MIP (on F) *3	1.73#	2.00	1.22 –+2–	-.27
	(2.15)	(3.16)	(1.92)	(1.85)
MD (on MJP•MIP) *4	2.55#	1.00	.00	.09
	(1.44) –¢2–	(3.58)	(1.73) –¢3–	(.94)
F (on MD•MIP) *5	3.00#	3.00#	4.78#	4.09#
	(2.19)	(2.68)	(1.92)	(2.74)
MJP•MIP (on MD) $	1.09#	.33	-.44 –+3–	1.36
	(1.38)	(1.86)	(1.51)	(2.29)
MJP (on MD•MIP)	.18	-1.00	-.33	-.09
	(1.94)	(1.10)	(1.50)	(1.64)
MJP (on MD•MIP, version2) §,*6	.09	-1.75	.44	.09
	(.94)	(3.27)	(1.13)	(1.22)
Ingroup bias in total points *7	17.73#	16.00	8.78	1.18
	(19.72)	(22.57)	(12.00) –¢4–	(5.17)

The figure is significantly different from zero point ($p < .05$, two-tailed)

( ) The figures in brackets are standard deviations.

* The effect of social value: 1,2 and 3. Fs=2.92, 3.21, and 3.46, $p < .10$; 4. F =7.28, $p < .05$; 5 and 6 Fs=3.14 and 3.66, $p < .10$; 7. F=5.16, $p < .05$; df =1/33 for all Fs.

$ The effect of interaction between distraction and social values: F (1,33)=4.42, $p < .05$.

§ The effect of distraction: F (1,33)=3.66, $p < .10$.

¢ SDs of both sides are different: 1, 2 and 4. Fs=4.38, 6.18, and 5.38, $p < .05$; 3. F =3.37, $p < .10$.

\+ Means of both sides are different: 1. t (10.96)=2.14, separate variance estimate; 2. t (18)=1.77; 3. t (18)=-2.14; $p < .10$ for all.

Table 9.7 Rating bias and colour band differentiation indices by distraction and social value orientations

Social orientation:	Non-cooperators		Cooperators	
Distraction:	Weak	Strong	Weak	Strong
Band	(n = 12)	(n = 6)	(n =9)	(n =11)
Rating bias index *1	2.15# (1.95)	2.20# (1.99)	.22 (.49) –†–	1.13# (1.43)
Colour band index *2	77.78# (27.03)	74.78 (24.85)	40.04 (32.47)	62.47 (38.65)

\# The mean is significantly different from 51mm ($p < .05$, two-tailed)
* The effect of social value: 1. F (1,34)=8.07, $p < .01$; 2. F (1,33)=5.43, $p < .05$.
† Means and standard deviations on both sides are different: t (12.81)=-1.97, $p < .10$, separate variance estimate; F=8.32, $p < .01$.

Table 9.8 Self-reported allocation strategies

Social value orientation:	Non-cooperators		Cooperators	
Distraction:	Weak	Strong	Weak	Strong
Items	(n = 12)	(n = 6)	(n =9)	(n = 11)
"To be fair to each person" S1	3.92	2.67	5.89#	5.91#
"To be fair to each group" S2	3.58	2.67	5.44	6.00#
"To give yourself most points" S3	4.92	5.00	2.11#	2.00#
"To give your group most points" S4	5.08	3.83	2.11#	2.36#
"To give everyone as much as possible" S5	3.17	2.83	6.11	5.27
"The way others won't think you are unfair"	3.00	2.83	4.89	3.00
"To make my group win" S6	4.75	3.50	2.22#	2.09#
"Nothing in particular"	3.58	3.50	3.00	3.00

* The figure is a mean response on the scale 1. not at all— 7. very much
\# The figure is significantly different from neutral point ($p < .05$).
S The effects of social value orientations: 1. F=23.77, $p < .001$; 2. F=22.43, $p < .001$; 3. F=23.52, $p < .001$; 4. F=12.45, $p < .001$; 5. F=19.20, $p < .001$; and 6. F=9.09, $p < .01$; df=1/34 for all Fs.

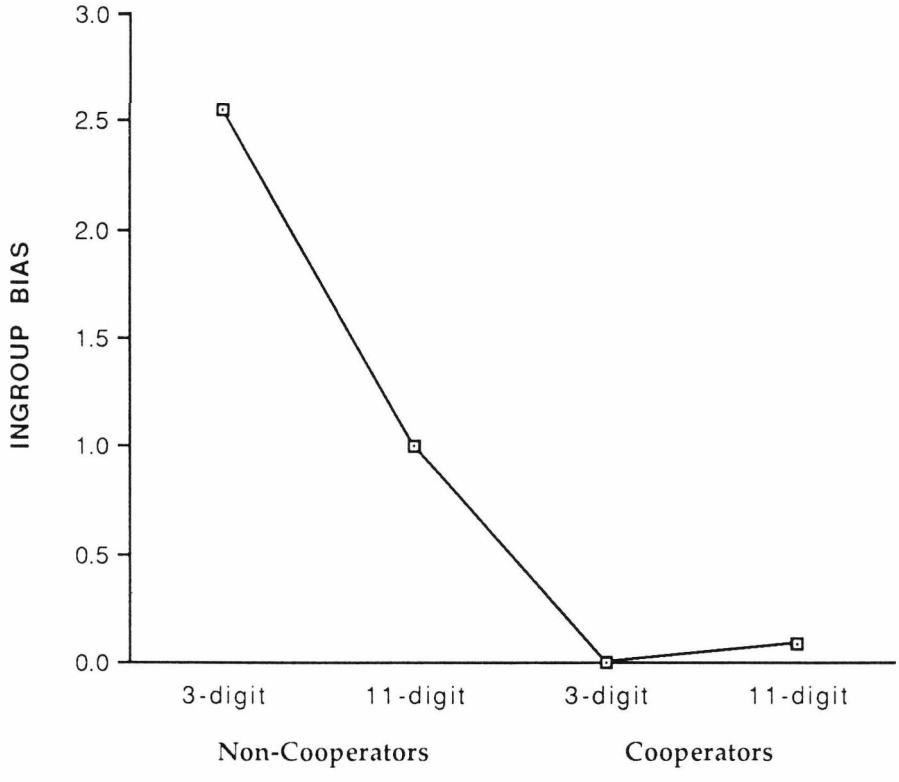


Fig. 9.1 The pull of MD (against MJP•MIP) by distraction and social value orientation

9.4 Discussion

Experimental manipulation of distraction

From the results in the manipulation check items of "concentration", "difficulty in remembering the rehearsal numbers", and "thinking about the groups", and from the results reported below, it can be said that the distraction manipulation induced a sufficient difference in the degree of distraction between the distraction conditions.

Validity of social value orientation

As noted in the results section, the distribution of subjects with different social value orientations was similar to Chin & McClintock (1993) despite the cultural and age differences (Table A9.2.2). Moreover, expected differences were obtained between Cooperators and Non-cooperators in the self-reported allocation strategies. Briefly, Cooperators reported trying to allocate points in a cooperative manner, and Non-cooperators in a non-cooperative, *i.e.* competitive manner (Table 9.8). This seems to show the validity, first, of the theoretical link between social value orientations and intergroup reward allocations (see Chin & McClintock, 1993; and Platow *et al*, 1990), and second, of the decomposed games to measure social value orientations.

Effects of distraction

For the dependent measures, an ingroup favouring tendency was evident and reliable in many indices. Total points allocated, discriminatory pull scores, and evaluative ratings all showed significant ingroup bias. There was also significant intergroup differentiation on the colour band measures (the grand mean of the distance between the two groups was significantly larger than the distance on the example band). This pattern of results was, however, qualified by significant distraction effects in an expected manner across the indices. That is, ingroup bias was larger in the weak than the strong distraction condition on total points and discriminatory pull scores (Tables 9.2 and 9.3) whereas there was no significant effect of distraction on rating bias and colour band indices (Tables 9.4 and 9.5). These results are consistent with the previous experiments (Experiments 2 and 4). The clearly significant effects of distraction on allocation indices were, however, distinct in the present study as opposed to the weak effects in the previous studies. These significant

effects of distraction on allocation indices can be attributed to the improvement in the distraction technique in the present experiment.

Another point is related to the manipulation check for self-presentational concern. There was a significant difference between the distraction conditions (Table 9.1). Subjects were concerned about how others would think of themselves (*i.e.* subjects) more in the weak than in the strong distraction condition. This result is consistent with the assumption of the noise hypothesis set out and examined in earlier chapters. Namely, it is thought that the more distraction, the more that noise from a self-presentational concern was removed. Note that the mean even in the weak distraction condition was around the neutral point. Therefore, it could be extrapolated that self-presentational concern would have been higher in a no distraction condition if there had been such a condition (see Chapters 3, 4 and 6 for detail).

Effects of social value orientation

Social value orientation significantly affected: discriminatory pull scores [MD•MIP (against MJP); MD•MIP (against MJP, version 2); MD•MIP (against F); and MD (against MJP•MIP)], Fairness and Joint-Profit pull scores [F (against MD•MIP); and MJP (against MD•MIP)], ingroup bias in total points allocated (Table 9.6), and rating bias and category differentiation on the colour bands (Table 9.7).

The effects of social value orientation on the pull scores were obtained in an expected manner for all indices. Non-cooperators indicated more ingroup bias in total points, and used more discriminatory strategies, than Cooperators. And Cooperators showed cooperative strategies, *i.e.* those of Fairness and Joint-Profit, more than Non-cooperators. This pattern of results

was also consistent with the results of self-reported allocation strategies (Table 9.8).[10]

There were, unexpectedly, significant effects of social value orientation on the rating bias and colour band indices. Both indices were larger among Non-cooperators than Cooperators. Experimental manipulations of social orientation in Brewer and Silver (1978), Brown (1984), Brown & Abrams (1986), and Experiment 5 in the thesis all reported absence of the social orientation effect on ratings. This difference can be ascribed to the way social orientation was operationalised in the present study. Only the present study utilised dispositional differences in social value orientations. This issue will be discussed again later.

Demand characteristics With regard to the effect of social value orientations, one of the issues raised in Chapter 8 was whether the effect of social orientation in Experiment 5 was due to demand characteristics or not. Since the current experiment employed dispositional difference in social orientation, and because it brought about the significant effects of social orientation on allocation indices, a demand characteristics explanation for the social orientation effect is implausible. No demand was made on subjects to create any particular social orientation, so the demand would have been the same to all subjects.

Relevance of the task Another related issue was whether the absence of a social orientation effect in Experiment 5 on rating bias and colour band indices could be explained by the relevance of the indices. Specifically, subjects in Experiment 5 may have judged that the rating and colour band tasks had nothing to do with the competitive or cooperative situation.

Two arguments could be put forward concerning this point. A) It could be that the rating and the colour band tasks were judged irrelevant to

---

[10] The direction of the social orientation effect on the pull score of MJP (against MD•MIP, version 2) was, unlike in Experiment 5, in an expected manner in this experiment

social orientation. Therefore, subjects may not have applied their behavioural plans, whatever they were, to the tasks. In this case, the absence of a social orientation effect does not reflect, it follows, automaticity of the processes in charge of the indices because absence means dismissal by decision. However, the absolute level of bias and differentiation still reveals the automaticity—rating bias and differentiation on the colour bands were evident despite the judgement of irrelevance. B) Alternatively, it could be that there was no such judgement concerning the relevance of the tasks to social orientation. It follows, in this case, that the absence of the social orientation effect, as well as the absolute level of rating bias and differentiation on the colour bands, indicates automaticity of the underlying processes.

Since there was no direct measure of relevance for each task, it is difficult to decide exactly how much the subjects may have judged the relevance of the tasks. Meanwhile, in comparison to Experiment 5, the situation in the present experiment is unlikely to have induced such a judgement among subjects as there was no experimental manipulation of social orientations. In any event, arguments A and B both support a certain degree of automaticity in the responses on the rating and colour band indices.

Interaction between distraction and social value orientation It was hypothesised that social value orientation would interact with distraction in producing ingroup bias in allocation indices. However, the only significant interaction on allocation indices was on a non-discriminatory pull (see Table 9.6). Therefore, statistically, the hypothesis was not supported. Nonetheless, as can be seen in Fig. 9.1, the pattern of means is consistent with the hypothesis. Several reasons can be conceived of for the absence of the interaction effect. Firstly, there may be insufficient power due to small cell sizes. Related to this, there were differences in variance on some indices between the weak and strong distraction conditions, which might well have reduced the power of the statistical analysis (although a separate variance

estimate method was employed, where appropriate, for the *a priori t*-tests). For these reasons, the analyses of interaction effects may not be very reliable. Moreover, the hypothesis that distraction would not affect allocation bias among Cooperators may be inappropriate for the reason described below.

Distraction effect among Cooperators Among Cooperators, three out of eight pull scores indicated that subjects were more discriminatory in the weak than the strong distraction condition [MD•MIP (against MJP); MD•MIP (against F); MJP•MIP (against MD); see Table 9.6]. These results are not surprising because Cooperators were also in the same (minimal) intergroup situation as Non-cooperators, and the manipulation of social orientation was achieved using the dispositional difference in social value orientation. It is thought that the dispositional difference in social value orientation reduced the overall level of allocation bias, but it did not affect the way distraction affected allocation bias. This interpretation partly fits the fact that allocation bias was generally larger Among Non-cooperators than among Cooperators.

Disposition or intention?

Rating and colour band indices Earlier in this section, it was pointed out that the significant effect of social value orientation on the rating and colour band indices was unique in the present experiment. This result needs a little consideration. It could be that social value orientation, and a hypothesised underlying factor— group membership salience—, may have influenced the supposedly automatic components captured in the rating and colour band indices. In this case, the assumption of automaticity should be at least modified for the rating and the colour band measures. Alternatively, it could be that the dispositional difference in social value orientation may correlate with a cognitive disposition towards category differentiation (see note 12 in Chapter 2). In this case, the effect need not be considered in terms

of automaticity/intentionality of the process. It would show simply that there is a *correlation* between category differentiation and social value orientation. In other words, there is no strong reason to assume that intentional processes should involve dispositional differences in social value orientation.

The present study was not designed to answer this question. Nevertheless, it is more plausible to assume that the effect on the rating and colour band indices in the present study was due to the use of disposition: the present study alone employed dispositional differences for the social orientation manipulation whereas the previous studies which utilised an experimental manipulation for social orientation did not find the effect (Brewer & Silver, 1978; Brown, 1984; Brown & Abrams, 1986; and Experiment 5 of the thesis).

Allocation indices If the above argument on the dispositional difference stands, it could also be claimed that the social value orientation effect on the allocation indices can be due to the dispositional difference. In this case, the effect would be attributed, similarly, to the *correlation* between social orientation and a tendency to discriminate. However, the results of self-reported allocation strategies showed that Non-cooperators and Cooperators did have different allocation strategies. While one could still argue that they were just self-reports and measured after the allocation task, it is more credible that intentional processes were involved in the social value orientation effect since the previous experiments noted above yielded a similar pattern of results using experimental manipulations.

Summary

As a manipulation of group membership salience, dispositional difference in social value orientation was utilised. For the distraction manipulation, the same technique was employed as Experiment 5, but this

time more caution was used to ensure that subjects were distracted accordingly.

The experiment replicated the results of the previous studies for distraction, but this time more clearly. That is, ingroup bias in allocation indices was significantly larger in the weak than the strong distraction condition whereas there was no significant effect of distraction on the rating bias and colour band indices. For social value orientation, expected effects were obtained in the allocation indices, replicating the results of Experiment 5. Thus, Non-cooperators indicated more ingroup bias in total points, and used more discriminatory strategies, than Cooperators. And Cooperators showed cooperative strategies, *i.e.* those of Fairness and Joint-Profit, more than Non-cooperators. On rating bias and category differentiation on colour bands, however, there were unexpectedly significant effects of social value orientation. Both rating bias and colour differentiation were larger among Non-cooperators than Cooperators. These results were discussed in terms of a correlational tendency between the dispositional qualities in social value orientation and in category differentiation. The absence of expected interaction effects between distraction and social value orientation on the allocation indices was also discussed in terms of the use of dispositional differences for the social orientation conditions, as well as of the size of the cells.

Chapter 10

General discussion

— Research findings, conclusion, and implications —

Contents

10.1 Summary of the studies

10.2 Validity of the hypotheses and measurement assumptions

10.3 Conclusion, unresolved problems, and future research

10.4 Theoretical and applied implications

10.5 Summary of the thesis

The thesis began with a review of relevant research areas (Chapter 1), followed by a statement of the main research questions, general assumptions, and hypotheses, of the thesis (Chapter 2). Chapters 3 to 9 reported a series of empirical studies, some based directly on the main research questions, and others on theoretical and methodological questions derived from the results of earlier studies.

To conclude the thesis, this last chapter summarises the research findings of the studies and evaluates them in the light of the hypotheses set out in Chapter 2. The validity of the measurement assumptions is discussed. Next, support obtained for the theoretical assumptions is assessed, limitations of, and unresolved questions in, the studies are raised and questions for future research are suggested. Finally, theoretical and applied implications of the research are discussed.

10.1 Summary of the studies

Theoretical framework

A brief review on the effects of distraction in Chapter 2 identified a) a line of studies which suggests that intergroup discrimination decreases with distraction, and b) another set of studies which implies that it increases with distraction. To resolve the seemingly contradictory empirical evidence concerning the direction of the distraction effect, a theoretical framework was developed using the concept of behavioural control hierarchy. Thus, it was suggested that intergroup discrimination can be conceptualised at two different levels: an automatic and an intentional level of behavioural control. Distraction was hypothesised to reduce ingroup bias at the intentional level (the intentional component), but to increase at the automatic level (the automatic component). [Note, for the latter, the difference between the functioning of the relevant process and the actual predicted bias. See "Issues in measurement" in Section 3.1; also "Distraction and the category differentiation process" in Section 2.3.]

Additionally, group membership salience was set forth as a relevant factor. Because the social identity process was assumed to be responsible for intergroup discrimination at the intentional level, it was hypothesised that group membership salience was necessary for intentional level discrimination. Finally, other general assumptions and hypotheses of the thesis were restated.

Study 1: Pilot study 1 and Experiment 1

Study 1 consisted of three parts. The first part considered theoretical and methodological issues regarding a distraction effect and the measurement of dependent variables. It was argued that the presence and degree of the distraction effects can indicate the functioning of the hypothesised underlying processes: the social identity process and the

category differentiation process. Point allocation measures and rating bias indices were proposed to capture, relatively speaking, the social identity and the category differentiation processes, respectively.

Pilot study 1 aimed to develop an experimental procedure, particularly that of a distraction manipulation. One hundred and thirty-two Japanese school pupils (12-13 year old) participated in a minimal group experiment in a 2 (distraction *vs.* no distraction) x 3 (group membership salience: salient, non-salient, and control) between-subjects design. Subjects drew a lot in the beginning to be assigned to either a "red" or a "white" group. They then filled in a dependent measure booklet which contained point allocation and rating tasks about the two groups. Group membership salience was manipulated by the degree of emphasis on the group distinction. Salient group subjects were asked to sit on one side in the classroom according to the group divisions while there was no such request for the non-salient group subjects. Distraction was manipulated by imposing or not imposing an extra concurrent distracting task of finding and copying italicised letters/characters and digits embedded in the dependent measure booklet. As expected, ingroup bias in total points was larger in the salient than the non-salient group membership conditions. Within the salient conditions, ingroup bias was reduced by the distraction manipulation, though non-significantly. Neither distraction or salience had an effect on the rating bias indices although the overall level of rating bias was significantly greater than the neutral point. Several procedural drawbacks were pointed out, including length of the session and insufficient anonymity associated with the salience manipulation.

Experiment 1 was designed to replicate the results of Pilot study 1 with an improved procedure and using an English sample. Ninety-two, 12-13 year old school pupils from a grammar school in Kent, England (42 male and 50 female) were randomly assigned to 2 (distraction *vs.* no distraction) x 2

(salient *vs.* non-salient group membership) experimental conditions in a minimal group experiment. The total length of the session was reduced from an hour to 25 minutes, and several procedural improvements were made. These included explanations of the tasks to subjects with illustrative posters and a double-sided "explanation sheet", as well as a different manipulation of group membership salience. In the salient group membership conditions, the group names in the experimental materials were coloured according to the group labels, "red" and "blue". Half of the subjects were given a distracting concurrent task (finding and *circling* italic letters in the dependent measure booklet) while the other half were not given such a task. Consistent with Pilot study 1, point allocation indices (discriminatory "pulls" and total points) showed larger ingroup bias in the salient than the non-salient group membership conditions whereas rating bias was not affected by group membership salience. Contrary to Pilot study 1, however, distraction led to increased ingroup bias in allocation bias indices. Rating bias was also larger in the distraction than the no distraction conditions. The procedure and the results were extensively discussed in the light of experimental manipulations, predictions, and assumed nature of the dependent measures. For the unexpected direction of the distraction effect on allocation indices, a secondary analysis using subjects' self-reported level of distraction, suggested that the contradictory results between Pilot study 1 and Experiment 1 may have derived from different degrees of distraction between the two studies, and that a moderate distraction should have yielded the largest allocation bias.

Study 2: Experiment 2

This study was designed to replicate the results of the secondary analysis of Experiment 1, by experimentally varying the degree of distraction. Sixty-nine school boys participated in a minimal group experiment utilising a

oneway between-subjects design with three levels of distraction: none, moderate and strong. The procedure was exactly the same as Experiment 1 except for the distraction manipulation in the strong distraction condition. In this condition, the distracting task was to *copy* 48 italicised letters (compared with *circling* 24 italicised letters in the moderate distraction condition). As expected, allocation bias was strongest in the moderate distraction condition whereas rating bias was equally large in the moderate and strong distraction conditions. For this inverted U-shape curve of the allocation bias with distraction, an explanation was proposed suggesting that weak distraction allows noise interference to the social identity process from other intentions (such as fairness, self-presentational concern, and altruism), which are eliminated by a stronger distraction. When the distraction is increased further, the social identity process itself is disrupted.

Study 3: Pilot study 2 and Experiment 3

One aim of Study 3 was to develop another, less evaluative, index for the category differentiation process: perceptual differentiation on colour gradation bands. A new distracting technique was also employed: a digit rehearsal task. Forty-two boys and girls participated in Pilot study 2 using a four factor repeated measures design, where they made differentiation/similarity judgements of four pairs of social groups, on various measures including "colour band" scales. Subjects also engaged in digit rehearsal tasks using four different length of numbers. The results showed that the colour band measures could be distinguished from the other differentiation/similarity measures. A seven-digit number, the longest in the experiment, was reported to be moderately difficult and slightly distracting whereas shorter-digit numbers were reported to be very easy to rehearse.

Experiment 3 was conducted to examine these new measures and the distracting technique in a minimal group situation. Fifty-four, 13-14 year old

pupils (21 male and 33 female) were randomly assigned to four experimental conditions. The procedure was the same as Experiments 1 and 2 except for the distraction manipulation. After group assignment with a lottery and explanations of the tasks, subjects were asked to memorise a number for the duration of the session. The number was either a 3-, 5-, 7-, or 9-digit number depending on the condition. They then filled in the dependent measure booklet which included point allocation and rating tasks, and direct and colour band differentiation/similarity scales. Surprisingly, there were no significant differences in ingroup bias among conditions. Correlational analyses revealed a) a positive relationship between a colour band measures factor and a rating bias index, and b) a negative relationship between a direct differentiation/similarity factor and an allocation bias index. The absence of any effect of distraction was discussed in terms of the magnitude and stability of distraction.

Study 4: Experiment 4

This study aimed, after Study 3, to improve the distraction technique, examine characteristics of the colour band scales, and further explore the noise hypothesis, put forward in Studies 1 and 2, utilising individual differences in various allocation strategies.

Seventy-eight, 12-13 year old Japanese pupils (41 male and 37 female) were randomly assigned to 3 (Weak, Moderate, and Strong distraction) x 2 (salient *vs.* non-salient category) experimental conditions in a minimal group experiment. The procedure was similar to previous experiments, but to improve the distraction technique, a concurrent distracting task (digit rehearsal) was delivered at four separate times during the experimental session. Thus, subjects rehearsed four numbers in total. The entire session took about 50 minutes.

The continual rehearsal task produced expected differences among conditions in subjects' self-reports of distraction. However, overall ingroup bias was not significant on any index. Therefore, it was inappropriate to consider the effects of distraction on ingroup bias indices.

Colour band scale measures indicated evidence of perceptual category differentiation: there was a significantly larger distance between the groups than chance on the colour bands, in the direction consistent with the group labels. However, there was no effect of the category salience manipulation on the colour band measures, nor were there differences on the category salience manipulation check items.

The noise hypothesis was supported in the secondary analyses. Among those subjects who had low fairness/joint-profit allocation intentions, there was a significant linear trend of *decreased* bias with distraction in allocation indices. This tendency was obtained also among those who were not concerned to present themselves as fair. These results indicate that the distraction effect appears once the noise from fairness/self-presentational concern is removed. The results of the secondary analyses using subjects with higher self-reported intentions of ingroup/self-interest, were mixed. Finally, there were sex differences on several indices. Overall, female subjects were more discriminatory than male subjects among the Japanese sample.

Study 5: Pilot study 3

This study employed and examined a new method for categorisation as an experimental manipulation: the right-eye/left-eye test. It also explored the causal relationship between the category differentiation process and the social identity process. Finally, the subjective difficulty of the various measures was assessed. Twenty-five, 12-13 year old pupils in Kent, England (7 male and 18 female) participated in the research in a single group session. Subjects were self-assigned to Right Eye group or Left Eye group according to

the right-eye/left-eye test. They then filled in a dependent measure booklet which contained point allocation and rating tasks about the two groups. The colour band scales were placed before (Time 1) and after (Time 2) these measures. The difficulty measure was placed immediately after each dependent measure.

Overall, ingroup bias was not significant in any index. However, colour band measures still indicated significant category differentiation. The correlation between the colour band index at Time 1 and the allocation bias index was negative and marginally significant while the partial correlation between the allocation index and the colour band index at Time 2, controlled by the colour band index at Time 1, was positive, large and significant. Assuming that the allocation and colour band indices respectively reflect the social identity and the category differentiation processes, these correlational results were interpreted to show that the social identity process is a motivational *reaction* to the initial category differentiation process, whereas the subsequent category differentiation is a cognitive *reflection* of the social identity process. Subjective difficulty measures were larger for the colour band scales than for the rating and allocation scales, and the latter two were judged by subjects to be equally easy. This may be because subjects were not provided with examples of the colour band scales on the explanation sheet, and hence the format was less familiar to them than the other scales.

Study 6: Experiment 5

Because overall ingroup bias in Experiment 4 and Pilot study 3 was not significant, it became necessary to gain more control over group membership salience — the second dimension of the theoretical framework —, in order to reliably examine the distraction effect. Competitive and cooperative social orientations were manipulated. Thirty-four pupils aged 12-13 in Kent, England (24 male and 10 female) participated in a minimal group experiment

in a 2 (competitive *vs.* cooperative social orientation) x 2 (weak *vs.* strong distraction) between-subjects design. The procedure was similar to that of Experiment 4. The major differences were that in Experiment 5, the language and subjects were English. The right-eye/left-eye test was used for group assignment, but social orientation was manipulated experimentally.

As expected, subjects in the competitive conditions self-reported more discriminatory allocations and fewer Fairness and Joint Profit allocations than those in the cooperative conditions. Furthermore, actual point allocations corresponded well to the self-reports for discriminatory and Fairness allocation strategies (though not for Joint Profit strategies). In other words, subjects formed the predicted intentions in each social orientation condition. Strangely however, no effect of distraction was observed on any index of ingroup bias. Procedural flaws were suspected and a close examination in fact revealed that nearly half of the subjects violated the instruction for the distraction manipulation.

Overall levels of rating ingroup bias and category differentiation on the colour bands were significantly greater than neutral. Moreover, the effects of social orientation and distraction on these indices were negligible, confirming the results of previous research. These results were interpreted in terms of an automatic aspect of intergroup discrimination.

Study 7: Experiment 6

Experiment 5 showed that experimentally manipulated social orientation (competition *vs.* cooperation) led to distinct intergroup consequences in point allocation indices. However, since the manipulation employed verbal instructions to create the social orientations, demand characteristic could be a problem. To avoid this, dispositional differences in social value orientation were utilised in Experiment 6. Fifty-five pupils aged 12-13 (21 male and 34 female) participated in the research, which consisted of

two stages: measurement of social value orientations and a minimal group experiment two weeks later. The procedure and the design of the minimal group experiment was virtually the same as Experiment 5 except that there was no manipulation of social orientation. Furthermore, more caution was used to ensure that the distraction manipulation was effective.

The experiment replicated the results of the previous studies for distraction, but this time more clearly. That is, ingroup bias on the allocation indices was significantly larger in the weak than the strong distraction condition whereas there was no significant effect of distraction on the rating bias and colour band indices. For social value orientation, the predicted effects were obtained on the allocation indices, replicating the results of Experiment 5. Thus, Non-cooperators indicated more ingroup bias in total points, and used more discriminatory strategies, than Cooperators. Cooperators showed cooperative strategies, *i.e.* those of Fairness and Joint-Profit, more than Non-cooperators. On rating bias and category differentiation on colour bands, however, there were unexpectedly significant effects of social value orientation. Both rating bias and colour differentiation were larger among Non-cooperators than Cooperators. These results were discussed in terms of a correlational tendency between the dispositional qualities in social value orientation and in category differentiation. The absence of the expected interaction effects between distraction and social value orientation on allocation indices was also discussed in terms of the use of dispositional differences for the social orientation conditions, as well as of the size of the cells.

Collapsing across results from the studies

Fig. 10.1 displays meta-analytic plot across the studies of the intentional component of intergroup discrimination as a function of distraction and group membership salience. The studies were matched by

condition with self-reports of distraction and group membership salience.[1] The pull of MD (against MJP•MIP) was used as an index for the intentional component of intergroup discrimination.[2] Each point represents the mean pull score in a condition in each study. The larger the size, the larger the mean pull score is.

One observation is that larger points are located around the centre and towards the upper part of the figure. Implications of this pattern are a), that group membership salience is necessary for the intentional component of ingroup bias, b), that a moderate degree of distraction allows more intentional ingroup bias in the middle range of group membership salience, and c), that high group membership salience leads to high intentional ingroup bias even when distraction is also strong.

Fig. 10.2 shows a similar meta-analytic plot across the studies of rating bias as a function of distraction and group membership salience. The matching method for distraction and group membership salience is exactly the same as in Fig. 10.1. Each point represents the mean rating bias in a condition in each study. The larger the size, the larger the mean rating bias is. Compared with Fig. 10.1, distribution of the data points is fairly even in all parts of the figure. In other words, the range of rating bias invariably fell between a small and a moderate degree across the studies.

To illustrate the inter-relationship among the studies, conditions in each study were connected with a line in Fig. 10.3, using the same matching

---

[1] Since the manipulation methods for, and the degree of, group membership salience and distraction were different in many ways across the studies, self-reports of these independent variables were employed as criteria in this matching. Thus, the items "thinking-about-group membership-in-allocation" (range 1-7) and "difficulty in remembering the number" (range 1-7) were respectively used for the salience and distraction criteria. For Studies 1 and 2 where "the difficulty in remembering" item was not included, the value of 1.00 was given to the no distraction conditions in Experiments 1 and 2; a mid-point (4) was given to the distraction condition in Experiment 1, and to the moderate distraction condition in Experiment 2; and the value of 6.22 was given to the strong distraction condition in Experiment 2 (because the largest among the rest was 6.22).

[2] Pilot studies 1 and 2 were excluded from this analyses because they did not include the pull score.

method for distraction and group membership salience. The left most points (the smallest distraction) are Pilot study 3 and the no distraction conditions in Experiments 1 and 2. The right most points (the largest distraction) are the strong distraction conditions in Experiments 2 and 5. Conditions in Experiment 4 achieved the least group membership salience while a salient condition in Experiment 5 (top right) achieved the highest group membership salience.

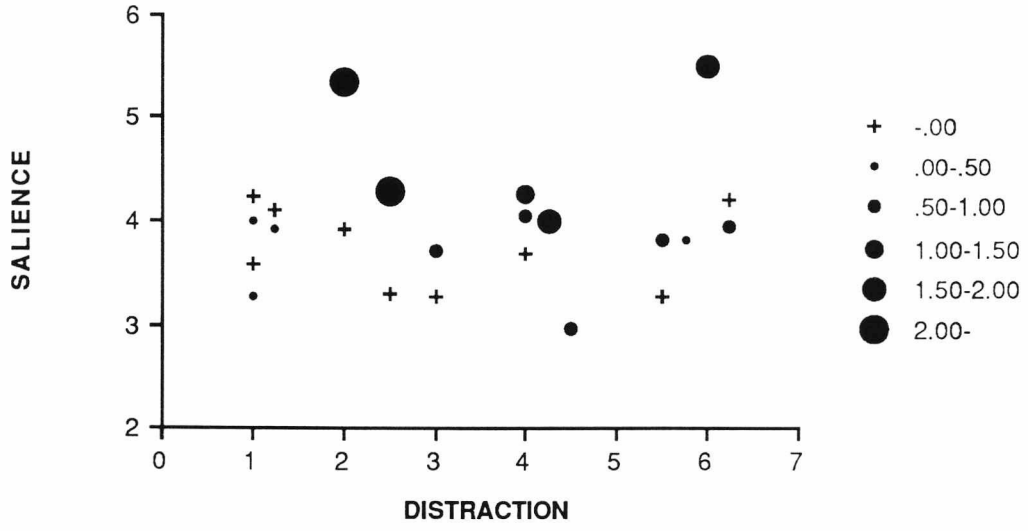


Fig. 10.1 The intentional component of ingroup bias* as a function of distraction and group membership salience across the studies

* The pull scores of MD against MJP•MIP (range from -6 to 6)

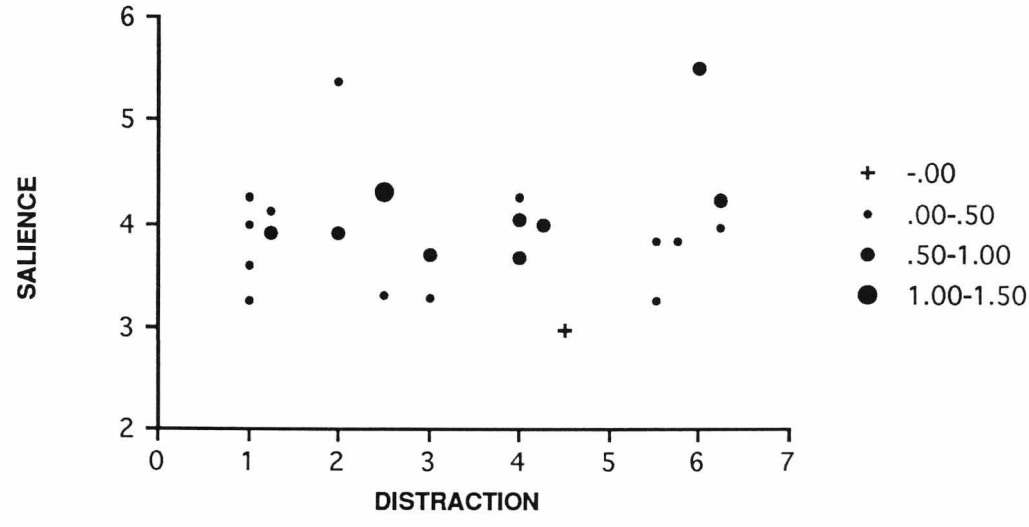


Fig. 10.2 Rating bias* as a function of distraction and group membership salience across the studies

* The average of five rating bias indices (range from -6 to 6)

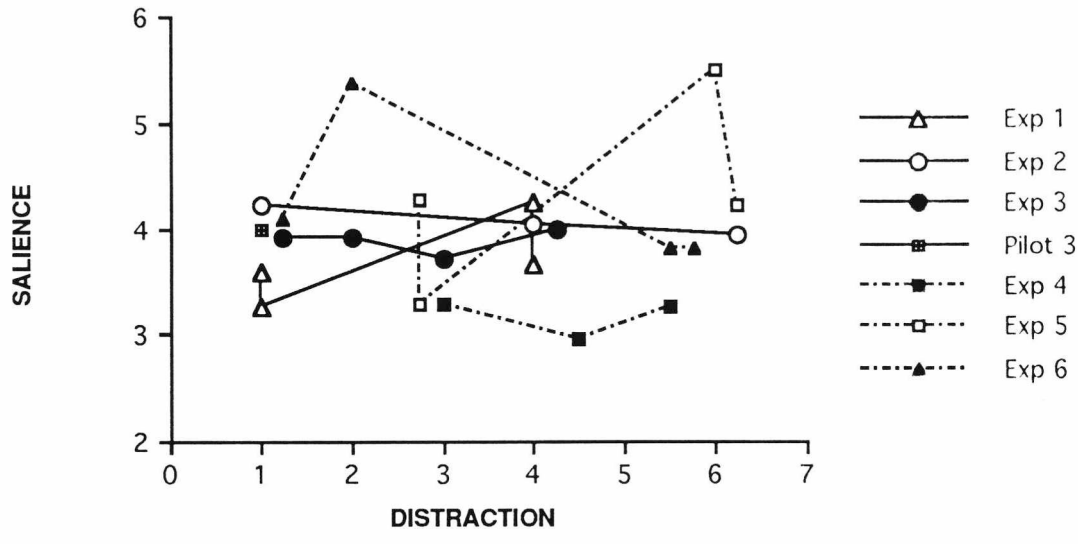


Fig. 10.3 Locations of experimental conditions in the studies as a function of distraction and group membership salience

10.2 Validity of the general hypotheses and measurement assumptions

In this section, the research results summarised in the preceding section are discussed in relation to the hypotheses and the assumptions in the thesis. First, the general hypotheses put forward in Chapter 2 are assessed in the light of the results of the studies. By doing so, the measurement assumptions in Chapter 3 (on allocation and rating bias indices), and Chapter 5 (on colour band measures) are evaluated. Finally, the noise hypothesis, set forth from the results of Pilot study 1, Experiments 1 and 2, is examined taking account of the results of later studies.

Validity of the general hypotheses

Hypothesis 1 The first hypothesis was:

1 When relevant categories are salient, the category differentiation process will occur even under distraction.

This hypothesis was tested by observing whether or not there was significant intergroup differentiation on rating scales (Experiments 1, 2, 3, 4, 5, and 6, and Pilot studies 1 and 3), and on colour band measures (Experiments 3, 4, 5, and 6, and Pilot study 3). Significant rating differentiation was observed in most of the studies: in Experiments 1, 2, 3, 5, and 6, and Pilot study 1. And all studies that included colour band measures indicated significant category differentiation: the mean distance between the groups on the colour bands was larger than that on the example band. Namely, an overwhelmingly large number of results support this hypothesis.

There are, however, some remaining ambiguities. First, two studies (Experiment 4 and Pilot study 3) revealed a significant level of colour band differentiation but not rating bias. Second, the concept of category salience begs the question: what minimal level salience is necessary? These ambiguities will be discussed later, respectively, in examining the empirical and the theoretical assumptions. A third ambiguity is under what level of distraction differentiation ceases to occur. There is a dilemma between a conceptual hypothesis and empirical testing here. That is, if one wants to test the idea that extreme distraction will block the process, one must create an extreme distraction condition. In this extreme distraction condition, however, one cannot possibly measure anything at all from subjects, thus, the hypothesis cannot be tested. While the conceptual hypothesis seems logically and intuitively correct, it cannot be tested empirically.[3]

Hypothesis 2 The second hypothesis was:

2 When relevant categories are salient, expression of the category differentiation process will increase with distraction.

This hypothesis was tested simply by observing the change in rating bias with the degree of distraction. Among the studies, Experiment 1 alone

[3] This may illustrate a limitation of empiricism!

supported this hypothesis. Therefore, the hypothesis does not seem to be valid in many situations. The question now is how to account for this difference between Experiment 1 and the rest. Looking at Fig. 10.2, one can notice a slight tendency that minimal rating bias is relatively dense at the left extreme (smallest degree of distraction) while small but comparatively larger rating bias is situated from the centre towards the right upper part. Turning to Fig.10.3, one can recognise that the location of the conditions in Experiment 1 was between the left extreme to the centre. Examining rating bias of the left and right extreme conditions in Experiment 3, and the left and the middle conditions in Experiment 2, which are close in location to those in Experiment 1, one can further notice that rating bias in those conditions in the centre of the figure are in fact significant and slightly larger than those in the left extreme, though non-significantly (Tables 4.5 and 5.4).

Thus, it seems that the difference between the studies derived from the different degrees of distraction among the studies. It could be said from the pattern in Fig. 10.2, that the expression of the category differentiation process increased with distraction only where distraction was initially very small, and reached a stable asymptote as distraction became larger. In any case, more studies are needed to draw a firm conclusion concerning this hypothesis.

Hypothesis 3 The third hypothesis was:

3 Group membership salience will increase the effect of the social identity process whereas it will not affect the category differentiation process.

This hypothesis has two propositions. The first and the second propositions concern the effects of group membership salience, respectively, on allocation bias, and rating bias and colour band measures. These propositions were tested in Pilot study 1, Experiment 1, and indirectly in Experiments 5 and 6 by observing the effect of group membership salience (or social orientation). Both propositions were supported by Pilot study 1, and

Experiments 1 and 5. While Experiment 6 gave counter-evidence for the second proposition, it was suggested that a likely reason for this was the particular operationalisation of social orientation in the experiment: dispositional difference in social value orientation. Therefore, this hypothesis was supported on the whole. It should still be noted however that the question remains, as mentioned regarding Hypothesis 1, as to the minimum level of category salience necessary for the category differentiation process.

Hypothesis 4 The fourth hypothesis was:

4 When group membership is salient, distraction will reduce the effect of the social identity process.

This hypothesis was tested most extensively in the thesis. In short, Pilot study 1, Experiments 4, 5 supported it, while a new "noise" hypothesis was put forward in Chapter 4 to integrate contradictory evidence from Pilot study 1 and Experiment 1. Therefore, results bearing on the hypothesis are discussed together later with the noise hypothesis.

Hypothesis 5 The fifth hypothesis was:

5 As distraction increases, the less group membership salience will be related to the outcome of the social identity process.

This hypothesis was tested by examining the correlation coefficients between group membership salience indices and allocation bias by distraction condition in Pilot study 1, Experiments 1 and 2. The results were mixed, depending on the group membership salience indices (and, perhaps, on the level of distraction and group membership salience in each experiment). In Experiment 1, an index of group membership salience (measured with CSR scale) correlated with an allocation bias index in the no distraction condition, but not in the distraction condition, consistent with the hypothesis. In contrast, another index of group membership salience (self-report on the "thinking-about-group-membership" item) correlated with the allocation

index in the distraction condition, but not in the no distraction condition. However, the reverse was the case with this index in Pilot study 1. Furthermore, in Experiment 2, CSR score did not correlate with the allocation index in any condition while thinking-about-group-membership correlated in the moderate and the strong distraction conditions. In sum, the hypothesis was not supported consistently.

Hypothesis 6 The sixth hypothesis was:

6 Distraction will not affect the relationship between the outcome of the category differentiation process and group membership salience.

This hypothesis was tested by examining the correlation coefficients between the group membership salience indices and rating bias by distraction condition in Pilot study 1, Experiments 1 and 2. The results were mixed and unclear. With the "thinking-about-group-membership" item as a salience index, the correlations were both moderate in the distraction (r =.35, p <.05) and the no distraction conditions (r =.25, p <.10) in Experiment 1. In Experiment 2, the correlations were low in the strong (r =.16, *n.s.*), and high in the no and moderate distraction conditions (rs=.61 and .70, respectively, p <.01). Moreover, the correlation was negative in the no distraction condition in Pilot study 1 (r = -.21, *n.s.*). Furthermore, with CSR score as another salience index, the patterns were unstable (see Tables 3.23 and 4.11). Finally, dispositional differences in social value orientation (which has a functional link with group membership salience) were shown to have effects on rating bias and colour band measures (indices for the category differentiation) in Study 7. In short, whereas there does not seem to be a systematic effect of distraction on the relationship between group membership salience and rating bias, distraction does seem to affect the relationship in some cases.

Hypothesis 7 The last hypothesis was:

7 Under the strongest distraction, no ingroup bias will be observed.

This hypothesis was not tested for the reason discussed in examining hypothesis 1.

Validity of the measurement assumptions

Allocation and rating bias indices Allocation bias indices were generally derived from the point allocation matrices (most studies used Tajfel's matrices adjusted for young children). They include ingroup bias in total points (total points to ingroup members minus those to outgroup members), and discriminatory pull scores [*i.e.* the pull scores of MD (against MJP•MIP), MD•MIP (against MJP) and MD•MIP (against F)]. In some studies, a composite score of the discriminatory pull scores was created as a representative allocation bias index. Rating bias indices in the thesis generally mean ingroup bias in ratings (ratings for ingroup members minus those for outgroup members): usually of an evaluative ratings (on seven-point bi-polar adjective scales), and sometimes of a sociometric rating (liking). In many cases, a composite score was created out of five rating scales on social dimensions as a representative index.

Measurement assumptions concerning the allocation and the rating bias indices were that relatively, they capture the functioning of, respectively, the social identity and the category differentiation processes. Owing to a confusing difference between theoretical and empirical predictions for the category differentiation process, it was emphasised that the direction of the effect was critical to distinguish the effects of the social identity and the category differentiation processes. Namely, a decrease with distraction was assumed to indicate the functioning of the social identity process, and an increase that of the category differentiation process.

However, introduction of the noise hypothesis in Chapters 3 and 4 nullified the criterion used to distinguish the processes because the predicted direction of the distraction effect can be the same for the both processes

according to the hypothesis (when distraction is relatively weak). Therefore, a new criterion to distinguish the effects of the two processes was whether or not the pattern with distraction follows the hypothesised inverted U-shape curve for the social identity process; and for the category differentiation process, whether or not distraction affects the pattern, and if its pattern is an increase with distraction. These concern the empirical validity of the measurement assumptions regarding the distraction effect. In other words, if rating bias follows the prescribed pattern, then it is reasonable to assume that it captures some part of the outcome of the category differentiation process; if allocation bias follows the inverted U-shape curve, then a claim is acceptable that it reflects the social identity process. The former was examined previously in examining Hypothesis 2; the latter will be assessed later in the light of the noise hypothesis.

Regarding rating bias indices, the discussion of Hypothesis 1 raised a question as to how much rating bias indices reflect the hypothesised category differentiation process. On the one hand, the fact that rating bias was not significant in Experiment 4 and Pilot study 3 in spite of the evidence of category differentiation on colour band measures, seems to indicate a limitation of this measure as a category differentiation index. On the other hand, the absence of the distraction effect (except when distraction is very small: see discussion about Hypothesis 2) seems to show that the quality of the measure is suitable to detect the functioning of the category differentiation process; the theoretical prediction was no effect of distraction while the empirical prediction was an increase (because of the nature of measurement). Moreover, Study 5 illustrated that the absence of the distraction effect was not caused by the ease with which subjects can complete the ratings. It was shown that subjective difficulty in responding to the rating scales was as difficult as the point allocation tasks. On balance, a tentative conclusion concerning the rating bias measure is that it is vulnerable

to inhibition (from accuracy goals, for example) only when distraction is small, but that it reflects the category differentiation process well after that point.

Regarding allocation bias indices, self-report measures can serve to validate their measurement qualities. Table 10.1 displays correlation coefficients between actual and self-reported point allocation strategies from the studies of the thesis and a few other studies. At a glance, one can tell that correlations are not always significant. Moreover, for the MJP•MIP pull score, no study showed significant correlation. Even among the other pull scores that showed significant correlations, no single pull score was consistent across all of the studies. Previously in Chapters 3, 4, and 8, it was argued that the size of the pull score may be responsible for correlation. Thus, it was suggested that significant correlation appears when the overall size of the corresponding pull score is large.

Since the overall size of a pull score should depend upon an experimental situation (e.g. the degree of group membership salience), the correspondence between actual and self-reported allocation strategies seems be contingent at least partly on the experimental situation. Therefore, as group membership becomes more salient, it becomes more likely that subjects establish intentional strategies for intergroup behaviour. There are of course a number of limitations in this correlational index for the correspondence because, for example, the self-reports were measured altogether after the experimental session. On balance however, it seems reasonable to accept that the allocation bias indices, especially the pull scores, are appropriate for measuring the intentional processes in minimal group situations (cf. Turner, 1983).

Table 10.1 Correlation between actual and self-reported point allocation strategy pulls

STRATEGY:		F	MJP	MJP•MIP	MD•MIP (vs. MJP)	MD•MIP (vs. F)	MD
Study	(*n*)						
Exp 1	(92)	.51**	.04	.07	.28**	.21*	.19
Exp 2	(69)	.33**	.04	-.15	.34**	.45**	.37**
Exp 3	(52)	.16	-.09	-.19	.25	.17	-.05
Exp 4	(78)	.33**	-.22	-.02	.18	.04	-.09
Exp 5 §	(34)	.41*	.07 -.11	.11	.40* .39*	.51**	.33
Pilot 3 §	(25)	-.13	.12 .33	.09	-.07 .35	.39	.17
Exp 6 §	(49)	.34*	.01 .27	.12	.27 .48**	.19	.45**
SB 91 ^{S1}	(160)	.13	-.02	—	.33**	.20**	.30**
SB 85 ^{S2}	(200)	.28**	.19*	—	.25**	.10	.29**

§ For them, there were two versions of the matrices types for MJP and MD•MIP (vs. MJP).
$ Data from: 1. Sachdev & Bourhis (1991); 2. Sachdev & Bourhis (1985)
* $p < .05$; ** $p < .01$

Colour band measure The colour band measure denotes the distance between the two groups (represented by the location of symbolic letters corresponding to the two groups) on colour gradation bands. In two studies (Studies 5 and 6), vector measures were also created taking into account the relative location of the groups on the bands. While different colour bands were sometimes used in different experiments, these bands were designed and created mostly to capture those aspects relevant to the group categories (the red-white-blue gradation band, for instance, for the red-blue group categories).

A measurement assumption for the colour band measures was that they represent an index of outcome of the category differentiation which is closer to its operation than most other measures because they are

uncontaminated with value judgements (see Chapter 5 for details). Therefore, unlike the rating bias indices, there is no difference between empirical and theoretical predictions regarding the distraction effect: simply no effect of distraction is predicted. And indeed, no study revealed any effect of distraction on category differentiation on the colour bands. Moreover, all studies that used the colour band scales showed significant category differentiation: the grand means were significantly larger than the standard (the distance on example band); and the consistency with colour gradation was significant on the vector indices.

Two criticisms could be made in response to the above arguments. First, the absence of distraction effect may be due to low sensitivity of the measures to the experimental manipulations, not due to the nature of the process which the measures were supposed to tap. Second, the alleged significance of the category differentiation is based on an arbitrary standard, that is, the distance between the two groups on the example bands. However, subjects' responses may be an artifact caused by the distances on the example band which might arise naturally due to, for example, a general preference for dividing arrays up into something like the golden section.

As regards the first criticism about sensitivity, in Study 5, subjective difficulty in responding was measured immediately after a judgement on each scale. It was thought that a measure tapping an automatic process would not take much consideration, thus would not be judged difficult to respond to. Contrary to this expectation, colour bands were judged more difficult to respond to than the rating scales and the allocation tasks. While this may have been, as discussed in Chapter 7, due to the presence and absence of explanations, respectively, of the rating and point allocation tasks, and the colour band scales, the latter may in fact be more difficult to respond to. If so, the colour band measures may be more insensitive to other situational conditions. Because this is an empirical question, it needs to be explored in

future research. The second criticism, about arbitrary standard, is also an empirical question which should be examined in future research.

Relationships among the measures Besides the earlier analyses for the validity of each type of measures, the relationship among the three types of measures may be of interest. If the different measures capture aspects of different processes as claimed, the response on the measures may exhibit different response patterns from each other. Two kinds of analyses were conducted to examine this possibility.

Factor analyses Separation of each type of measures and loadings on factors each consisting of the same type items would firstly indicate differences in the response pattern, and possibly in the underlying processes. Factor analyses were conducted for the studies that included "pull" scores and rating bias indices. Colour band indices were also included in the analyses for experiments where these were measured.

For each experiment, the relevant indices were subject to a principal-components analysis, with a cutting point of eigenvalue of 1.0. The factors were then obliquely rotated because it is assumed that the different response formations should be correlated to a certain degree. Separate factors for allocation bias indices (*i.e.* competitive pull scores), rating bias indices, and colour band indices emerged for Experiments 1, 2, 5, and 6, with colour band indices available only for the latter two. This provides empirical support for the hypothesised independence of the different types of measures. Significant correlations among the factor scores were found only between rating bias and competitive pulls factor scores for Experiment 1 (r =.24, p <.05), and between rating bias and colour band factor scores for Experiment 6 (r =.35, p <.05). For Experiment 4, the factors did not converge within 25 iterations. For Experiment 3, the factors mixed various "pull" scores, ratings bias and colour band indices. See Appendix 10.1 for details of the analyses.

Overall, factor analyses from four experiments indicated separation of the different types of measures in the predicted form. In one experiment, there was no convergence. The one factor analysis that produced a mixed pattern matrix is difficult to explain other than in terms of some unknown idiosyncratic element. To sum up the above analyses, rather consistent support (4 out of 6 experiments) was obtained for the claim that different measures reflect different underlying processes.

Comparisons of correlation coefficients A second type of analyses involved comparing correlation coefficients among the three types of measures. An assumption was that aspects of the social identity process are reflected more strongly, and those of category differentiation process more weakly, as one moves from allocation bias indices to ratings bias indices and colour band indices, with the latter two closely related. Therefore, it is expected that the correlation will be larger between rating bias and colour band indices than between allocation bias and rating bias indices, and between allocation bias and colour band indices. The results are shown in Table 10. 2. In Experiments 3, 4, 5 and 6 where colour band measures were included, comparison of the coefficients do show the predicted pattern. Although the moderate correlation between the colour band and allocation bias indices may be a problem in Experiment 6, it is more important to note that the correlation between the rating bias and colour band indices was still larger. Note also that the correlation between the allocation bias index and rating bias index (and between the colour band index and allocation bias index) was negative in Experiment 4.

Summary From the preceding validity analyses of measurement assumptions, it seems plausible that those measures are at least empirically separate, and probably capture the stated underlying processes, relative to one another. While this conclusion is thought to be reasonable for the

purposes of the current thesis, further investigation into the measurement issue will be important for future research.

Table 10.2 Pearson's correlation coefficients between different types of measures

	COMBINATION OF MEASURES §		
	Allocation bias -Rating bias	Rating bias -Colour band	Colour band -Allocation bias
Exp. 1 (df =81) ^{S}	.30*	–	–
Exp. 2 (df=61) ^{S}	.33*	–	–
Exp. 3 (df=52)	-.02	.23*	.01
Exp. 4 (df=73)	-.35**	.14	-.04
Exp. 5 (df=31)	.20	.27†	.11
Exp. 6 (df=44)	.30*	.45**	.35**

§ Allocation bias: a sum of the competitive pull scores of MD (on MJP•MIP), MD•MIP(on F) and MD•MIP (on MJP). Rating bias: a sum of five rating bias indices. Colour band: an average of all distance measures in each experiment.

^{S} Controlled by Group division and Booklet versions

** p <.01, * p <.05, † p <.10

Evaluating Wickens' multiple-resource model Given the variety of types of the dependent measures discussed above, it may be useful to consider whether an alternative explanation can be applied to the pattern of results using the multiple-resource model (Wickens, 1980 etc.; see also Section 1.4 in Chapter 1). This model would predict greater interference of one task with the other task when the two tasks share processing resources in the same modality (auditory or visual) and code (verbal or spatial) [the third dimension of the model, processing stages, is probably irrelevant to the present context because all tasks are assumed to involve all stages].

Let us now derive predictions for different types of dependent measures in each experiment according to this model. The distraction tasks in the experiments in the thesis were italic letter finding and digit rehearsal. The former is assumed to involve mainly visual modality and spatial code whereas the latter is thought to concern mainly auditory modality and verbal code. The major dependent measures in the experiments were point allocations, trait ratings, and colour band indices. It is assumed that the point allocations and the ratings are mainly concerned with visual modality and verbal code (because subjects respond to written, verbal scales/measures), and the colour band measures with visual modality and spatial code (because subjects read a written instruction and respond to spatially based measures). Consequently, one would expect that the italic finding task would interfere more with the colour band measures than point allocations and ratings because it shares both the visual modality and the spatial code with the former. Meanwhile, the digit rehearsal task would interfere more with both point allocations and ratings than with the colour band measures because it shares the verbal code with the former two. Finally, relative strength of interference of the italic finding task (regarding visual modality) and the digit rehearsal task (regarding verbal code) with point allocations and ratings is not clear because a quantitative aspect of the model has barely been investigated (cf. Wickens & Liu, 1988). (NB while it is unclear whether distraction tasks were primary or secondary for subjects, it seems that most subjects at least engaged in the distraction tasks seriously as shown in the next sub-section.)

The results suggest that both the italic letter finding task and the digit rehearsal task interfered with allocations, but not with ratings or colour band measures. Specifically, the italic letter finding task (weakly) interfered with competitive allocations but not with ingroup favouring ratings in Pilot study 1. The same distraction task interfered with both competitive allocations and ingroup favouring ratings in Experiments 1 and 2 (though the interference in

Experiment 2 was marginally significant for the allocations and non-significant for the ratings). Note that the direction of interference was facilitation of both competitive allocations and ingroup favouring ratings in Experiment 1, and quadratic with competitive allocations in Experiment 2; these patterns do not follow the predictions based on the trade-off rule of the multiple-resource model. There are no data regarding interference with colour band indices because they were not included in Pilot study 1, or Experiments 1 and 2. The digit rehearsal distraction task interfered with competitive allocations, but not with ingroup favouring ratings or colour band indices in Experiment 6, and for a selected sample in Experiment 4. The digit rehearsal distraction task did not interfere with any of the measures in Experiments 3 and 5 (where procedural flaws are the likely reasons: respectively a small impact of distraction, and partial violation of an experimental instruction in the distraction conditions). Finally, while it is difficult to compare the degree of interference between italic finding and digit rehearsal with allocations and ratings, it may be plausible that both distraction tasks produced interference.

The multiple-resource model seems to fit the presence and absence of interference with, respectively, point allocations and colour band indices in Experiments 4 and 6. However, it cannot explain the non trade-off interference in Experiments 1 and 2, and fails to explain the absence of interference with ratings in Pilot study 1 and Experiments (3,) 4, (5) and 6. A summary of this analysis is shown in Table 10.3. In short, it does not appear that the multiple-resource model alone can parsimoniously explain the pattern of the results in the experiments. The pattern seems to be more readily explained by the framework of the thesis as has been and will be discussed in this chapter.

Table 10.3 A summary of predictions of and results regarding the multiple-resource model

PREDICTIONS	Dependent measure		
	Point allocations (visual, verbal)	**Ratings** (visual, verbal)	**Colour band indices** (visual, spatial)
Distraction task			
Italic finding			
visual modality spatial code	+	+	++
Digit rehearsal			
auditory modality verbal code	+	+	–
EXPERIMENTAL RESULTS			
Italic finding			
visual modality verbal code	+ – (Pilot 1) X (Expts 1, 2)	– (Pilot 1) X (Expts 1, 2)	N.A
Digit rehearsal			
auditory modality verbal code	+ (Expts 4, 6) – (Expts. 3#, 5#)	– (Expts 3#, 4, 5#, 6)	– (Expts 3#, 4, 5#, 6)

Notes) Larger interference in the order of: ++, +, –; non trade-off interference: X
Suspected procedural flaws

Relevance of the multiple-resource model Not only is the model unable to account for the pattern of results in the experiments, but there are also other reasons to be cautious in applying it to the experiments in this thesis. First, the multiple-resource model for dual-task studies in cognitive psychology does not map closely onto the tasks used in the current experiments. In cognitive psychology experiments, instructions are usually provided as to specifically what subjects must aim at (searching targets, matching categories, naming words, etc.) However, in the current

experiments, there are no obviously explicit goals provided by the experimenter(s) for each dependent variable. Moreover, the point allocation tasks, for example, were used to measure different intentions in allocating points to ingroup and outgroup others. The intentions could be to be fair to everyone, to favour one's own group members, or to give everyone as much as possible, etc. In other words, there was not a single correct answer according to which performance could be assessed. Literature on automatic processing in cognitive psychology indicates that automaticity will not typically be present in these cases (Neumann, 1984, p.282).

Second, the level of analysis is fundamentally different between the two. Thus, the current experiments concern the content of the responses that are assumed to be tapped by the measures used in the experiments (e.g. intentions, category differentiation, etc.), and do not concern either how accurate or fast subjects can conduct the tasks— what we could call surface level responses— which is typically the case with dual-task experiments in cognitive psychology. In this thesis, automaticity is assumed to operate at the processing level, not the response level.

Third, the experimental settings in the thesis do not share the fundamental assumption behind automaticity in cognitive psychological experiments. This assumption is that tasks need to be practised enough prior to the dual-task sessions for the response to them to become automatic. What is claimed to be different in automaticity in the thesis is not the surface level responses to the tasks, but the underlying psychological processes that are captured with the different measures. If these points are accepted, the multiple-response model may not be able to make clear predictions regarding interference on any task.

Validity of distraction manipulations To be certain about the above interpretations of distraction effects, it is important to know how effective the distraction tasks were. Apart from the manipulation check items and the

effects of distraction on the dependent variables, there are other good indications that the distraction manipulations were effective at least to the extent that they made subjects engage in the distracting tasks in the intended manner.

For the italic-finding distraction task, almost all the subjects in distraction conditions either circled or copied, depending on the experimental manipulations, more than half of the italic letters without error (Experiments 1 and 2). For the digit rehearsal distraction task, 89% of the subjects in Experiment 3 recalled all the digits correctly, indicating that the subjects were rehearsing the numbers during the experimental session (see Appendix 5.7). Although the relevant data from the other digit rehearsal experiments are not readily available, it seems reasonable to believe that the same pattern exists; subjects almost certainly engaged in the digit rehearsal distraction task to the extent that the experimental manipulation required them to. It should be noted, however, that it is possible that subjects may have engaged in the distraction task *non-concurrently* with the intergroup tasks, as suspected for Experiment 5. Unfortunately, there are no data regarding this issue.

Validity of the noise hypothesis

The noise hypothesis refers to the explanation that the initial increase of the allocation ingroup bias with weak distraction is caused by eliminating the noise from other intentions such as fairness, self-presentational concern, and so on. Combined with the general hypothesis about the distraction effect (Hypothesis 4: decreased allocation bias with distraction), it was hypothesised that allocation bias would follow an inverted U-shape curve with distraction.

A function of allocation bias with distraction As discussed in Chapter 4, the results in Pilot study 1 and Experiment 1 (when matched for the degree of distraction), the secondary analysis of Experiment 1, and those of Experiment 2 all fit the predicted inverted U-shape curve describing the

relationship between distraction and allocation bias. To map this pattern in a wider context, an allocation bias index (the pull score of MD against MJP•MIP) in all the conditions that contained Tajfel's matrices, including those of Experiments 1 and 2, is described in a two-dimensional space of distraction and group membership salience (see Fig. 10.1). This figure illustrates an overall configuration of allocation bias, including applicability of the noise hypothesis. Thus, as formerly suggested, the inverted U-shape curve with distraction is valid only in the middle range of group membership salience. When salience is low, distraction does not seem to have very much effect (at the lower part of the figure). Similarly, distraction may not have a strong effect in the higher salience range (at the higher part of the figure). The evidence for the last proposition is rather weak as there were few conditions that achieved high group membership salience. Note further that the right top dot is smaller than the left top one. Judging from this meta-analytic presentation, therefore, it is suggested that the effect of distraction is qualified by the degree of distraction and the level of group membership salience (part of which was already incorporated in Hypothesis 4). Nonetheless, the essence of Hypothesis 4 (when group membership is salient, distraction will reduce the effect of the social identity process) is correct, and moreover, is perfectly tenable when taking account of the role of noise at a weaker level of distraction.

The role of noise With regard to the role of noise, two kinds of evidence are available from the studies in the thesis. Study 4 demonstrated that there was a strong effect of distraction in line with Hypothesis 4 (decrease with distraction) only among those who reported having been less concerned with fairness and self-presentation. This was despite the fact that overall ingroup bias was not evident, perhaps because the general noise level was strong. This result indicates that once the noise is removed, the distraction effect can occur. Second, in Study 7 there is evidence that

distraction significantly decreased self-reported level of self-presentational concern. Self-presentational concern is thought to constitute one of the intentions which could work as noise. Thus, this is an example of the decreased noise with distraction.

Alternative explanations What other explanations could there be for the pattern of allocation bias with distraction? Experiment 2 showed that moderate distraction led to the strongest ingroup bias in the point allocation indices whereas rating bias slightly increased with distraction. It was suggested that distraction in general should have eliminated intentional processes, and moderate distraction, in particular, should have got rid of a noise interference from the various other intentions such as self-presentation, allowing ingroup bias to be expressed. This analysis is also consistent with the latter result. That is, the increase in rating bias with distraction is thought to mirror the decrease of the inhibition from intentional processes to the expression of the cognitive process.

The effects of distraction have been studied in mainly three areas in social psychology: social facilitation (see Baron, 1986), persuasion (Petty & Brock, 1981 etc.), and recently, stereotypes (Gilbert, 1989; Stangor & Duan, 1991, etc.). Social facilitation can explain the increase of allocation bias in a moderate distraction condition, by assuming that the moderate distraction increased subjects' engagement in the tasks, thus increasing their performance. It is, however, not plausible to assume a drive-like effect of moderate distraction since in Experiment 2, moderate distraction in fact *decreased* significantly one of the dominant responses in the point allocation tasks (*i.e.* fairness) against a social facilitation prediction (cf. Sanders & Baron, 1975). The noise hypothesis is, however, similar to that found in some persuasion research in that both assume that distraction inhibits mental processes such as other intentions or counter-arguments. Assertions in stereotype studies concerning distraction also resemble the noise hypothesis

in terms of the predicted outcomes: the use of stereotypes, like ingroup bias in the case of minimal group situations. However, the crucial difference of the present studies from these persuasion and stereotyping studies in general is that in the present studies, there is no explicit message to be counter-argued or stereotype to be accessed. Therefore, in spite of the seeming resemblance with these explanations, it could be argued that the noise hypothesis is more parsimonious because it does not have to assume any message to persuade or stereotypes which might have happened to be induced in the experiments.

To sum up this sub-section, the noise hypothesis seems to be valid for the middle range of group membership salience when distraction is weak, and the remaining part of the present framework is consistent with Hypothesis 4 as far as allocation bias is concerned. Furthermore, some evidence has been obtained that noise in fact was playing a role in the experiments, and is not just a convenient explanatory tool. Finally, the noise hypothesis seems to provide a more parsimonious explanation for the pattern of results than those alternatives mentioned here.

10.3 Conclusion, unresolved questions, and future research

The previous section discussed and assessed the validity of the general hypotheses and the measurement assumptions of the thesis, and evaluated also a new hypothesis — the noise hypothesis. In the light of these ideas, this section discusses the general theoretical assumptions, dealing with propositions at a theoretical level. This discussion serves as an overall conclusion of the thesis, and deals with issues which have not been dealt with in previous discussions. Unresolved and/or unchallenged questions during the course of the studies in the thesis are pointed out, and future research programmes related to them are suggested.

Conclusion of the research

Because the general hypotheses in Chapter 2 were made in order of abstractness of the proposition, they are discussed here in reversed order.

Assumption 9

9 Increasing group membership salience increases the likelihood that one identifies with the relevant group.

This assumption was the basis on which it was hypothesised that group membership salience should influence the social identity process. Hypotheses 3 (Group membership salience does and does not increase, respectively, the social identity and the category differentiation processes) and 5 (Distraction reduces a link between group membership salience and the outcome of social identity process) were derived from this, as well as other assumptions. To review, Hypothesis 3 was fully supported by the research findings while support for Hypothesis 5 was not consistent.

One of the differences between the hypotheses is the kind of technique used to test them. That is, Hypothesis 3 was tested by comparing effects of salience manipulations on the social identity and category differentiation indices whereas a test for Hypothesis 5 was based on correlation between the indices for the social identity process and group membership salience. First, since the studies employed an experimental approach, results from correlational analyses may not be as interpretable as those from analyses of variance. Second, group membership salience indices did not show consistent results among themselves, as pointed out earlier. Therefore, it is difficult to decide which or whether indices reflect "group membership salience". In short, the fact that evidence for Hypothesis 5 is inconclusive does not necessarily mean the underlying assumption was wrong. Rather, it may reveal empirical problems of measuring group membership salience (see also discussion about salience manipulation checks in Chapter 3).

Assumption 8

8 The category differentiation process is blocked only by the strongest distraction.

This assumption together with others was used to derive Hypothesis 7 (no ingroup bias under the strongest distraction). As discussed earlier, the hypothesis was not tested. Therefore, little more can be said about this.

Assumption 7

7 Distraction hinders intentional processes in general. Therefore, the social identity process is also impeded by distraction.

This assumption was one of the key points in the thesis. Hypothesis 4 was derived mainly from this and Assumption 6. To recap, Hypothesis 4 (reduced allocation bias with distraction under group membership salience) was qualified by the noise hypothesis (interference of noise from other intentions under no/weak distraction). The conclusion about the noise hypothesis in the previous section was that the noise hypothesis applies when distraction is weak and group membership salience is moderate while Hypothesis 4 (*i.e.* distraction will reduce the effect of the social identity process when group membership is salient) is valid for the rest. Hence, Assumption 7 appears to be correct in that distraction reduced the hypothesised outcome from the social identity process in some conditions, and in that the qualification made by the noise hypothesis is also in line with the assumption (*i.e.* noise from other intentions is hypothesised to be reduced by distraction).

Assumption 6

6 The social identity process is a major intentional process in intergroup situations when group membership is salient, though other intentions are also at work.

This assumption was used to derive Hypotheses 4, 5, and 7. In addition, the noise hypothesis was partly based on this assumption in that this assumes roles of the other minor intentions under group membership salience. In other words, there could not possibly be noise if it were not for these intentions. As noted above, Hypotheses 5 and 7 were respectively not supported and not tested whereas Hypothesis 4 was supported with a qualification of the noise hypothesis. And to repeat, tests for Hypothesis 5 were based on relatively unreliable correlational results with unreliable indices. Therefore, it could be said, on balance, that the results concerning these hypotheses do not actually undermine the validity of the assumption.

Assumptions 5a and 5b

5a The social identity process operates when one identifies with the category. The category must be salient, in the first place, to be identified with.

5b The social identity process is partly inhibited by counteracting intentions (e.g. equality, fairness & self-presentation)

Assumptions 5a and 5b were employed to derive respectively Hypotheses 3 and 5, and the noise hypothesis. As discussed before, Hypothesis 5 was not, or could not be, properly tested. And Hypothesis 3 and the noise hypothesis were generally approved. Therefore, as far as the derived and tested hypotheses were concerned, the assumption was useful. An interesting question about category salience (5a) is discussed shortly.

Assumptions 4a and 4b

4a The category differentiation process operates when the relevant categories are salient.

4b Expression of the category differentiation process is suppressed when other intentions are counteracting.

Hypotheses 2 and 3 were derived mainly from Assumptions 4b and 4a respectively. To recap, Hypothesis 2 (increased expression of category

differentiation with distraction) was not supported, and a tentative alternative was suggested. However, this does not mean that this assumption is incorrect. The result simply indicates that rating bias (a measurement of the category differentiation process) may reflect the theoretical process of category differentiation, and be free from intentional suppression.

Concerning Assumption 4a, a question was raised in examining Hypotheses 1 and 3: what is the minimal level of category salience? Both hypotheses assume at least a minimal level of category salience. And Assumption 4a specifies its functional role: it is necessary for the category differentiation process. In theory, there is no problem in assuming this; in practice, the issue is whether this minimal level can be operationally defined or not. Since there is no authoritative and objective index for salience in general, one cannot define with confidence what is the minimal level. Perhaps, the colour band measure — the best measure so far theoretically and empirically — may serve as an adequate index of salience if its empirical validity is further verified in the future.

Assumption 3

3 The category differentiation process operates more automatically and less intentionally than the social identity process.

General assumption 3 is another key proposition of the thesis, and laid foundation for most of the hypotheses. This assumption is at a highly abstract level. However, it was crucially important, in particular, for Hypothesis 6 (no effect of distraction on the relationship, if any, between the category differentiation process and group membership salience). To recap, the results for this particular hypothesis were inconsistent and thus, inconclusive. Note that Hypothesis 6 was also based, like Hypothesis 5, on a correlational approach *and* group membership salience indices. For the same reasons given

earlier, ambiguity of support for Hypothesis 6 does not undermine the validity of the present assumption.

Tests of other hypotheses (1, 2, 4, and 5) based on Assumption 3, provide support for the validity of this assumption. Except Hypothesis 5, which used correlational approach with group membership salience, all the hypotheses were supported by experimental results (with qualifications reconcilable with the assumptions). That is, there was evidence of category differentiation across the whole range of distraction, with a slight initial increase (Hypotheses 1 and 2); distraction reduced allocation bias— an outcome of the social identity process— when noise is removed (Hypothesis 4 and the noise hypothesis).

Assumptions 1 and 2

1 Ingroup bias is caused in intergroup situations by two main processes: the category differentiation process and the social identity process.

2 The category differentiation process is characterised as a cognitive process at the perceptual level; the social identity process as a motivational process, the goal of which is to maintain and enhance ingroup-esteem.

These two general assumptions provided a basis for virtually all the hypotheses. In other words, they are the theoretical essence of the thesis. Probably, these are most abstract and cannot be fully examined in empirical hypotheses. Perhaps, all one can do is to judge them from the way more concrete level hypotheses were verified. Of the seven general hypotheses and six sets of general assumptions, the majority of the hypotheses were empirically supported, some with qualifications. Furthermore, the general assumptions considered so far were found to be useful for deriving the hypotheses, and generally defensible.

Thought experiments To look at Assumptions 1 and 2 from a different angle, let us consider what evidence has been obtained for and against them. The critical question here may be what process(es) are

represented by the results of allocation bias on the one hand, and those of rating bias and colour band differentiation on the other? The following are three thought experiments to examine this question, using three different models.

Category differentiation single process model Suppose, for now, that the allocation, rating, and colour band measures tap different consequences of a single process, and that the results on these measures simply reflect the single process differentially.

Let us take the category differentiation process first. The critical issue here is whether the category differentiation process alone could logically explain the effect of distraction? Category differentiation may induce ingroup bias, as argued in Chapter 1, when combined with the unit formation concept. Thus, the psychological process would be that a collection of people are first categorised into ingroup and outgroup, then because of the unit relation with ingroup members, one evaluates ingroup (members) positively. In this case, significant rating bias and colour band differentiation would mean that the category differentiation process was functioning. Meanwhile, absence of the distraction effect on these indices would show either that cognitive resources are not usurped by distraction or that there are enough resources even in a distraction condition. How then, can one explain the distraction effect on allocation bias? One would have to assume that more resources are specially required for allocation bias to explain this effect, and that resources available were just enough for rating bias and colour band differentiation. The very fact, however, that one would need this additional assumption in the model demonstrates that the category differentiation single process model can not explain the results. Therefore, this model does not stand as a complete model.

Social identity single process model Next, let us examine a model that assumes only the social identity process in an intergroup situation. The crucial questions for this model are a) whether colour band differentiation,

and b) absence of a distraction effect on rating bias, can be explained in this model. The social identity process is a goal-achievement process, the goal of which is to enhance ingroup-esteem. Thus in this model, allocation bias and rating bias are interpreted as fulfilling this goal. However, would differentiation on the colour bands fulfil this goal? Differentiation would fulfil a goal of delineating a boundary between ingroup and outgroup. This, however, is a function of category differentiation, thus does not fit this model.[4]

Concerning question b), it is hard to explain why distraction did not affect rating bias, but did affect allocation bias. One reason may reflect the differential sensitivity of the measures. Extremely easy and difficult tasks would show ceiling and floor effects so that distraction would not affect the task performances. This may be the case if the effects (or rather absence of them) on rating bias are derived from extremely easy or difficult tasks. However, as Study 5 demonstrated, the point allocation tasks and evaluative rating tasks were judged equally easy [mean averaged difficulty across separate tasks: *M*s=2.74 and 2.56 respectively for point allocation and rating tasks on 7-point scales; t (24)= -.80, *n.s.*]. Therefore, sensitivity of the measures is less likely to be the cause of the differences although it is also important to examine other psychometric qualities of the measures in the future research.

In addition, there is evidence that argues against both of the single process models. Study 5 demonstrated that initial colour band differentiation and an index for allocation bias correlated *negatively*. If either the category differentiation process or the social identity process model is the only relevant process, how could different indices of the single process correlate

---

[4] In this case, we would have to assume two goals in the social identity process: ingroup enhancement and ingroup-outgroup distinction. Apart from the fact that this confuses the theoretical distinction between the social identity process and the category differentiation process, this two-goal assumption cannot be reconciled with the fact that the distraction effect was absent for colour band differentiation measures, unless one assumes that a differentiation goal is particularly free from the distraction effect. This assumption is essentially the same as that of the category differentiation process.

negatively? In short, the category differentiation single process model does not stand because it cannot, on its own, explain the effect of distraction on allocation bias; the social identity single process model does not stand for it fails to explain colour band differentiation and absence of an effect of distraction on rating bias; and neither of the single process models can stand because they cannot explain the relationship between allocation bias, rating bias, and colour band differentiation.

A dual process model Suppose that allocation bias represents the outcome of the social identity process, and rating bias and colour band differentiation represent outcome of the category differentiation. This dual process model is the one which has been adopted throughout the thesis. This assumption can, as we have seen in this and previous chapters, explain the distraction effect on allocation bias, significant colour band differentiation, and the absence of the distraction effect on rating bias, as well as the relationship among the indices. Therefore, it is suggested that the dual process model best fits the configuration of the results.

Unresolved questions and future research

Measurement of group membership salience As pointed out in the previous sections, the hypotheses involving the correlation between group membership salience and intergroup bias did not gain much support (Hypotheses 5 and 6). Moreover, indices of group membership salience (CSR scale score; and "thinking-about-group membership" check item) did not yield common results in many cases suggesting a measurement problem associated with group membership salience.

One of the reasons for this problem may be a conceptual weakness in interpreting the indices. For instance, the use of Collective Self-Regard scale as a group membership manipulation check is problematic since it is thought to measure psychological end-results, not the characteristics of the

experimental setting (as group membership salience is thought to be). Regarding the "thinking-about-group membership" item, it was pointed out earlier that the measure may be confounded with distraction check since distraction would be expected to reduce time available for thinking (see Chapter 3). This means, not only that the correlational hypotheses could not be properly tested, but also that manipulation checks for group membership salience were not always interpretable in deciding whether a manipulation was successful or not. This issue relates also to the next point.

Manipulation of group membership salience The issue of salience manipulation has not been dealt with in detail in the thesis. On the one hand, salience was conceptually defined as the characteristics of the psychological situation that stand out in the setting (see Chapter 1; also Fiske & Taylor, 1984). On the other hand, salience of "group membership" must be the psychological significance of group membership in a "psychological field" since group membership is a psychological variable. Therefore, manipulation of group membership salience requires a situational manipulation but at the same time, it must be strong enough to induce a psychological impact. And this psychological impact is in effect similar to identification with the group — the end-result of group membership salience. This entails a number of problems. For example, it follows that a manipulation of group membership salience can be assessed only by its end-result (cf. Abrams, 1990, 1994).

Another point related to salience involves a distinction between category salience and group membership salience. It was argued previously that category salience is related to the clarity of the distinction between group whereas group membership salience concerns characteristics of ingroup that lead to identification with the group. However, because of the problems of manipulating and measuring group membership salience, this distinction remains at the moment only conceptual. In sum, the issue of salience in general should be dealt with more seriously in future research.

Nature of category differentiation In Chapter 2, two views were presented concerning the nature of the category differentiation process: strict and mild assumptions of automaticity. In the strict view, the category differentiation process is seen rigourously automatic (*i.e.* no effect of distraction). In the mild view, the category differentiation is seen as mediated by the amount of cognitive resources (*i.e.* increased functioning with distraction). The strict view has been adopted in the thesis for theoretical reasons. The unexpected findings that distraction did not, after a point, affect rating bias and colour band differentiation — indices for the category differentiation process, supports the thesis's strict automaticity view of category differentiation. The next step would be to seek a way to integrate the two views. The initial increase of differentiation under weak distraction may give a clue to this direction which could be another major theme for future studies.

Cross-cultural factors The studies in the thesis relied exclusively on data from young school pupils aged mainly between 12 and 13. This is of course not ideal sampling for the purposes of drawing general conclusions. However, one of the justifications for the use of this age group is that Tajfel *et al.*'s (1971) first minimal group experiments also used, as their subjects, school pupils of a similar age. Since it is thought their study was a starting point of the social identity approach, it is also thought that the use of a similar sample is justifiable for the aim of the present thesis — clarification of the processes in the theory.

There is however another issue in sampling of the subjects in the present studies. Solely for administrative reasons, two different national groups were employed. Pilot study 1 and Experiment 4 used Japanese school pupils whereas all the rest utilised English pupils. To the author's knowledge, there is no study pointing out distinctive features in the use of Japanese school pupils in minimal group experiments. However, there are suggestions

regarding different styles in achieving social identity which could be related to cultural differences (e.g. Brown, Hinkle, Ely, Fox-Cardamone, Maras & Taylor, 1992; Markus & Kitayama, 1991). Some cross-cultural studies on a collectivism-individualism dimension even suggested that a form of ingroup bias is more typical to collectivist cultures to which the Japanese culture is claimed to belong (e.g. Triandis, *et al.*, 1988). And using only a Japanese sample, the author previously suggested that centrality of the concept of social identity in intergroup relations can be tested for in this sample (Kakimoto, in preparation).

However, since there have been only a few studies using Japanese subjects in social identity research, the studies conducted for the thesis may help clarify possible cultural differences. For example, female subjects were more discriminatory than male subjects among the Japanese sample (Experiment 4) whereas the reverse was the case for the English sample (Experiment 1). While this does not have any direct theoretical bearing on the present thesis, a more systematic investigation into cultural differences may reveal important theoretical implications. This is a subject for future studies.

Utility of the minimal group paradigm The present studies employed the minimal group paradigm. Similar to the sampling issue, a justification for remaining within this paradigm is that it reduces contamination from such other factors as previous relationships between groups, realistic conflicts of interests, and so on (cf. Tajfel *et al*, 1971). At the practical level, since no methodology for investigating the effects of distraction had been established previously, it was necessary to develop a technique using socially embryonic settings. It is also likely that studying realistic intergroup situations may have generated additional theoretical insights, however they would also have introduced confounding factors. On balance, because of the theoretical and practical reasons given above, and despite the drawbacks of the experimental approach, the use of the minimal

group paradigm in the thesis seems warranted. The applied implications of the research findings, and further theoretical investigations using realistic intergroup relations will be the subject of future research.

Relationship between the processes The relationship between the social identity process and the category differentiation process was investigated only briefly in Study 5. Since the study concerned itself only with correlational evidence at different times, it is not entirely clear how the two processes combine or interact with one another. Distraction can be used in future investigation of this relationship. One research project could use a time-series design with multiple stages, each with measurements of the two processes, under different degrees of distraction. While such a project might be difficult to conduct, it would clarify the remaining ambiguities relating the processes in intergroup discrimination at least in a laboratory setting.

10.4 Theoretical and applied implications

Methodological implications

The present studies developed a methodology for studying the effects of distraction in minimal group situations. Utilising techniques from other areas of social psychology, the present studies showed how they can be applied to (minimal) intergroup situations. Broadly two methods were used, both with a concurrent distracting task. The first method incorporated a italic letter finding task into a minimal group paradigm. The second involved a digit rehearsal task during a minimal group session. As discussed earlier, both tasks have the advantage of controlling the amount and timing of distraction better than other methods (e.g. thought disruption technique used in Hong & Harrod, 1988). It was also found that the method by which the italic finding task is conducted (copying or circling), and the way digit rehearsal task is executed (the length of the digits, frequency of its

presentation, and control over subjects concerning rehearsing numbers) are important parameters in the tasks. These points should be considered in conducting future research.

With these insights, future studies can be conducted controlling more strictly and precisely the amount, timing, and degree of distraction. It is hoped that the present observations will contribute to a more complete understanding of the effects of distraction on intergroup discrimination.

Theoretical implications

Plausibility of the processes As discussed in the previous section, the results of the studies on the whole support the idea that the social identity process and the category differentiation process both play important roles in intergroup discrimination at least in a minimal group situation. In intergroup relations research, there seems to be a different degree of emphasis on each of the processes depending on the interests of particular academic schools. However, as shown theoretically in Chapter 2 and empirically in the later chapters, it would be more fruitful, and perhaps parsimonious, to take into account both processes to establish a more complete picture of the psychological phenomenon of intergroup discrimination.

Self-concepts Though only remotely related to the present research programme, an interesting issue would be functions of the self-concept. The present thesis has regarded the self-concept only as a source of the social identity process. The general conclusion is that the social identity process works in an intentional manner. Whether engagement of self is intentional or not is a subject of further investigation.

Applied implications: beyond minimal groups

Social engineering in inter-group encounter While the theoretical aspect of the thesis may give an impression of "theory for the sake of theory", it has fundamentally an applied value since theoretical investigation in

general is expected to lead someday to the ultimate goal of understanding and resolving intergroup conflicts in the real world. The empirical aspect of the thesis, however, can be more directly related to immediate applied issues. The empirical aspect of the thesis concerns primarily the effects of distraction on intergroup discrimination.

To relate the research findings to a realistic context, it can be suggested that the deliberate aspect of intergroup discrimination is strongest when one is slightly distracted, then reduced as distraction increases, whereas an unconscious aspect of intergroup discrimination remains at the same level after a slight increase under a weak distraction. To unravel the real applications, three elements in the above statement must be implemented according to a local context: distraction, deliberate discrimination and unconscious discrimination. Thus, distraction could be implemented, for example, as auditory noise (e.g. noise level of the work place), visual stimuli (e.g. style and degree of street decoration), others' presence, and so on. The deliberate aspect of discrimination could be interpreted as various kinds of social decisions, such as choices of relationships, trade transactions, political behaviour, and so on. The unconscious aspect might be implemented as stereotypes formed passively about a group of people, impressions one may have concerning an outgroup member, and so on. What is important here is that each of the three elements should be investigated so that the degree of its intensity can be somehow identified.

Incidents involving football hooligans may perhaps provide an instance of application. As for the automatic responses, these might include spontaneous negative images of, and physiological arousal in the face of other teams fans *etc.* In problematic instances, however, groups of football fans of particular teams exhibit antagonism towards each other including physical violence. Salience of group membership (being supporters of Team X) is typically made very high around the period of the relevant football match.

Controlled violence may be likely to occur when there is fairly, but not too strong distraction (e.g. in a moderately busy city centre at a moderately busy time of the evening). It is hard to imagine, however, that this happens either in the busiest rush hours or quiet early mornings. Controlled violence in a specific time and area might be prevented by modifying environmental noise, flow of people, and street designs of the place for instance.

Although a detailed research programme may be developed elsewhere, it would need to involve exploratory work to identify relevant social settings and variables, implementations of these variables, development of measurement and manipulation methods in field and laboratory settings, and so on.

10.5 Summary of the thesis

How can the thesis be summarised? Probably, there are three levels of conclusions corresponding to the organisation of the present thesis: a theoretical, an empirical, and a methodological level. At the theoretical level, what was sought and found was evidence for the processes hypothesized to be responsible for intergroup discrimination: the social identity and the category differentiation processes. This issue constitutes an important core of social identity theory. Progress towards this theoretical goal was achieved by analysing the differential effects of distraction on the two processes. This, at the same time, relates to the purpose at the empirical level.

The purpose at the empirical level was to resolve contradictory predictions concerning the effects of distraction on intergroup discrimination. The concept of behavioural control hierarchy was introduced to integrate two approaches that produced the different predictions. It was found that an intentional component of intergroup discrimination was strongest at a weak degree of distraction, and then reduced as distraction increased, whereas an

automatic component of intergroup discrimination increased slightly under a weak distraction, then remained at the same level. Since the effects of distraction have not been studied extensively in intergroup relations research, the studies in this thesis may contribute a useful database for future research programmes. At the same time, it can be argued that this empirical aspect has applied implications to social engineering regarding realistic intergroup relations.

At the methodological level, it can be said that the current research programme has developed a method of examining the interaction between two processes in intergroup relations. It was argued that distraction can distinguish the outcome and functioning of hypothesised processes in intergroup relations. Two types of methods were implemented to manipulate the degree of distraction: "italic letter finding" and "digit rehearsal" concurrent tasks. Although there is much room for improving the techniques, it can be said that a basic technique for future research has been established. This methodological aspect has also provided conceptual and practical tools to analyse the results concerning these data. For example, it was claimed that the degree of distraction was important as well as presence or absence of distraction. Finally, a new measure was developed — colour gradation bands — to capture the category differentiation process, and a framework for interpreting the conventional and the new measures of intergroup bias was suggested.

REFERENCES

Abelson, R. P. 1976 Script processing in attitude formation and decision-making. In J. S. Caroll & J. W. Payne (eds.) *Cognition and social behavior*. Hillsdale, NJ: Lawrence Erlbaum.

Abrams, D. 1985 Focus of attention in minimal intergroup discrimination. *British Journal of Social Psychology*, **24**, 65-74,

Abrams, D. 1989 Political identity: relative deprivation, social identity and the of Scottish nationalism. *ESRC 16-19 Initiative Occasional Papers.*

Abrams, D. 1990 How do group members regulate their behaviour? : an integration of social identity and self-awareness theories. In D. Abrams & M. A. Hogg (eds.) *Social identity theory: constructive and critical advances*. London: Harvester Wheatsheaf.

Abrams, D. 1992 Process of social identification. In G. M. Breakwell (ed.) *Social psychology of identity and the self concept*. London: Surrey University Press.

Abrams, D. 1994 Social self-regulation. *Personality and Social Psychology Bulletin*, **20**, 473-483.

Abrams, D. & Brown, R. 1989 Self-consciousness and social identity: self-regulation as a group member. *Social Psychology Quarterly*, **52** (4), 311-318.

Abrams, D. & Hogg, M. A. 1988 Comments on the motivational status of self-esteem in social identity and intergroup discrimination. *European Journal of Social Psychology*, **18**, 317-334.

Abrams, D. & Hogg, M. A. (eds.) 1990a *Social identity theory: constructive and critical advances*. London: Harvester Wheatsheaf.

Abrams, D. & Hogg, M. A. 1990b Social identification, self-categorization and social influence. In W. Stroebe & M. Hewstone (eds.) *European Review of Social Psychology*. Vol.1. Chichester, West Sussex: John Wiley & Sons.

Abrams, D., Thomas, J., & Hogg, M. A. 1990 Numerical distinctiveness, social identity and gender salience. *British Journal of Social Psychology*, **29**, 87-92.

Abrams, D., Wetherell, M., Cochrane, S., Hogg, M. A., & Turner, J. C. 1990 Knowing what to think by knowing who you are: self categorization and the nature of norm formation, conformity and group polarization. *British Journal of Social Psychology*, **29**, 97-119.

Allport, G. W. 1954 *The nature of prejudice*. Cambridge, MA: Addison-Wesley.

Aronson, E. 1980 *The social animal*. 3rd ed. San Francisco: Freeman.

Aschenbrenner, K. M. & Schaefer, R. E. 1980 Minimal group situations: comments on a mathematical model and on the research paradigm. *European Journal of Social Psychology*, **10**, 389-398.

Ashmore, R. D. & Del Boca, F. K. 1981 Conceptual approaches to stereotypes and stereotyping. In D. L. Hamilton (ed.) *Cognitive processes in stereotyping and intergroup behavior*. Hillsdale, NJ: Lawrence Erlbaum.

Bargh, J. A. 1989 Conditional automaticity: varieties of automatic influence in social perception and cognition. In J. S. Uleman & J. A. Bargh (eds.) *Uninted thought*. New York: The Guilford Press.

Bargh, J. A. 1992 The ecology of automaticity: toward establishing the conditions needed to produce automatic processing effects. *American Journal of Psychology*, **105**, 181-199.

Bargh, J. A. & Pietromonaco, P. 1982 Automatic information processing and social perception: the influence of trait information presented outside of conscious awareness on impression formation. *Journal of Personality and social psychology*, **43**, 437-449.

Bartsch, R. A. & Judd, C. M. 1993 Majority-minority status and perceived ingroup variability revisited. *European Journal of Social Psychology*, **23**, 471-483.

Billig, M. 1973 Normative communication in a minimal intergroup situation. *European Journal of Social Psychology*, **3**, 339-343.

Billig, M. & Tajfel, H. 1973 Social categorization and similarity in intergroup behaviour. *European Journal of Social Psychology*, **3**, 27-52.

Bodenhausen, G. V. & Lichtenstein, M. 1987 Social stereotypes and information-processing strategies: the impact of task complexity. *Journal of Personality and Social Psychology*, **52**, 871-880.

Bornstein, G., Crum, L., Wittenbraker, J. Harring, K., Insko, C. & Thibaut, J. 1983 On the measurement of social orientations in the minimal group paradigm. *European Journal of Social Psychology*, **13**, 321-350.

Branthwaite, A., Doyle, S. & Lightbown, N. 1979 The balance between fairness and discrimination. *European Journal of Social Psychology*, **9**, 149-163.

Brewer, M. B. 1979 In-group bias in the minimal intergroup situation: a cognitive-motivational analysis. *Psychological Bulletin*, **86**, 307-324.

Brewer, M. B. 1991 The social self: on being the same and different at the same time. *Personality and Social Psychological Bulletin*, **17**, 475-482.

Brewer, M. B. & Kramer, R. M. 1985 The psychology of intergroup attitudes and behavior. *Annual Review of Psychology*, **36**, 219-243.

Brewer, M. B. & Silver, M. 1978 Ingroup bias as a function of task characteristics. *European Journal of Social Psychology*, **8**, 393-400.

Brown, R. J. 1978 Competition and cooperation between similar and dissimilar groups. PhD thesis, University of Bristol.

Brown, R. 1984 The effects of intergroup similarity and cooperative *vs.* competitive orientation on intergroup discrimination. *British Journal of Social Psychology*, **23**, 21-33.

Brown, R. 1988 *Group processes: dynamics within and between groups.* Oxford: Basil Blackwell.

Brown, R. & Abrams, D. 1986 The effects of intergroup similarity and goal interdependence on intergroup attitudes and task-performance. *Journal of Experimental Social Psychology*, **22**, 78-92

Brown, R., Condor, S., Mathews, A., Wade, G. & Williams, J. 1986 Explaining intergroup differentiation in an industrial organization. *Journal of Occupational Psychology*, **59**, 273-286.

Brown, R., Hinkle, S., Ely, P. G., Fox-Cardamone, L., Maras, P. & Taylor, L. A. 1992 Recognizing group diversity: individualist-collectivest and autonomous-relational social orientations and their implications for intergroup processes. *British Journal of Social and clinical Psychology*, **31**, 327-342.

Brown, R., Tajfel, H. & Turner, J. C. 1980 Minimal group situations and intergroup discrimination: comments on the paper by Aschenbrenner and Schaefer. *European Journal of Social Psychology*, **10**, 399-414.

Brown, R. J. & Turner, J. C. 1979 The criss-cross categorization effect in intergroup discrimination. *British Journal of Social and clinical Psychology*, **18**, 371-383.

Brown, R. J. & Williams, J. A. 1984 Group identification: the same thing to all people. *Human Relations*, **37**, 547-564.

Carver, C. S. & Scheier, M. F. 1981 *Attention and self-regulation: a control-theory approach to human behavior*. New York: Springer-Verlag.

Chapman, L. J. 1967 Illusory correlation in observational report. *Journal of Verbal Learning and Verbal Behavior*, **6**, 151-155.

Chin, M. G. & McClintock, C. G. 1993 The effects of intergroup discrimination and social values on level of self-esteem in the minimal group paradigm. *European Journal of Social Psychology*, **23**, 63-75.

Collins, A. M. & Loftus, E. F. 1975 A spreading-activation theory of semantic processing. *Psychological Review*, **82**, 407-428.

Crocker, J. & Luhtanen, R. 1990 Collective self-esteem and ingroup bias. *Journal of Personality and Social Psychology*, **58**, 60-67.

Crocker, J., Blaine, B. & Luhtanen, R. 1993 Prejudice, intergroup behaviour and self-esteem: enhancement and protection motives. In M. A. Hogg & D. Abrams (eds.) *Group motivations: social psychological perspectives*. London: Harvester Wheatsheaf. (pp.52-67)

Crocker, J., Thomson, L. J., McGraw, K. M. & Ingerman, C. 1987 Downward comparison, prejudice, and evaluations of others: effects of self-esteem and threat. *Journal of Personality and Social Psychology*, **52**, 907-916.

Deschamps, J. -C. 1982 Social identity and relations of power between groups. In H. Tajfel (ed.) *Social identity and intergroup relations.* Cambridge: Cambridge University Press.

Deschamps, J. -C. & Brown, R. 1983 Superordinate goals and intergroup conflict. *British Journal of Social Psychology*, **22**, 189-195.

Deschamps, J. -C. & Doise, W. 1979 Crossed category memberships in intergroup relations. In H. Tajfel (ed.) *Differentiation between social groups.*

Devine, P. G. 1989 Stereotypes and prejudice: their automatic and controlled components.*Journal of Personality and Social Psychology*, **56**, 5-18.

Diehl, M. 1989 Justice and discrimination between minimal groups: the limits of equity. *British Journal of Social Psychology*, **28**, 227-238.

Diener, E. 1980 Deindividuation: the absence of self-awareness and self regulation in group members. In P. Paulus (ed.) *The psychology of group influence.* Hillsdale, NJ: Lawrence Erlbaum Associates. (pp.209-242)

Doise, W. 1978 *Groups and individuals: explanations in social psychology.* Cambridge: Cambridge University Press.

Doise, W., Csepeli, G., Dann, H. D., Gouge, C., Larsen, K. & Ostell, A. 1972 An experimental investigation into the formation of intergroup images and intergroup behaviour. *European Journal of Social Psychology*, **2**, 202-204.

Doise, W. & Sinclair, A. 1973 The categorisation process in intergroup relations. *European Journal of Social Psychology*, **3**, 145-157.

Eiser, J. R. 1971 Enhancement of contrast in the absolute judgement of attitude statements. *Journal of Personality and Social Psychology*, **17**, 1-10.

Eiser, J. R. & Stroebe, W. 1972 *Categorization and social judgement.* London: Academic Press.

Farsides, T. 1993 Social identity theory — a foundation to build upon, not undermine. *Theory & Psychology*, **3**, 207-215.

Fazio, R. H., Sanbonmatsu, D. M., Powell, M. C. & Kardes, F. R. 1986 On the automatic activation of attitudes. *Journal of Personality and Social Psychology*, **50**, 229-238.

Fenigstein, A., Scheier, M. F. & Buss, A. H. 1975 Public and private self-consciousness: assessment and theory. *Journal of Consulting and Clinical Psychology*, **43**, 522-527.

Festinger, L. & Maccoby, N. 1964 On resistance to persuasive communications. *Journal of Abnormal and Social Psychology*, **68**, 359-366.

Fiske, S. J. & Neuberg, S. L. 1990 A continuum of impression formation, from category-based to individuating processes: influences of information and motivation on attention and interpretation. In M. P. Zanna (ed.) *Advances in Experimental Social Psychology*. Vol. 23. New York: Academic Press.

Fiske, S. J., Neuberg, S. L., Beattie, A. E. & Milberg, S. J. 1987 Category-based and attribute-based reactions to others: some informational conditions of stereotyping and individuating processes. *Journal of Experimental Social Psychology*, **23**, 399-427.

Fiske, S. J. & Taylor, S. E. 1984 *Social cognition*. New York: Random House.

Gagnon, A. & Bourhis, R. 1992 Discrimination in the minimal group paradigm: self interest or social identity? Paper presented at the 53rd Annual Convention of the Canadian Psychological Association.

Gerald, H. & Hoyt, F. M. 1974 Distinctiveness of social categorization and attitude toward ingroup members. *Journal of Personality and Social Psychology*, **29**, 836-842.

Gilbert, D. T. 1989 Thinking lightly about others: automatic components of the social inference process. In J. S. Uleman & J. A. Bargh (eds.) *Unintended thought*. New York: Guilford Press.

Gilbert, D. T. & Hixon, J. G. 1991 The trouble of thinking: activation and application of stereotypic beliefs. *Journal of Personality and Social Psychology*, **60**, 509-517.

Gilbert, D. T. & Krull, D. S. 1988 Seeing less and knowing more: the benefits of perceptual ignorance. *Journal of Personality and Social Psychology*, **54**, 193-202.

Gilbert, D. T., Pelham, B. W. & Krull, D. S. 1988 On cognitive busyness: when person perceivers meet persons perceived. *Journal of Personality and Social Psychology*, **54**, 733-740.

Gilbert, D. T. & Osborne, R. E. 1989 Thinking backward: some curable and incurable consequences of cognitive busyness. *Journal of Personality and Social Psychology*, **57**, 940-949.

Hagendoorn, L. & Henke, R. 1991 The effect of multiple category memebership on intergroup eveluation in a north Indian context: class, caste and religion. *British Journal of Social Psychology*, **30**, 247-260.

Hamilton, D. L. 1981 Stereotyping and intergroup behavior: some thoughts on the cognitive approach. In D. L. Hamilton (ed.) *Cognitive process in stereotyping and intergroep behavior*. Hilsdale, NJ: Lawrence Erlbaum Associates.

Hamilton, D. L. & Rose, T. L. 1980 Illusory correlation and the maintenance of stereotypic beliefs. *Journal of Personality and Social Psychology*, **39**, 832-845.

Hamilton, D. L. & Gifford, R. K. 1976 Illusory correlation in interpersonal perception: a cognitive bias of stereotypic judgements. *Journal of Experimental Social Psychology*, **12**, 392-407.

Harkins, S. G. & Petty, R. E. 1981 The multiple source effect in persuasion: the effects of distraction. *Personality and Social Psychology Bulletin*, **7**, 627-635.

Hayashi, C. 1988 *Measuring Japanese mind*. Tokyo: Asahi Shinbun-sha. (in Japanese)

Heider, F. 1958 The psychology of interpersonal relations. New York: John Wiley & Sons.

Hewstone, M., Islam, M. R. & Judd, C. M. 1993 Models of crossed categorization and intergroup relations. *Journal of Personality and Social Psychology*, **64**, 779-793.

Higgins, E. T., Bargh, J. A. & Lombardi, W. 1985 Nature of priming effects on categorization. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, **11**, 59-69.

Hinkle, S. & Brown, R. J. 1990 Intergroup comparisons and social identity: some links and lacunae. In D. Abrams & M. A. Hogg (eds.) *Social identity theory: constructive and critical advances*. Hemel Hempstead, Hertfordshire: Harvester Wheatsheaf.

Hirose, Y. & Okuda, T. 1992 The effects of upward mobility and power differentials on ingroup favouritism in a simulated society. Paper presented at the 25th International Congress of Psychology, Brussels.

Hogg, M. A. & Abrams, D. 1988 *Social identifications: a social psychology of intergroup relations and group processes*. London: Routledge.

Hogg, M. A. & Turner, J. C. 1987 Intergroup behaviour, self-stereotyping and the salience of social categories. *British Journal of Social Psychology*, **26**, 325-340.

Hong, O. P. & Harrod, W. J. 1988 The role of reasons in the ingroup bias phenomenon. *European Journal of Social Psychology*, **18**, 537-545.

Horwitz, M. & Rabbie, J. M. 1982 Individuality and membership in the intergroup system. In H. Tajfel (ed.) *Social identity and intergroup relations*. Cambridge: Cambridge University Press.

Howard, J. & Rothbart, M. 1980 Social categorization and memory for ingroup and outgroup behaviour. *Journal of Personality and Social Psychology*, **38**, 301-310.

Hyland, M. 1979 Comment on Branthwaite *et al.*'s mathematical model of intergroup conflict. *European Journal of Social Psychology*, **9**, 417-428.

Insko, C. A., Hoyle, R. H., Pinkley, R. L., Hong, G., & Slim, R. M. 1988 Individual-group discontinuity:the role of a consensus rule. *Journal of Experimental Social Psychology*, **24**, 505-519.

Jahoda, M. 1986 Small selves in small groups. *British Journal of Social Psychology*, **25**, 253-254.

Judd, C. M., Ryan, C. S. & Park, B. 1991 Accuracy in the judgement of in-group and out-group variability. *Journal of Personality and Social Psychology*, **61**, 366-379.

Judd, C. M. & Park, B. 1988 Out-group homogeneity: judgements of variability at the individual and group levels. *Journal of Personality and Social Psychology*, **54**, 778-788.

Judd, C. M. & Park, B. 1993 Definition and assessment of accuracy in social stereotypes. *Psychological Review*, **100**, 109-128.

Kakimoto, T. 1989 Individual differences in the effect of social categorization. Proceedings of the 37th Annual Convention at the Japanese Group Dynamics Association. (in Japanese)

Karasawa, M. 1988 Effects of cohesiveness and inferiority upon ingroup favoritism. *Japanese Psychological Research*, **30**, 49-59.

Karasawa, M. 1991 Towards assesment of social identity: the structure of group identification and its effects on in-group evaluations. *British Journal of Social Psychology*, **30**, 49-59.

Katz, P. A. & Taylor, D. A. (eds.) 1988 *Eliminating racism: a profile in controversy*. London: Plenum Press.

Kelly, C. 1989 Political identity and perceived intragroup homogeneity. *British Journal of Social Psychology*, **28**, 239-250.

Kogawa, M., Fujihara, T., Inoue, W., Ishii, S. & Fukuda, H. 1983 A microgenetic developmental-study of interpersonal cognition during transition to a new environment. *Japanese Journal of Psychology*, **53**, 330-336. (in Japanese)

LaBerge, D. 1981 Unitization and automaticity in perception. In J. H. Flowers (ed.) *Nebraska Symposium on Motivation, 1980. Cognitive process.* Lincoln: University of Nebraska Press. (pp. 53-72).

Langer, E. J. & Abelson, R. P. 1972 The semantics of asking a favor: how to succeed in getting help without really dying. *Journal of Personality and Social Psychology*, **24**, 26-32.

Le Bon, G. 1982 The crowd: a study of the popular mind. Atlanta, Georgia: Cherokee Publishing Company (original work published in 1896).

Lemyre, L. & Smith, P. M. 1985 Intergroup discrimination and self-esteem in the minimal group paradigm. *Journal of Personality and Social Psychology*, **49**, 660-670.

Leyens, J -P. & Codol, J -P. 1988 Social cognition. In M. Hewstone *et al.* (eds.) *Introduction to social psychology*. Oxford: Blackwell.

Liebrand, W. B. G., Jansen, R. W. T. L., Rijken, V. M., & Suhre, C. J. M. 1989 Might over morality: social values and the perception of other players in experimental games. *Journal of Experimental Social Psychology*, **22**, 203-215.

Linville, P. W., Fischer, G. W. & Salovey, P. 1989 Perceived distributions of the characteristics of ingroup and outgroup members: empirical evidence and a computer simulation. *Journal of Personality and Social Psychology*, **57**, 165-188.

Luhtanen, R. & Crocker, J. 1991 Self-esteem and intergroup comparisons: toward a theory of collective self-esteem. In J. Suls & T. A. Wills (eds.) *Social comparison: contemporary theory and research*. Hillsdale, NJ: Lawrence Erlbaum Associates.

McClintock, C. G. & Van Avermaet, E. 1982 Social values and rules of fairness: a theoretical perspective. In V. J. Derlega & J. Grzelak (eds.) *Cooperation and helping behavior: theories and research*. New York: Academic Press. (Pp. 43-71).

McGarty, C. & Penny, R. E. C. 1988 Categorization, accentuation and social judgement. *British Journal of Social Psychology*, **26**, 325-340.

McGuire, W. J., McGuire, C. V., Child, P. & Fujioka, T. 1978 Salience of ethnicity in the spontaneous self-concept as a function of one's ethinic distinctiveness in the social environment. *Journal of Personality and Social Psychology*, **36**, 511-520.

Mackie, D. M., Worth, L. T. & Asuncion, A. G. 1990 Processing of persuasive in-group messages. *Journal of Personality and Social Psychology*, **58**, 812-822.

Macrae, C. N. & Shepherd, J. W. 1991 Categorical effects on attributional inferences: a response-time analysis. *British Journal of Social Psychology*, **30**, 235-245.

Markus, H. R. & Kitayama, S. 1991 Culture and the self: implications for cognition, emotion, and motivation. *Psychological Review*, **98**, 224-253.

Markus, H. & Zajonc, R. B. 1985 The cognitive perspective in social psychology. In G. Lindzey & E. Aronson (eds.) *The handbook of social psychology*, 3rd edn. Vol. I. New York: Ramdom House. (pp.137-230).

Martin, L. L., Seta, J. J. & Crelia, R. A. 1990 Assimilation and contrast as a function of people's willingness and ability to expend effort in forming an impression. *Journal of Personality and Social Psychology*, **59**, 27-37.

Messick, D. M. & Mackie, D. M. 1989 Intergroup relations. *Annual Review of Psychology*, **40**, 45-81.

Mummendey, A. & Schreiber, H. J. 1984 Different just means better: some obvious and some hidden pathways to in-group favouritism. *British Journal of Social Psychology*, **23**, 363-368.

Mullen, B. 1987 Self-attention theory: the effects of group composition on the individual. in: B. Mullen & G. R. Goethals (eds.) *Theories of group behaviour*. New York: Springer-Verlag.

Mullen, B., Brown, R. & Smith, C. 1992 Intergroup bias as a function of salience, relevance, and status: an integration. *European Journal of Social Psychology*, **22**, 103-122.

Murry, N. Sujan, H., Hirt, E. R. & Sujan, M. 1990 The influence of mood on categorization: a cognitive flexibility interpretation. *Journal of Personality and Social Psychology*, **59**, 411-425.

Neumann, O. 1984 Automatic processing: a review of recent findings and a plea for an old theory. In W. Prinz & A. F. Sanders (eds.) *Cognition and motor processes*. New York: Springer-Verlag.

Ng, S. H. 1981 Equity theory and the allocation of rewards between groups. *European Journal of Social Psychology*, **11**, 439-443.

Ng, S. H. 1985 Biases in reward allocation resulting from personal status, group status, and allocation procedure. *Australian Journal of Psychology*, **37**, 289-296.

Ng, S. H. 1986 Equity, intergroup bias and interpersonal bias in reward allocation. *European Journal of Social Psychology*, **16**, 239-255.

Oakes, P. J. 1987 The salience of social categories. In J. C. Turner *et al. Rediscovering the social group: a self-categorization theory.* Oxford:Basil Blackwell.

Oakes, P. and Turner, J. C. 1986 Distinctiveness and the salience of social category memberships: is there an automatic perceptual bias bias towards novelty? *European Journal of Social Psychology*, **16**, 325-344.

Oakes, P. & Turner, J. C. 1990 Is limited information processing capacity the cause of social stereotyping? In W. Stroebe & M. Hewstone (eds.) *European Review of Social Psychology*. Vol. 1. Chichester, West Sussex: John Wiley & Sons.

Pavelchak, M. A. 1989 Piecemeal and category-based evaluation: an idiographic analysis. *Journal of Personality and Social Psychology*, **56**, 354-363.

Petty, R. E. & Brock, T. C. 1981 Thought distruption and persuasion: assessing the validity of attitude change experiments. In R. E. Petty, T. M. Ostrom, & T. C. Brock (eds.) *Cognitive responses in persuasion.* Hillsdale, NJ: Lawrence Erlbaum Associates.

Pettigrew,T. F. 1978 The ultimate attribution error: extending Allport's cognitive analysis of prejudice. *Personality and Social Psychology Bulletin*, **5**, 461-476.

Perdue, C. W., Dovidio, J. F., Gurtman, M.B., & Tyler, R. B. 1990 Us and them: social categorization and the process of intergroup bias. *Journal of Personality and Social Psychology*, **59**, 475-486.

Platow, M. J., McClintock, C. G. & Liebrand, W. B. 1990 Predicting intergroup fairness and ingroup bias in the minimal group paradigm. *European Journal of Social Psychology*, **20**, 221-239.

Prentice-Dunn, S. & Rogers, R. W. 1989 Deindividuation and the self-regulation of behaviour. In P. B. Paulus (ed.) *Psychology of group influence*. Lawrence Hillsdade, NJ: Lawrence Erlbaum Associates.

Quattrone, G. A. 1982 Overattribution and unit formation: when behavior engulfs the person. *Journal of Personality and Social Personality*, **42**, 593-607.

Rabbie, J. M., Benoist, F., Oosterbaan, H. & Visser, L. 1974 Differential power and effects of expected competitive and cooperative intergroup interaction on intragroup and outgroup attitudes. *Journal of Personality and Social Personality*, **30**, 46-56.

Rabbie, J. M. & Horwitz, M. 1969 Arousal of ingroup-outgroup bias by a chance win or loss. *Journal of Personality and Social Psychology*, **13**, 269-277.

Rabbie, J. M., Schot, J. C. & Visser, L. 1989 Social identity theory: a conceptual and empirical critique from the perspective of a behavioral interaction model. *European Journal of Social Psychology*, **19**, 171-202.

Reicher, S. D. 1984a The St. Pauls' riot: an explanation of the limits of crowd action in terms of a social identity model. *European Journal of Social Psychology*, **14**, 1-21.

Reicher, S. D. 1984b Social influence in the crowd: attitudinal and behavioural effects of de-individuation in conditions of high and low group salience. *British Journal of Social Psychology*, **23**, 341-350.

Romer, D. 1979 Distraction, counterarguing, and the internalization of attitude change. *European Journal of Social Psychology*, **9**, 1-18.

Ross, L. 1977 The intuitive psychologist and his shortcomings: distortions in the attribution process. In. L. Berkowits (ed.) *Advances in Experimental Social Psychology*. Vol. 10. New York: Academic Press.

Rothbart, M., Fulero, S., Jensen, C., Howard, J., & Birrell, P. 1978 From individual to group impressions: availability heuristics in stereotype formation. *Journal of Personality and Social Psychology*, **14**, 237-255.

Sachdev, I. & Bourhis, R. Y. 1985 Social categorization and power differentials in group relations. *European Journal of Social Psychology*, **15**, 415-434.

Sachdev, I. & Bourhis, R. Y. 1987 Status differentials and intergroup behaviour. *European Journal of Social Psychology*, **17**, 277-293.

Sachdev, I. & Bourhis, R. Y. 1991 Power and status differentials in minority and majority group relations. *European Journal of Social Psychology*, **21**, 1-24.

St Claire, R. N. & Turner, J. C. 1982 The role of demand characteristics in the social categorization paradigm. *European Journal of Social Psychology*, **12**, 307-314.

Sanders, G. S. 1984 Self-presentation and drive in social facilitation. *Journal of Experimental Social Psychology*, **20**, 312-322.

Sanders, G. S. & Baron, R. S. 1975 The motivating effects of distraction on task performance. *Journal of Personality and Social Psychology*, **32**, 956-963.

Sanders, G. S., Baron, R. S. & Moore, D. L. 1978 Distraction and social comparison as mediators of social facilitation effects. *Journal of Experimental Social Psychology*, **14**, 291-303.

Schaller, M. 1991 Social categorization and the formation of group stereotypes: further evidence for biased information processing in the perception of group-behavior correlations. *European Journal of Social Psychology*, **21**, 25-35.

Schaller, M. & Maass, A. 1989 Illusory correlation and social categorization: toward an integration of motivational and cognitive factors in stereotype formation. *Journal of Personality and Social Psychology*, **56**, 709-721.

Sears, D. O., Peplau, L. A., Freedman, J. L. & Taylor, S. E. 1988 *Social Psychology 6th ed.* Englewood Cliffs, New Jersey: Prentice-Hall.

Sherif, M. 1962 *Intergroup relations and leadership.* New York: John Wiley & Sons.

Sherif, M. 1966 *In common predicament: social psychology of intergroup conflict and cooperation*. New York: Houghton Mifflin.

Sherman, S. J., Judd, C. M. & Park, B. 1989 Social cognition. *Annumal Review of Psychology*, **40**, 281-326.

Shiffrin, R. M. 1988 Attention. In R. C. Atkinson, R. J. Herrnstein, G. Lindzey & R. D. Luce (eds.) *Stevens' handbook of experimental psychology*. Vol. 2. New York: John Wiley & Sons. (pp. 739-811).

Sigger, J. 1992 Which "self-esteem"? Social identity theory, self esteem and evaluative biases. Paper presented at the Joint Meeting of the European Association of Experimental Social Psychology & Society for Experimental Social Psychology, Leuven/Louvain-la-Neuve, Belgium.

Silverman, I. & Regula, C. 1968 Evaluation apprehension, demand characteristics, and the effects of distraction on persuasibility. *Journal of Social Psychology*, **75**, 273-281.

Simon, B. & Brown, R. 1987 Perceived intragroup homogeneity in minority-majority contexts. *Journal of Personality and Social Psychology*, **53**, 703-711.

Simon, B. & Mummendey, A. 1990 Perceptions of relative group size and group homogeneity: we are the majority and they are all the same. *European Journal of Social Psychology*, **20**, 351-356.

Simon, B. & Pettigrew, T. F. 1990 Social identity and perceived group homogeneity: evidence for the ingroup homogeneity effect. *European Journal of Social Psychology*, **20**, 269-286.

Spears, R., Lea, M.. & Lee, S. 1990 De-individuation and group polarization in computer-mediated communication. *British Journal of Social Psychology*, **29**, 121-134.

Spivey, C. B. & Prentice-Dunn, S. 1990 Assessing the directionality of de-individuation, modeling, and private self-consciousness on aggressive and prosocial responses. *Basic and Applied Social Psychology*, **11**, 387-403.

Srull, T. K. & Wyer, R. S. 1980 Category accesibility and social perception: some implications for the study of person memory and interpersonal judgments. *Journal of Experimental Social Psychology*, **38**, 841-856.

Stangor, C. & Duan, C. D. 1991 Effects of multiple task demands upon memory for information about social groups. *Journal of Experimental Social Psychology*.

Stangor, C. & Ford, T. E. 1992 Accuracy versus expectancy-confirming processing orientations: influences on development and maintenance of social stereotypes. In W. Stroebe & M. Hewstone (eds.) *European Review of Social Psych*ology. Vol. 3. Chichester, West Sussex: John Wiley & Sons.

Stephan, W. G. 1985 Intergroup relations. In G. Lindzey & E. Aronson (eds.) *The handbook of social psychology*. 3rd edn. Vol. II. New York: Ramdom House. (pp.599-658).

Stephan, W. G. & Stephan, C. W. Intergroup anxiety. *Journal of Social Issues*, **41**(3), 157-175.

Swann, W. B., Jr. Hixon, J. G., Stein-Seroussi, A. & Gilbert, D. T. 1990 The fleeting gleam of praise: psychological processes underlying reactions to self-relevant information. *Journal of Personality and Social Psych*ology, **59**, 17-26.

Tajfel, H. 1959 Quantitative judgement in social perception. *British Journal of Psychology*, **50**, 16-29.

Tajfel, H. 1969 Social and cultural factors in perception. In G. Lindzey & E. Aronson (eds.) *Handbood of Social Psychology*. 2nd ed. Vol. III. New York: Random House. (pp315-394).

Tajfel, H. 1970 Experiments in intergroup discrimination. *Scientific American*, **223**, 96-102.

Tajfel, H. 1978 The achievement of group differentiation. In H. Tajfel (ed.) *Differentiation between social groups*. New York: Academic Press. (pp.77-98)

Tajfel, H. 1981 *Human groups and social categories: studies in the social psychology*. Cambridge: Cambridge University Press.

Tajfel, H. 1982 Social psychology of intergroup relations. *Annumal review of Psychology*, **33**, 1-39.

Tajfel, H., Flament, C., Billig, M. & Bundy, R. 1971 Social categorization and intergroup behaviour. *European Journal of Social Psychology*, **1**, 149-177.

Tajfel, H., Sheikh, A. A. & Gardner, R. C. 1964 Content of stereotypes and the inference of similarity between members of stereotyped groups. *Acta Psychologica*, **22**, 191-201.

Tajfel, H. & Wilkes, A. L. 1963 Classification and quantitative judgement. *British Journal of Psychology*, **54**, 101-114.

Tajfel, H. & Turner, J. C. 1979 An integrative theory of social conflict. In W. G. Austin & S. Worchel (eds.) *The social psychology of intergroup relations.* Monterey, Calif.: Brooks-Cole.

Taylor, S. E. 1981 A categorization approach to stereotyping. In D. L. Hamilton (ed.) *Cognitive processes in stereotyping and intergroup behaviour*. Hillsdale, NJ: Lawrence Erlbaum Associates.

Tesser, A. 1978 Self-generated attitude change. In L. Berkowitz (ed.) *Advances in experimental social psychology*. Vol.11. London: Academic Press.

Tougas, F. & Veilleux, F. 1988 The influence of identification, collective relative deprivation, and procedure of implementation on women's response to affirmative action: a causal modelling approach. *Canadian Journal of Behavioural Science*, **20**, 15-28.

Trope, Y. 1986 Identification and inferential processes in dispositional attribution. *Psychological Review*, **93**, 239-257.

Turner, J. C. 1980 Fairness or discrimination in intergroup behaviour?: A reply to Branthwaite, Doyle and Lightbrown. *European Journal of Social Psychology*, **10**, 131-147.

Turner, J. C. 1981 The experimental social psychology of intergroup behaviour. In J. C. Turner & H. Giles (eds.) *Intergroup behaviour.* Oxford: Basil Blackwell.

Turner, J. C. 1982 Towards a cognitive redefinition of the social group. In: H. Tajfel (ed.) *Social identity and intergroup relations*. Cambridge: Cambridge Universtiy Press.

Turner, J. C. 1983 Some comments on ... 'the measurement of social orientations in the minimal group paradigm'. *European Journal of Social Psychology*, **13**, 351-367.

Turner, J. C. 1985 Social categorization and the self-concept: a social cognitive theory of group behaviour. In E. Lawler (ed.) *Advances in group processes* Vol. 2. Greenwich, Conn.: JAI Press.

Turner, J. C. & Brown, R. J. 1978 Social status, cognitive alternatives and intergroup relations. In H. Tajfel (ed.) *Differentiation between groups*. London: Academic Press.

Turner, J. C., Brown, R. J. & Tajfel, H. 1979 Social comparison and group interest in ingroup favouritism. *European Journal of Social Psychology*, **9**, 187-204.

Turner, J. C., Hogg, M. A., Oakes, P. J., Reicher, S. D., & Wetherell, M. S. 1987 *Rediscovering the social group: a self-categorization theory*. Oxford & New York: Basil Blackwell.

Turner, J. C., Wetherell, M. S. & Hogg, M. A. 1989 Referent informational influence and group polarization. *British Journal of Social Psychology*, **28**, 135-147.

Uleman, J. S. 1989 A framework for thinking intentionally about unintended thought. In J. S. Uleman & J. A. Bargh (eds.) *Unintended thought*. New York: Guilford Press.

Vallacher, R. R. & Wegner, D. M. 1987 What do people think they're doing? Action identification and human behavior. *Psychological Review*, **94**, 3-15.

Van Avermaet, E. & McClintock, C. G. 1988 Intergroup fairness and bias in children. *European Journal of Social Psychology*, **18**, 407-427.

Vanbeselaere, N. 1987 The effects of dichotomous and crossed social categorizations upon intergroup discrimination. *European Journal of Social Psychology*, **17**, 143-156.

Vanbeselaere, N. 1991 The differential effects of simple and crossed categorizations: a result of the category differentiation process or of differential category salience? In W. Stroebe & M. Hewstone (eds.) *European Review of Social Psychology*. Vol. 2. Chichester, West Sussex: John Wiley & Sons.

Wapner, S. 1978 West Germany. *Hiroshima Forum of Psychology*. cited in Kogawa *et al.* (1983).

Wagner, U. & Schönbach, P. 1984 Links between educational status and prejudice: ethnic attitudes in West Germany. In N. Miller & M. B. Brewer (eds.) *Groups in contact: the psychology of desegregation*. Academic Press: London.

Wickens, C. D. 1980 The structure of attentional resources. In R. S. Nickerson (ed.) *Attention and performance VIII* (pp.239-257). Hilsdale, NJ: Lawrence Erlbaum.

Wickens, C. D. 1984 Processing resources in attention. In R. Parasuraman & R. Davies (eds.) *Varieties of attention*. New York: Academic Press.

Wickens, C. D. 1989 Resource management and time-sharing. In J. I. Elkind, S. K. Card, J. Hochberg & B. M. Huey (eds.) *Human performance models for computer-aided engineering* (pp.180-202). Washington DC: National Academy Press.

Wickens, C. D. & Liu, Y. 1988 Codes and modalities in multiple resources: a success and a qualification. *Human Factors*, **30**, 599-616.

Wicklund, R. A. 1975 Objective self-awareness. In L. Berkowitz (ed.) *Advances in experimental social psychology*. Vol. 8. New York: Academic Press.

Wicklund, R. A. 1980 Group contact and self-focused attention. In P. Paulus (ed.) *Psychology of group influence*. Hillsdale, NJ: Lawrence Erlbaum Associates.

Wilder,D. A. 1986 Social categorization: implications for creation and reduction of intergroup bias. In. L. Berkowits (ed.) *Advances in experimental social psychology*. Vol. 19. New York: Academic Press

Wright, S. C., Taylor, D. M., & Moghaddam, F. M. 1990 Responding to membership in a disadvantaged group: from acceptance to collective protest. *Journal of Personality and Social Psychology*, **58**, 994-1003.

Zajonc, R. B. 1965 Social facilitation. *Science*, **149**, 269-274.

Zimbardo, P. G. 1970 The human choice: individuation, reason, and order versus deindividuation, impulse, and chaos. In W. J. Arnold & D. Levine (eds.) *Nebraska Symposium on Motivation*. Lincoln: University of Nebraska Press.

Zimbardo, P., Snyder, M., Thomas, J., Gold, A. & Gurwitz, S. 1970 Modifying the impact of persuasive communications with external distraction. *Journal of Personality and Social Psychology*, **16**, 669-680.

Appendices

List of Appendices

Appendix for Chapter 1

1.1 Control level and the cognitive and motivational processes 364

1.2 Applications of self-categorisation theory: referent informational influence and self-stereotyping 366

Appendices for Chapter 3

3.1 Instruction to the experimenter and dependent measure booklet for Pilot study 1 (reduced from one-sided A4s) 369

3.2 Further analyses of Pilot study 1 377

3.3 Instructions for each condition for Experiment 1 385

3.4 Poster to explain the division of code numbers according to the groups (original in A1) and an example of the lot for Experiment 1 386

3.5 Explanation sheet for Experiment 1 (original in double-sided A4) 387

3.6 Dependent measure booklet: one of the eight versions for Experiment 1 (reduced from one-sided A4s) 388

3.7 Tajfel matrices used in the studies 395

3.8 Supplementary tables for Experiment 1 400

Appendices for Chapter 4

4.1 Instructions for the strong distraction condition in Experiment 2 404

4.2 A version of the dependent measure booklet for the strong distraction condition in Experiment 2 (reduced from one-sided A4s) 405

4.3 Explanation sheet for the strong distraction condition in Experiment 2 412

4.4 Supplementary tables for Experiment 2 413

Appendices for Chapter 5

5.1 Full descriptions of Pilot study 2 414

5.2 Dependent measure booklets for Pilot study 2: example set, sets 1, 2, 3 & 4 (reduced from one-sided A4s) 433

5.3 Instructions for Pilot study 2 452

5.4 Instructions for Experiment 3 453

5.5 Explanation sheet for Experiment 3 (original in double-sided A4) 454

5.6 A version of the dependent measure booklet for Experiment 3 (reduced from one-sided A4s) 455

5.7 Supplementary results for Experiment 3 464

Appendices for Chapter 6

6.1 Instructions for Experiment 4 468

6.2 Poster for roup division for Experiment 4 (original in A1) 469

6.3 Posters for task examples (in two A1 sheets) and the explanation sheet (original in double-sided A4) for Experiment 4 470

6.4 Rehearsal numbers for Experiment 4 471

6.5 The dependent measure booklet for Experiment 4 (reduced from one-sided A4s) 472

6.6 Supplementary tables for Experiment 4 481

6.7 Correlational analyses of colour band scales (Experiment 4) 486

6.8 Analyses involving time (Experiment 4) 487

6.9 An alternative analysis of the noise hypothesis 490

Appendices for Chapter 7

7.1 The dependent measure booklet for Pilot study 3 (reduced from one-sided A4s) 492

7.2 The explanation sheet for Pilot study 3 (original in double-sided A4) 506

7.3 Supplementary tables for Pilot study 3 507

7.4 Examination of the relationship between the social identity and the category differentiation processes: with different allocation indices 516

Appendices for Chapter 8

8.1 Instructions for Experiment 5 517

8.2 The dependent measure booklet for Experiment 5 (reduced from one-sided A4s) 518

8.3 The explanation sheet for Experiment 5 (original in double-sided A4) 528

8.4 Rehearsal numbers for Experiment 5 529

8.5 Supplementary tables for Experiment 5 530

Appendices for Chapter 9

9.1 Decomposed games sheet 538

9.2 Supplementary tables for Experiment 6 539

9.3 Analyses including eight subjects who completed social value orientation measures after the minimal group experiment 544

9.4 Correlational analyses on social value orientations and intergroup biases 546

9.5 Correspondence between self-reported and actual point allocation strategies 548

Appendices for Chapter 10

10.1 Factor analyses of different ingroup bias and category differentiation measures 549

Appendix 1.1

Control level and the cognitive and the motivational processes

Carver & Scheier's (1981) theory of behavioural self-regulation assumes "that the behaving person's attention is directed largely to the Programme level during most behavioural self-regulation" (1981, pp. 136-137), and that efficacy of a behaviour control system needs either automaticity of the lower-level system or divided attention to the lower-level system as well as the higher one.

Vallacher & Wegner (1987), in the meantime, assert that attention tends to be devoted to as high level as one can afford. In other words, attention is paid to a lower level only when it is difficult (e.g. stepping on the safer route while crossing a dangerous bridge).

From these assumptions, the best way to conceptualize the two processes of ingroup bias is to conceive the cognitive and the motivational processes as being responsible to separate actions (see Fig. A1.1). Action B, corresponding to the motivational process, is to maintain/enhance group self-esteem. This is at the Principle level. Meanwhile, Action A (to see the world clearly) corresponding to the cognitive process can be conceived of at the relationship level of behavioural control.

In this model, Action A is thought to be rather automatic because it is at a lower level, while Action B needs attention at higher levels. Introducing Vallacher & Wegner's argument, in the situations where effective conduct at Principle & Programme levels are difficult, attention goes down to lower levels. So, action B may not be achieved properly while action A is intact. Distraction is thought to produce this difficult situation.

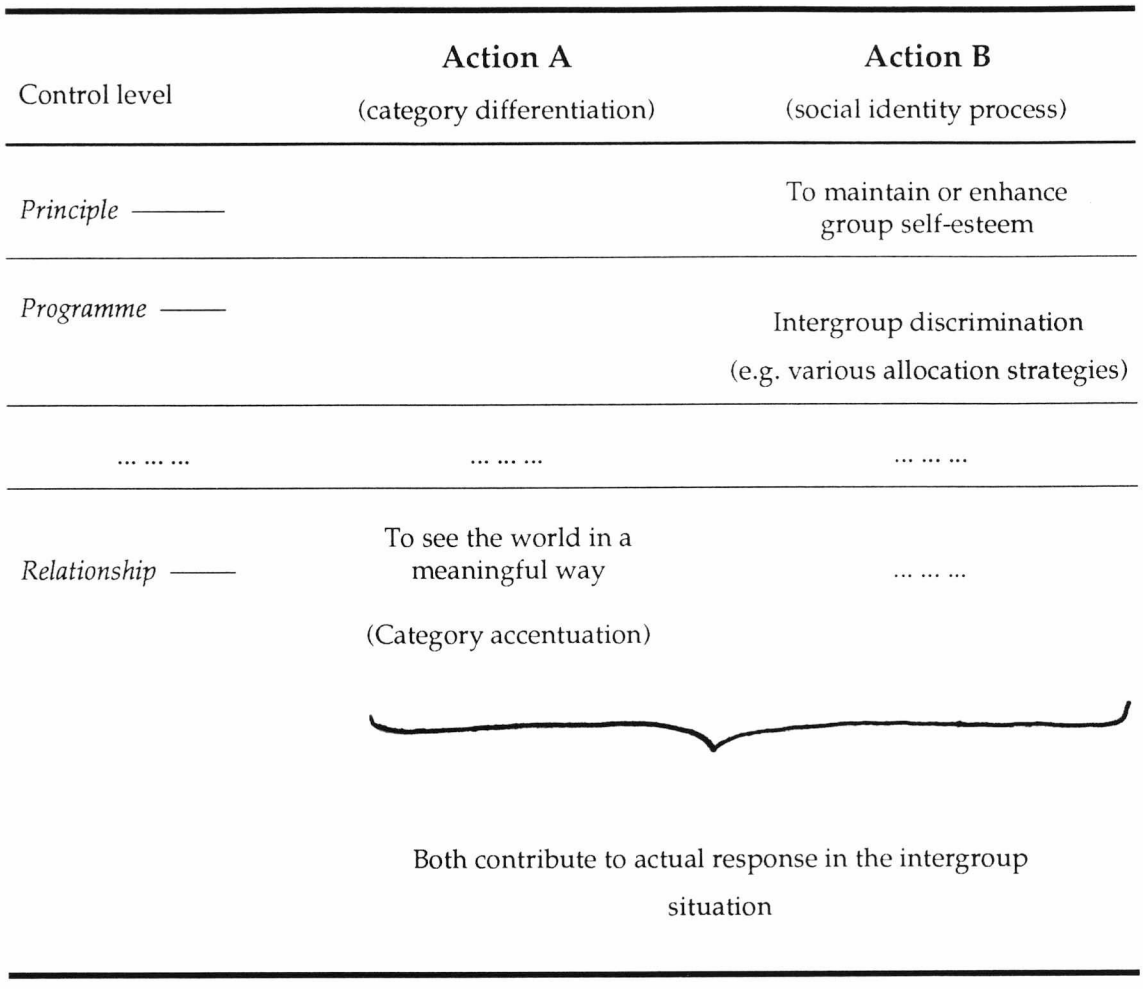


Fig. A1.1 Level of behavioural control and the cognitive and motivational processes in intergroup biases

Appendix 1.2

Applications of self-categorisation theory: referent informational influence and self-stereotyping

Referent informational influence As an application of self-categorisation theory, the idea of referent informational influence was proposed (Turner, 1982; Turner *et al.*, 1987, p. 72; also Turner, Wetherell & Hogg, 1989). Social influence is exerted by members of one's own group due to one's perception that they share the same characteristics and reactions as oneself. Informational influence refers to a type of influence derived from taking others' responses as an objective informational source, whereas normative influence refers to influence due to taking others' responses as a normative source (social pressure). The concept of referent informational influence contains both informational and social elements: informational because other similar people's responses are informative; social because this information comes from members of one's own group. Empirical support for the notion of referent informational influence was obtained, for instance, in the studies by Abrams, Wetherell, Cochrane, Hogg & Turner (1990). They demonstrated that information from others had more influence a) as the group membership shared with others became salient (Exp. 1: Sherif's autokinetic effect paradigm), and b) when judgements from the ingroup were made publicly, rather than privately (Exp. 2: Ash's conformity paradigm); and c) that convergence of subjects' opinions after discussion was less when the source of influence belonged to an outgroup (Exp. 3: group polarisation paradigm). All these results show the importance of the source of influence; they demonstrate that social influence at least partly depends on whether the information source is ingroup or outgroup.

Self-stereotyping It could be said that the central tenet of self-categorisation theory is that when one self-categorises as a group member,

one perceives oneself as such, and behaves more in a manner stereotypic of the group than in an idiosyncratic manner. A central issue, therefore, is whether or not social categorisation really induces self-stereotyping as a group member, which leads to group behaviour.

Support was obtained by Hogg & Turner (1987) who used subjects' sex as the focal category, and manipulated salience by changing the encounter constitution of category memberships. In the high salience condition, where two male subjects and two female subjects formed a discussion group, both males and females rated themselves more self-stereotypic compared with subjects in the low salience condition, where a single sex dyad formed a discussion group.

A related and rather confusing issue in self-stereotyping concerns group homogeneity effects. Whereas the ingroup homogeneity effect seems to be an idea unique to intergroup relations research, the outgroup homogeneity effect has been studied also in social stereotypes research. The outgroup homogeneity effect refers to the tendency "to perceive out-group members as being more homogeneous in their characteristics than in-group members." (Linville, Fischer & Salovey, 1989, p. 166). Three overlapping explanations of this effect have been put forward: differential familiarity, differential information organisation, and greater incentives for ingroup variability (*ibid.*, p. 166).[1] Meanwhile, the ingroup homogeneity effect — the reversal of the outgroup homogeneity effect — was also obtained mainly for minority group members (Bartsch & Judd, 1993; Simon & Brown, 1987; Simon & Mummendey, 1990; Simon & Pettigrew, 1990). Simon & Brown (1987) ascribed this ingroup homogeneity effect to consequences of social identity. To paraphrase them, ingroup homogeneity is understood as a form of ingroup enhancement under a threat to minority status; a homogenous group

[1] Assertion of individuality and justification of intergroup discrimination were also suggested as reasons (see Simon & Pettigrew, 1990).

is thought to be better. While the ingroup homogeneity effect seems to appear only among minority group members, it is complicated by Simon & Mummendey's (1990) suggestion that the ingroup homogeneity effect may also arise among members in an equal number group under certain circumstances. Clearly, more research is needed into these homogeneity effects. In any case, both effects deal with *relative* homogeneity between ingroup and outgroup. On the other hand, what self-stereotyping would imply is homogeneity *within* a group, independent of relative homogeneity between the groups (see Kelly, 1989). In other words, this is more related to the intra-class similarity effect of categorisation. Because of the two relative homogeneity effects, however, examination of intra-group homogeneity would need careful consideration to disentangle these different effects. In this connection, it is desirable that group homogeneity as a result of self-stereotyping will be studied in a wider context of accuracy of ingroup and outgroup variability judgements (Judd, Ryan & Park, 1991), and more generally, of stereotype accuracy (Judd & Park, 1993).

「　」は生徒への説明例

社会的アイデンティティ調査　進行表

柿本敏克

調査の区分

最初の２クラスには、グループ名も書いてある「くじ」を用いる。そのうちの１クラスでは、生徒に筆配具を持って左右に移動させ、グループごとに座らせる。これでグループ意識が強くなると予想される。もう一つのクラスでは、移動させず、その席のままで回答させる。

もしできるようなら、追加のクラスでは、「くじ」は番号のみが書いてあるものを使う。アンケート用紙もそれに応じて、グループ欄がアンケート上部にないものとなる。また、生徒に席を移動はさせない。（グループがないから当然なのだが。）

生徒に対する一般的注意

ア　社会心理学の重要な研究であることを述べる。
イ　「回答中は私語をしない。質問があるときには手を挙げて直接に実験者に聞く。お互いに話をしない。くじのグループ・番号は秘密にしておく」
ウ　「回答後も他の人の迷惑にならないように、静かにしている。」

用いる材料

ア　くじ　a.グループ（赤組か白組か）と番号　：最初の２クラス
　　b.番号のみ　：追加の２クラス　イ　箱　　くじが入れてある
ウ　封筒　　くじを見た後、これにいれる。
エ　黒板とチョーク
オ　アンケート用紙　４種類　＋　2種類（番号のみ）
　A1.　斜字体あり・分配表が先　　B5 斜字体あり
　A2.　斜字体あり・第一印象評定が先　　B6 斜字体なし
　A3.　斜字体なし・分配表が先
　A4.　斜字体なし・第一印象評定が先

調査の流れ

Ⅰ.調査目的の説明と一般的注意

「社会心理学の重要な問題である、意思決定について調査する。意思決定というのはさまざまな場面でおこなわれているが、それがどのようにされているのかを調べる。匿名性（個人の秘密を守るため）と調査の都合で、皆さんには最初にくじを引いてもらうが、その内容は黙って読み誰にもいわないように」

「回答中は私語をせず、質問があるときは手を挙げて直接に実験者にきくこと。」

「回答後も他の人の迷惑にならないように、静かにしている。」

Ⅱ.アンケート用紙の配布

「指示があるまで表紙をめくらないこと」
＊列ごとに前から流していってもよい

Ⅲ.くじの実施

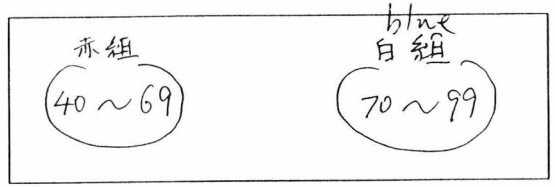
「調査の都合で、皆さんにはくじを引いてもらい、（グループと）番号を割り当てます。それをそれぞれ、これから配るアンケート用紙の各ページに書いてもらいます。」（括弧内は最初の２クラスのみ）

「箱の中から一人一つづつくじを引いて下さい。引いたくじにかいてある（グループと）番号は誰にもいってはいけません。見たらすぐ、封筒の中にいれて下さい。後で回収します。（グループ名と）番号は、忘れないように表紙のどこかにメモしておくといいでしょう。」

Ⅳ.グループ分け（グループ条件、つまり最初の２クラスのみ。追加クラスでは飛ばしてⅤへ）

ここで黒板を使ってグループ名と番号の対応を説明する。

「４０番から６９番までの人は赤組、７０番から９９番までの人は白組です。」といいつつ、黒板の左右に次のように書く



「移動させるクラス」では、ここで黒板の図に応じて左右に移動させる。

Ⅴ.アンケートの解説

アンケートには用いる材料オで示したように何種類かあって、回答の順番が違っているもの、別の課題がつけ加わっているものがある。しかしすべてに共通して次の２点は最初に説明して下さい。そのほかの質問に関しては、意味を説明するのはいいですが、どれがいいかという判断は教えないで下さい。

見返していいかという質問には、「今の感じで答えなさい。先のと矛盾してもいい」と答えて下さい。前から順番に答えていかせて下さい。

１.分配課題

$\frac{12}{11}$　$\frac{13}{10}$　$\frac{15}{9}$　……

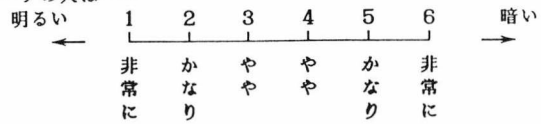
というのを含んだものを、例（アンケートによって１ページにあるのと３ページにあるのとがある）を見させながらどう回答したらいいかというやり方を説明する。説明文を読んでやってもいいでしょう。「正しい答というのはないから、気楽に答えるように。」といって下さい。

実際のくじは
赤20こ　白20こ　[illegible]

斜字体を与す課題がはいているアンケートもあるが ~~質問が出た~~

2.印象評定課題

(例) このグループの人は……



この例（1ページか8ページ）をみさせながら、「右の6が一番暗いと感じるとき、左の1が一番明るいと感じるときに○印をつける。真ん中あたりの3は、よくわからないがちょっと明るいと感じるとき、4はあまりよくわからないがすこしは暗いと感じるときに○印をつける。」というようなことを説明してやって下さい。

これに関しては、あまり考え込まずに、パット思った通りに答えるようにも指導して下さい。これも、「正しい答というのはないのだから、気楽に答えるように。」といってやって下さい。

VI.アンケート・封筒の回収

アンケートと封筒を回収して下さい。後ろから前に回させてもかまいません。
回収したアンケートは、どのクラスのかがわかるようにしておいて下さい。

最後に、他のクラスの生徒に何をやったかを話さないように注意して下さい。生徒にはできるだけ同じ条件で回答してほしいのです。

アンケート用紙・封筒などの処理

最初の2クラスが完了した時点で、その分を取りに参りますので、柿本まで連絡下さい。それまで安全に保管しておいて下さい。残りのクラスで調査ができましたら、また連絡下さい。
なお、次のところが阪大での窓口です。何かありましたら、自宅以外に、こちらにもご連絡下さい。

〒565　吹田市山田丘1-2
大阪大学人間科学部　社会心理学研究室
大学院生
合田美加
tel　(06)877-5111　内線6339　助手室で呼出

意思決定に関するアンケート

私たちは普段から、さまざまな事柄についての意思決定をしなければなりません。自分が次に何をどのようにするか、人をどう判断・評価するかといったことから、もっと抽象的な数学的課題といったものまで、さまざまです。このアンケートでは皆さんのそういった意思決定が、どのようにされているのかということを調べることが目的です。

次のページ以降、いくつかの意思決定課題があります。あまり考え込まず、思った通りに回答してください。資料集計の都合上、すべての質問に答えていただけるようお願いします。では、下の注意事項を読んだ上でアンケートに答えていって下さい。

回答上の注意

各ページの上部には、あなたのグループ名と番号を書いていただく欄があります。集計の都合上必要ですので、それぞれのページの質問を読む前に、忘れずにこれに記入してください。

なおこの調査では、文章理解のスピードと注意力を測ることも目的としています。質問文と回答欄の両方に*斜字体*で書かれた部分があります。それぞれの質問に回答するなかで*斜字体*の文字に出くわしたときに、その文字を回答欄の右側の欄外に記入していってください。その際、斜字体だけ先にあるいは後で書き出すのではなく、あくまでも回答していくのと同時に書き出していって下さい。

大阪大学・ケント大学 大学院生

柿本 敏克

敏克 コード表

グループ名 あなたの番号

赤 1
白 2
無 3

斜字体

I. 賞金の分配

まず最初に、賞金の分配についての意思決定をしてもらいます。仮にあなたがクラスの中のそれぞれのグループの人にたいして賞金を分配することができると考えてください。なお、これは他の人に対する分配であって、自分に対する賞金ではありません。

下の例を見て下さい。左上にはあなたが分配するふたりの人のグループ名と番号が、その右には賞金の分配額の組み合わせが示されています。分数の形をしたもののうち、上段の数が上の人（赤組３７番）、下段の数が下の人（白組２５番）に対する分配額です。

例

それぞれのグループの人に対する分配の組み合わせを選んで下さい。

グループ 赤組
番号 ３７

グループ 白組
番号 ２５

7	8	9	10	11	12	13
15	14	13	12	11	10	9

選択した分配の組み合わせを、記入して下さい。

赤組３７番の人に 9 点

白組２５番の人に 13 点

この例では、分配額の組み合わせのうち、左から三つ目が選択され、したがって赤組３７番の人に対して９点が、白組２５番の人には１３点が与えられたことになります。

意思決定に関するアンケート　　グループ名　　あなたの番号

斜字体

では例にならって実際に分配の意思決定問題をおこなって下さい。

1.それぞれのグループの人に対する分配の組み合わせを選んで下さい。

グループ 赤組 番号 15	1	2	3	4	5	6	7
	17/17	18/19	19/21	20/23	21/25	22/27	23/29
グループ 白組 番号 9							

選択した分配の組み合わせを、記入して下さい。

赤組１５番の人に　　＿＿＿ 点

白組　９番の人に　　＿＿＿ 点

2.それぞれのグループの人に対して、賞金を分配して下さい。

グループ 白組 番号 13	16/7	15/9	14/11	13/13	12/15	11/17	10/19
グループ 赤組 番号 8							

選択した分配の組み合わせを、記入して下さい。

白組１３番の人に　　＿＿＿ 点

赤組　８番の人に　　＿＿＿ 点

意思決定に関するアンケート　　グループ名　　あなたの番号

斜字体

3.それぞれのグループの人に対して、賞金を分配して下さい。

グループ 白組 番号 10	11/5	13/9	15/13	17/17	19/21	21/25	23/29
グループ 赤組 番号 19							

選択した分配の組み合わせを、記入して下さい。

白組１０番の人に　　＿＿＿ 点

赤組１９番の人に　　＿＿＿ 点

4.それぞれのグループの人に対して、賞金を分配して下さい。

グループ 白組 番号 9	17/17	19/18	21/19	23/20	25/21	27/22	29/23
グループ 赤組 番号 15							

選択した分配の組み合わせを、記入して下さい。

白組　９番の人に　　＿＿＿ 点

赤組１５番の人に　　＿＿＿ 点

意思決定に関するアンケート　　グループ名　　あなたの番号

斜字体

rev

5.それぞれのグループの人に対して、賞金を分配して下さい。

グループ　白組
番号　13

グループ　赤組
番号　8

10	11	12	13	14	15	16
19	17	15	13	11	9	7

選択した分配の組み合わせを、記入して下さい。

白組１３番の人に　　＿＿点
赤組　８番の人に　　＿＿点

rev

6.それぞれのグループの人に対して、賞金を分配して下さい。

グループ　白組
番号　10

グループ　赤組
番号　19

23	21	19	17	15	13	11
29	25	21	17	13	9	5

選択した分配の組み合わせを、記入して下さい。

白組１０番の人に　　＿＿点
赤組１９番の人に　　＿＿点

意思決定に関するアンケート　　グループ名　　あなたの番号

斜字体

rev

7.それぞれのグループの人に対して、賞金を分配して下さい。

グループ　赤組
番号　15

グループ　白組
番号　9

23	22	21	20	19	18	17
29	27	25	23	21	19	17

選択した分配の組み合わせを、記入して下さい。

赤組１５番の人に　　＿＿点
白組　９番の人に　　＿＿点

8.それぞれのグループの人に対して、賞金を分配して下さい。

グループ　赤組
番号　8

グループ　白組
番号　13

7	9	11	13	15	17	19
16	15	14	13	12	11	10

選択した分配の組み合わせを、記入して下さい。

赤組　８番の人に　　＿＿点
白組１３番の人に　　＿＿点

意思決定に関するアンケート　　グループ名　　あなたの番号

斜字体

9.それぞれのグループの人に対して、賞金を分配して下さい。

グループ　赤組
番号　19

グループ　白組
番号　10

$\frac{5}{11}$ $\frac{9}{13}$ $\frac{13}{15}$ $\frac{17}{17}$ $\frac{21}{19}$ $\frac{25}{21}$ $\frac{29}{23}$

選択した分配の組み合わせを、記入して下さい。

赤組19番の人に　　＿＿点

白組10番の人に　　＿＿点

rev

10.それぞれのグループの人に対して、賞金を分配して下さい。

グループ　白組
番号　9

グループ　赤組
番号　15

$\frac{29}{23}$ $\frac{27}{22}$ $\frac{25}{21}$ $\frac{23}{20}$ $\frac{21}{19}$ $\frac{19}{18}$ $\frac{17}{17}$

選択した分配の組み合わせを、記入して下さい。

白組　9番の人に　　＿＿点

赤組15番の人に　　＿＿点

意思決定に関するアンケート　　グループ名　　あなたの番号

斜字体

rev.

11.それぞれのグループの人に対して、賞金を分配して下さい。

グループ　赤組
番号　8

グループ　白組
番号　13

$\frac{19}{10}$ $\frac{17}{11}$ $\frac{15}{12}$ $\frac{13}{13}$ $\frac{11}{14}$ $\frac{9}{15}$ $\frac{7}{16}$

選択した分配の組み合わせを、記入して下さい。

赤組　8番の人に　　＿＿点

白組13番の人に　　＿＿点

rev.

12.それぞれのグループの人に対して、賞金を分配して下さい。

グループ　赤組
番号　19

グループ　白組
番号　10

$\frac{29}{23}$ $\frac{25}{21}$ $\frac{21}{19}$ $\frac{17}{17}$ $\frac{13}{15}$ $\frac{9}{13}$ $\frac{5}{11}$

選択した分配の組み合わせを、記入して下さい。

赤組19番の人に　　＿＿点

白組10番の人に　　＿＿点

意思決定に関するアンケート　　グループ名　　あなたの番号

斜字体

Ⅱ. 第一印象

つぎに、赤組の人と*白組*の人についての印象をお尋ねします。あまり考え込まず、ぱっと頭に思い浮かんだままを答えてください。

① まず赤組の人が全体としてどんな人達かを思い浮かべ、その印象について、次のそれぞれの項目にお答えください。適すると思うところにひとつ○印をつけて下さい。

（例）このグループの人は……

明るい ← 1 2 3 4 5 6 → 暗い

非常に　かなり　やや　やや　かなり　非常に

このグループの人は……

1. 暖かい ← 1 2 3 4 5 6 → 冷たい
2. アイデアが豊か ← 1 2 3 4 5 6 → アイデアが乏しい
3. 知的な ← 1 2 3 4 5 6 → 知的でない
4. 強い ← 1 2 3 4 5 6 → 弱い
5. 才能豊かな ← 1 2 3 4 5 6 → 才能の乏しい
6. はっきりした ← 1 2 3 4 5 6 → はっきりしない
7. 正直な ← 1 2 3 4 5 6 → 不正直な
8. 親しみやすい ← 1 2 3 4 5 6 → 親しみにくい
9. 信頼できる ← 1 2 3 4 5 6 → 信頼できない
10 気前がよい ← 1 2 3 4 5 6 → けちだ

このグループの人と……

11 友達になりたい ← 1 2 3 4 5 6 → 友達になりたくない

意思決定に関するアンケート　　グループ名　　あなたの番号

斜字体

② では次に、白組の人が全体としてどのような人達かを思い浮かべ、その印象について、次のそれぞれの項目にお答えください。適すると思うところにひとつ○印をつけて下さい。あまり考え込まず、ぱっと頭に思い浮かんだままを答えてください。

このグループの人は……

1. 暖かい ← 1 2 3 4 5 6 → 冷たい
2. アイデアが豊か ← 1 2 3 4 5 6 → アイデアが乏しい
3. 知的な ← 1 2 3 4 5 6 → 知的でない
4. 強い ← 1 2 3 4 5 6 → 弱い
5. 才能豊かな ← 1 2 3 4 5 6 → 才能の乏しい
6. はっきりした ← 1 2 *3* 4 5 6 → はっきりしない
7. 正直な ← 1 2 3 4 5 6 → 不正直な
8. 親しみやすい ← 1 2 3 4 5 6 → 親しみにくい
9. 信頼できる ← 1 2 3 4 5 6 → 信頼できない
10 気前がよい ← 1 2 3 4 5 6 → *けちだ*

このグループの人と……

11 友達になりたい ← 1 2 3 4 5 6 → 友達になりたくない

③ 赤組の人と白組の人とで最も違う点は、次のどの点だとあなたは思いますか。大きく違うと思う順に三つ選んで番号を入れてください。

1.暖かさ　2.アイデアの豊富さ　3.知性　4.強さ　5.才能
6.はきはきしているか　7.正直さ　8.親しみやすさ　9.信頼できるか
10.気前のよさ

1番（　）　2番（　）　3位（　）

意思決定に関するアンケートはここまでです。以下では、あなたの
このアンケートへの取り組み方についてお尋ねします。

Ⅲ.

a１．先の「Ⅰ.賞金の分配」に回答したとき、あなたが使った賞金分配のルールは何ですか。当てはまるものにいくつでも○印をつけて下さい。

1.公平さ　2.相手への親しみの度合い　3.自分の利益
4.自分のグループの利益　5.クラス全体の利益　6.自分のプライド
7.なんとなく　8.その他（そのルール：　　）

a２．その自分の分配のし方はどれくらい正しいと思いますか。次の番号のうち適当と思うところにひとつ○印をつけて下さい。

絶対正しい ← 1 2 3 4 5 6 → 絶対間違っている

b．「Ⅰ賞金の分配」を決めるときに、どれだけ自分のグループ（赤組か、あるいは白組か）のことを考えましたか。当てはまる番号にひとつ○印をつけて下さい。

1 非常に考えた
2 かなり考えた
3 ある程度は考えた
4 少しだけ考えた
5 あまり考えなかった
6 ほどんど考えなかった
7 全然考えなかった

8 分からない

c．「Ⅱ第一印象」で自分の属していないグループの印象について答えたときに（あなたが赤組なら白組の人について答えたとき）、あなたはどれだけ自分のグループと比べて考えましたか。当てはまる番号にひとつ○印をつけて下さい。

1 非常に比べた
2 かなり比べた
3 ある程度は比べた
4 少しだけ比べた
5 あまり比べなかった
6 ほどんど比べなかった
7 全然比べなかった

8 分からない

d．アンケートに答える時に、どれだけ集中して回答しましたか。当てはまる番号にひとつ○印をつけて下さい。

1 非常に集中した
2 かなり集中した
3 ある程度は集中した
4 少しだけ集中した
5 あまり集中しなかった
6 ほどんど集中しなかった
7 全然集中しなかった

8 分からない

e．アンケートに回答するときに、どれだけ頭が混乱しましたか。当てはまる番号にひとつ○印をつけて下さい。

1 非常に混乱した
2 かなり混乱した
3 ある程度は混乱した
4 少しだけ混乱した
5 あまり混乱しなかった
6 ほどんど混乱しなかった
7 全然混乱しなかった

8 分からない

f．このアンケートに回答するのはどれくらい難しかったですか。次の番号のうち適当と思うところにひとつ○印をつけて下さい。

非常に難しかった ← 1 2 3 4 5 6 7 → 全然難しくなかった

以上です。ご協力ありがとうございました。

Appendix 3.2

Further analyses of Pilot study 1

Table A3.2.1 Experimental design and the number of subjects by the booklet versions and the group assignment

Distraction booklet versions group divisions	Group membership salience: Salient	Non-salient	No category (control)	
DISTRACTION	17	32	14	
Version 1	9	16	14	
"red"	6	9		
"white"	3	7		
Version 2	8	16	0	
"red"	2	7		
"white"	6	9		
NO DISTRACTION	18	33	18	
Version 1	9	16	18	
"red"	5	6		
"white"	4	10		
Version 2	9	17	0	
"red"	4	9		
"white"	5	8		
TOTAL				132

Note: only a booklet version 1 was in the no category conditions. And there was of course no group division there.

Table A3.2.2 The factor matrix of the rating bias scores (varimax rotated)

rating index	Factor 1	Factor 2	Factor 3	Factor 4
bias10	.751			
bias7	.656			
bias1	.637	.463		
bias8		.810		
bias9		.705		
bias4			.752	
bias6			.673	
bias3			-.628	.360
bias2				.775
bias5		.331		.645

1) The figure is the factor loading of the item. Absolute loading value less than .30 are omitted.
2) 61.3% of the total variance is explained by the three factors.
3) Bias 1 to 10 correspond to those described in the Method section in the order.

Table A3.2.3 The factor matrix of check items

check items	Factor 1	Factor 2
check6	.888	
check5	.811	
check3	.457	
check4		.851
check2		.742

1) The figure is the factor loading of the item. Absolute loading value less than .30 are omitted.
2) Eigen value of factor1 and factor2 were 1.89 and 1.21 respectively. 37.9% and 24.1% of the total variance was explained respectively.
3) Check2 to check6 concern, respectively, thoughts about own group in point allocation, comparison with own group in outgroup ratings, concentration on the tasks, cognition of distraction, and how difficult the tasks were (see the method section.) The response form for all items were 1 very much (thought about it, compared, concentrated, etc.) — 7 not at all, and 8 I don't know.

Table A3.2.4 Pearson correlation coefficients

check item scale	slbias1	slbias2	slbias3	slbias4
task quality	-.14	-.30*	-.01	-.09
subject's involvement	.40**	-.19	-.28	-.14

1) The task quality scale consists of check item 5 and 6. The more, the more difficult and distracting subjects felt the tasks were. The subject' involvement scale consists of check item 2 and 4. The more, the more subjects involved in the tasks.
2) Slbias1 consists of bias10, bias7, and bias1; slbias2 consists of bias8 and bias9; slbias3 consists of bias4, bias6, and bias3; and slbias4 consists of bias2 and bias5.
3) Correlations were taken for those who were in the "white" group. $n = 47\sim 52$, $^{*}p < .05$, $^{**}p < .01$

Individual matrix score Choices from combinations of points to pairs of people were scored, such that 1 represents one end of the each allocation strategy continuum and 7 represents the other end. Therefore, for example, from the matrix shown in Fig.A3.2.1, choice of the left end was scored 1 and that of the right end 7, for the subjects assigned to the white group, on a scale of the allocation strategy continuum (F—MdJpIp).[1] The mean scores on 12 matrices are shown in Table A3.2.5. Because one matrix constituted two different scales depending on which group (white or red) the subject was assigned to, 24 sets of scores are represented in the table. No multivariate effect was significant.

[1] The "pull" score of the each strategy could not be calculated due to the lack of the corresponding matrix.

	F	1	2	3	4	5	6	7	MdIpJp
√	For white group	17	19	21	23	25	27	29	
	For red group	17	18	19	20	22	23	24	

Fig. A3.2.1 An example of scoring the matrix.
One version of allocation strategy continuum Md—IpJp.

Of particular interest are the significant main effects of distraction on the scales:

2. MdIp—Jp 1,
4. Md—IpJp 3,
9. F—MdIpJp 2, and
19. F—IpJp 3.

These effects seem to indicate that 1) subjects were more inclined to use discriminatory strategies when they were not distracted than when they were, while 2) when choice were made between Fairness and mixture of Ip and Jp (and Md), subjects recoursed to the choices of bigger points, regardless of recipients' group membership, supposedly without paying attention. Another interpretation of the result is that subjects used Jp strategy whenever it was possible when they were distracted. It needs, however, a further empirical investigation to argue about the plausibility of these interpretations.

It should be noted that significant interaction effect on the scale of (MdIp—Jp 3) seems due to strong MdIp choice against Jp in the salient/no distraction condition. This pattern is consistent with theoretical predictions of this study.

Table A3.2.5 The mean matrix score on 12 matrices

matrix	distraction salient	distraction non-salient	no distraction salient	no distraction non-salient	*F* value distraction	*F* value salience	*F* value interaction
1. F–MdIpJp 1	3.88	3.38	3.63	3.33	.18	.57	.03
2. MdIp–Jp 1	4.75	4.81 $_{a}$	3.50	3.39 $_{b}$	5.55 *	.00	.02
3. Md–IpJp 1	4.25	3.81	3.13	4.17	.69	.38	2.41
4. F–MdIpJp 2	5.50 $_{a}$	3.75	3.00 $_{b}$	3.28 $_{b}$	5.65 *	1.40	2.61
5. MdIp–Jp 2	3.75	4.13	4.13	3.94	.02	.02	.22
6. Md–IpJp 2	3.13 $_{a}$	4.06	3.63	5.06 $^{\#}{}_{b}$	1.80	4.51 *	.19
7. F–MdIpJp 3	3.38	3.56	3.88	5.06 $^{\#}$	2.39	1.17	.67
8. MdIp–Jp 3	4.50 $_{a}$	3.81	2.50 $^{\#}{}_{b}$	4.56 $_{a}$	1.25	1.55	6.18 *
9. Md–IpJp 3	5.00	4.81	3.50	4.11	4.11 *	.16	.56
10. F–MdIpJp 4	3.25	4.13	3.13	3.39	.28	.73	.19
11. MdIp–Jp 4	4.13	4.19	4.25	4.06	.05	.00	.05
12. Md–IpJp 4	3.50	4.63	3.75	4.33	.00	2.16	.22
13. F–IpJp 1	3.00	2.87 $^{\#}$	3.33	3.07	.47	.04	.01
14. –MdIpJp 1	4.88	4.27	3.67	3.53	3.06 †	.39	.22
15. –MdIpJp' 1	3.75	4.13	5.33 $^{\#}$	4.67	3.82 †	.09	1.03
16. F–IpJp 2	2.75	2.87 $^{\#}$	2.33 $^{\#}$	3.60	.07	1.30	.90
17. –MdIpJp 2	3.63	3.73	4.67	4.00	1.94	.18	.56
18. –MdIpJp' 2	4.63	4.07	4.44	4.20	.00	.55	.08
19. F–IpJp 3	2.38 $^{\#}$	2.73 $^{\#}$	3.56	3.87	5.72 *	.80	.00
20. –MdIpJp 3	4.88 $_{a}$	4.13	5.44 $^{\#}{}_{a}$	3.33 $_{b}$	.11	9.20 **	2.06
21. –MdIpJp' 3	3.63	4.27	4.78	3.87	.41	.06	1.88
22. F–IpJp 4	2.13 $^{\#}{}_{a}$	2.73 $^{\#}{}_{a}$	2.44 $^{\#}{}_{a}$	4.13 $_{b}$	2.19	3.99 †	.91
23. –MdIpJp 4	5.13	3.47	4.67	4.80	1.01	1.44	2.68
24. –MdIpJp' 4	4.75	4.00	3.78	3.47	2.01	1.02	.17

1) # denotes the figure is significantly different from neutral point 4 ($p < .05$)

2) Multivariate effect of distraction and that of interaction between distraction and salience on the matrix score from item 13 to item 24 were marginally significant ($F = 1.87$, $df = 12$, $p < .1$; $F = 1.98$, $df = 12$, $p < .075$).

3) F value: $^{\dagger}p < .1$, $^{*}p < .05$, $^{**}p < .01$, $df = 1/45$ for all effects.

4) The number of subjects in each cell is, from left to right, 7, 8, 15, and 18 for the upper 12 lines (those who were assigned to the white group); 8, 9, 15, and 15 for the lower 12 lines (those who were assigned to the red group).

Mean matrix score averaged for the versions Average score of the four (eitht in the case of --MdIpJp) versions of the each matrix was also taken. The mean across subjects in each condition was shown in Table A2.3.6. On the strategy continuum of Md—IpJp, subjects had a tendency to choose towards the Md end more when group membership was salient than not.

Matrix score and amount of group membership thought The matrix score described in the above section (averaged for the versions) was subject to an analysis on the basis of subjects' self-reported amount of thoughts about their group membership during the allocation task (see Table A3.2.7). The main effect of salience and the interaction effect was marginally significant on Md— IpJp matrix score ($F = 4.33, df = 1/41, p < .05$; $F = 3.48, df = 1/41, p < .07$). The result pattern indicates that subjects used more discriminatory strategies when group membership was salient, and that this tendency was emphasized when subjects were allowed to think about their group membership. This analysis supports the theoretical prediction of this study.

Ingroup bias in ratings Rating bias was calculated by subtracting the outgroup rating score from the ingroup rating score on each scale. There were no significant main effect nor interaction effect on any scale. The bias was not significantly different from the neutral point zero in any of the experimental conditions (see Table A3.2.8). This pattern is quite strange given that ingroup bias in general was observed in other indices.

Table A3.2.6 The mean matrix score (averaged for the versions) on each allocation strategy continuum

	distraction		no distraction		*F* value		
continuum	salient	non-salient	salient	non-salient	distraction	salience	interaction
F–MdIpJp	4.00	3.70	3.40	3.76	.44	.00	.53
MdIp–Jp	4.28	4.23	3.59	3.99	1.05	.41	.14
Md–IpJp	3.91	4.20	3.34	4.18	.50	2.93 †	.33
F–IpJp	2.56 #	2.80 #	2.92	3.67	1.95	1.16	.72
–MdIpJp	4.08	3.85	4.43	4.07	2.07	.69	.40

1) # denotes the figure is significantly different from neutral point 4 ($p < .05$)
2) *F* value: †$p < .1$, $df = 1/42$ for all effects.
3) The number of subjects in each cell is, from left to right, 7, 15, 8, and 18 for the upper three lines (those who were assigned to the white group); 8, 15, 9, and 15 for the lower 2 lines (those who were assigned to the red group).

Table A3.2.7 The mean matrix score (averaged for the versions) on the basis of subjects' amount of thinking about their group membership

	membership thoughts		no such thoughts		*F* value		
continuum	salient	non-salient	salient	non-salient	thoughts	salience	interaction
F–MdIpJp	3.56	3.89	3.73	3.52	.00	.00	.42
MdIp–Jp	3.06	4.18	4.25	4.11	.98	.84	1.98
Md–IpJp	2.56 #	4.23	3.98	4.14	2.18	4.33 *	3.48 †
F–IpJp	3.20	3.10 #	2.56 #	3.32 #	.21	.67	.71
–MdIpJp	4.63	4.14	4.12	3.88	2.42	2.03	.24

1) # denotes the figure is significantly different from neutral point 4 ($p < .05$)
2) *F* value: †$p < .1$, *$p < .01$, $df = 1/41$ for all effects.
3) Subjects who marked from 1 to 3, on the scale (how much did you think about your group when you gave points?: 1 very much — 7 not at all), were categorised as "membership thoughts" group, and those who marked from 4 to 7 as "no such thoughts" group.
4) The number of subjects in each cell is, from left to right, 4, 11, 11, and 21 for the upper three lines (those who were assigned to the white group); 5, 10, 12, and 19 for the lower 2 lines (those who were assigned to the red group).

Table A3.2.8 Ingroup bias in ratings

	Distraction		No distraction		*F* value		
Rating index	Salient	Non-Salient	Salient	Non-salient	Distraction	Salience	Interaction
bias1	.20	.04	.06	.36	.01	.06	.66
bias2	.07	-.44	-.06	-.14	.36	.38	.97
bias3	-.73	-.04	.17	.33	3.40†	2.08	.87
bias4	.60	.00	-.33	.46	.31	.05	2.65†
bias5	.27	-.33	.17	.24	.57	.70	1.16
bias6	.20	.37	.11	-.18	.61	.02	.32
bias7	.00	.00	-.06	-.06	.04	.00	.00
bias8	.40	.40	.22	.18	.38	.00	.00
bias9	.00	.07	-.06	.36	.14	.62	.30
bias10	.33	.19	.44	.15	.01	.42	.04

1) *F* value: †$p < .10$, $df = 1/89$ for all effects.
2) The number of subjects in each cell is, from left to right, 15, 27, 18, and 33.
3) Bias1, bias2, ..., and bias10 indicate respectively ingroup bias on the scale of adjective pairs: 1 warm-cold, 2 creative-not creative, 3 intelligent-unintelligent, 4 strong-weak, 5 talented-untalented, 6 clear-unclear, 7 honest-dishonest, 8 friendly-unfriendly, 9 trustworthy-untrustworthy, and 10 generous-stingy

Exp1 Instructions ([salience] & (distraction))

1) General instruction

(1) "Thank you very much for taking part in our research. This is a study about decisions [and groups]. On the desk, you should have a small and a big envelope, a questionnaire booklet, and an instruction sheet. Don't turn them over, and please just listen to the instructions I give you, and I will explain more to you about the research later on. "

2) Manipulation of social categorisation

(2.0) " Ok, before explaining what you are going to do, I'd like you all to draw lots from these boxes. The lot gives you your number and group name. Each of you will have a different number. "

(2.1) "This number is just for convenience of the research, and to protect your privacy "

[(2.1) " This is to divide you into two groups. "]

(2.2) " When you pick up the lot, remember the number and group name, and put the lot in the small envelope. Don't tell or show the number and the group name to anybody. Keep it a secret. "

(Subjects draw a slip. Assistant & Experimenter walk around).

(2.3) " (After everyone picks up one) Has everyone taken the slip? Now, Turn over the booklet and write your number and group on the bottom boxes of the first page. (After a while) Have you written them down? "

[Membership salience]

[(2.4) " The number you've just had are taken from the groups of numbers described on this sheet. So, if your number is Zero, your group must be red. And if your number is ten, your group must be blue. You are going to make a team with the people of the same group, red or blue, and in the afternoon, each group will play a game and see which group performs best. As you can see on the sheet, by chance, roughly half of the class belong to the red group and the other half belong to the blue group. "]

3) Filling in the questionnaire

(3.0) " (Posters are attached to the blackboard to explain tasks: different posters in each condition)

Ok, now I'll explain to you how to use the booklet. All the instructions and some examples are written out on the separate sheet of paper, just in case you need to check them, but I'll go through them now. Basically, what I'd like you to do are two things. Please look at the poster here (while pointing). "

(3.1) " One part of the booklet asks you to decide how many points you are going to give to each of the people [/groups] in a pair. Look at this example. (Reading aloud the text of the poster). "

(3.2) " The other part of the booklet asks you to show what you think about the people from red group and blue group. Look at this example. (Reading aloud the text of the poster) "

4) Notes (Distracting task)

(4.0) " Now, turn the first page and listen to the instruction at the top of the page as I read aloud" (Read aloud page1)

(" So, for example in this [allocation] poster, you would also circle the italic letter p, when you see it. And in this [rating] poster, you would also put a circle around the italic letter t. ")

(4.1) " If you have any questions, first of all, look at the instruction sheet. If you still have a question, put up your hand. Don't ask your neighbours. Now, start from page one, please.

... ...

(Towards the end of the session) When you finish the questionnaire, please turn it over so that nobody can see it."

(End) " (After everyone finish the questionnaire) Please put everything in the big envelope. "

Your personal code: **57** Your group name: **Blue**

COLOUR OF THE GROUPS AND NUMBERS

RED GROUP

0, 1, 2, 3, 4,
5, 6, 7, 8, 9

20, 21, 22, 23, 24,
25, 26, 27, 28, 29

40, 41, 42, 43, 44,
45, 46, 47, 48, 49

BLUE GROUP

10, 11, 12, 13, 14,
15, 16, 17, 18, 19

30, 31, 32, 33, 34,
35, 36, 37, 38, 39

50, 51, 52, 53, 54,
55, 56, 57, 58, 59

Giving points

Look at the example below. The number of each person and the name of their group is written next to some boxes which contain points for each of the people. Imagine the points stand for pence. You must choose one box.

In this example, suppose you circled the box which gives 9 points to the person of number 37 from the blue group and 13 points to person number 25 from the red group. You then copy these numbers into the spaces below the boxes.

You would also circle the *italic* letter *p*

(Example). Circle a box to give points to the two groups

Person number 37 of the blue group	7	8	9	10	11	12	13
Person number 25 of the red group	15	14	13	12	11	10	9

Write below, the details of the points that you have chosen:

Points for person number 37 of the blue group: 9

Points for person number 25 of the red group: 13

Your impressions of members of the two groups

We would like to ask you about your view of the two groups (blue and red). Answer the questions carefully but do not spend too long on each one. There are no right or wrong answers

1 Think of the people in Red group, and circle a number to show what you think they are like. For example, if you think people in the Red group are quite tall you would circle 3, but if you think they are very tall you would circle 1. If you think they are very short you would circle 7. You would also put a circle around the *italic* letter *t*.

EXAMPLE

People in red group are.....

tall 1 2 3 4 5 6 7 short

Aplx 3.6

MAKING DECISIONS

This is a study about decisions and groups.

Your number [ ] Your group name [ ]

Please work on your own, without talking. Pages inside the questionnaire may be different in order from your neighbours'. So, don't worry about your neighbours. If you need any extra help, put up your hand and someone will come over to see you. Begin with the first page and remember not to miss any pages out.

IMPORTANT

1) Write your number and group name in the boxes at the top of every page.

2) Make your decisions quite **quickly** because there is only just enough time to make them in.

3) We are also interested in how well you can find italic letters, as this tells us something about how observant you are. The letters you have to find are slanted like *this*. There are several *italic* letters on each page. When you come across *italic* letters, please put a circle around that letter. Put a circle around the *italics* as soon as you come across them, not before or after you make your decisions.

Making decisions

your number

your group name

Remember to put a circle around the italics when you see them.

Your impressions of members of the two groups

1 Circle the numbers to show what you think about the people in **red** group?

*P*eople in **red** group are.....

a.	warm	1	2	3	4	5	6	7	cold
b.	dis*h*onest	1	2	3	4	5	6	7	honest
c.	friendly	1	2	3	4	5	6	7	unfriendly
d.	*u*ntrustworthy	1	2	3	4	5	6	7	trustworthy
e.	generous	1	2	3	4	5	6	7	selfish

How much would you *l*ike to make friends with people of **red** group?

very much 1 2 3 4 5 6 7 not at all

Making decisions

your number

your group name

Remember to put a circle around the italics when you see them.

2 Next, circle the numbers to show what you think about the people in **blue** group?

People in **blue** group are.....

a.	war*m*	1	2	3	4	5	6	7	cold
b.	dishonest	1	2	3	4	5	6	7	honest
c.	friendly	1	2	3	4	5	6	7	unfrien*d*ly
d.	un*t*rustworthy	1	2	3	4	5	6	7	trustworthy
e.	generous	1	2	3	4	5	6	7	selfish

How much would you like to make friends with people of **blue** group?

very *m*uch 1 2 3 4 5 6 7 not at all

3 Circle the word that you think describes the biggest difference between the **red** and the **blue** group

warmth honesty friendliness trustworthiness generosity

Making decisions

1 Write down :

your number | your group name

Remember to put a circle around the italics when you see them.

Giving points

2 Circle a box to give points to the two groups

*P*erson number **15** of *the* **blue** group | 7 | 8 | 9 | 10 | 11 | 12 | 13 |

Person number **9** of the **red** group | 7 | 6 | 5 | 4 | 3 | 2 | 1 |

Write *b*elow, the details of the points that you have chosen:

Points for person number **15** of the **blue** group: _____

Points for person number **9** of the **red** group: _____

3 Check that you have circled a box and the italics, and copied the numbers

Making decisions

1 Write down :

your number | your group name

Remember to put a circle around the italics when you see them.

2 Circle a box to give points to the two groups

Person num*b*er **4** of the **red** group | 10 | 9 | 8 | 7 | 6 | 5 | 4 |

Person number **18** of the **blue** group | 1 | 3 | 5 | 7 | 9 | 11 | 13 |

Write be*l*ow, the details of the points that you have chosen:

Points for person number **4** of the **red** group: _____

Points for person number **18** of the **blue** group: _____

3 Check that you have circled a box and the italics, and copied the numbers

Making decisions

1 Write down :

your number | your group name

Remember to put a circle around the italics when you see them.

2 Circle a box to give points to the two groups

Person number **13** of the **blue** group

Person number **6** of the **red** group

6	7	8	9	10	11	12
3	5	7	9	11	13	15

Write below, the details of the points that you have chosen:

Points for person number **13** of the **blue** group: _____

Points for person number **6** of the **red** group: _____

3 Check that you have circled a box and the italics, and copied the numbers

Making decisions

1 Write down :

your number | your group name

Remember to put a circle around the italics when you see them.

2 Circle a box to give points to the two groups

Person number **8** of the **red** group

Person number **11** of the **blue** group

7	8	9	10	11	12	13
7	6	5	4	3	2	1

Write below, the details of the points that you have chosen:

Points for person number **8** of the **red** group: _____

Points for person number **11** of the **blue** group: _____

3 Check that you have circled a box and the italics, and copied the numbers

Making decisions

1 Write down :

your number | your group name

Remember to put a circle around the italics when you see them.

2 Circle a box to give points to the two groups

Person number *19* of the *blue* group

Person number *5* of the *red* group

10	9	8	7	6	5	4
1	3	5	7	9	11	13

Write below, the details of the points that you have chosen:

Points for person number *19* of the *blue* group: _____

Points for person number *5* of the *red* group: _____

3 Check that you have circled a box and the italics, and copied the numbers

Making decisions

1 Write down :

your number | your group name

Remember to put a circle around the italics when you see them.

2 Circle a box to give points to the two groups

Person number *7* of the *red* group

Person number *17* of the *blue* group

6	7	8	9	10	11	12
3	5	7	9	11	13	15

Write below, the details of the points that you have chosen:

Points for person number *7* of the *red* group: _____

Points for person number *17* of the *blue* group: _____

3 Check that you have circled a box and the italics, and copied the numbers

Thank you very much. We would like next to ask you the questions about how you made your decisions.

❒

1 When you gave points to people, how much did you try to do each of the things listed below?

a. be fair to each person

very much 1 2 3 4 5 6 7 not at all

b. be fair to each group

very much 1 2 3 4 5 6 7 not at all

c. give yourself most points

very much 1 2 3 4 5 6 7 not at all

d. give your group most points

very much 1 2 3 4 5 6 7 not at all

e. give everyone as much as possible

very much 1 2 3 4 5 6 7 not at all

f. make yourself feel good

very much 1 2 3 4 5 6 7 not at all

g. try to make your group win

very much 1 2 3 4 5 6 7 not at all

h. nothing in particular

very much 1 2 3 4 5 6 7 not at all

2 How much do you think what you tried to do is what people like your parents or teachers would want you to do?

very much 1 2 3 4 5 6 7 not at all

❒❒

3 When you gave points to people, how much did you think about your own group?

very much 1 2 3 4 5 6 7 not at all

4 How much did you concentrate on the questions when you answered to them?

very much 1 2 3 4 5 6 7 not at all

5 How much were you distracted when you answered to them?

very much 1 2 3 4 5 6 7 not at all

6 When you gave your views about the other group, how much did you compare it with your own group?

very much 1 2 3 4 5 6 7 not at all

7 How difficult was it to answer the questions?

very difficult 1 2 3 4 5 6 7 very easy

8 How difficult was it to find the italics?

very difficult 1 2 3 4 5 6 7 very easy

□□□

The following concern your feelings about your group

Please answer the folloing by circling the appropriate number.

Where 1 = " Strongly Disagree " and 7 = " Strongly Agree "

PLEASE CIRCLE THE GROUP YOU ARE IN :

BLUE OR RED

	Strongly Disagree						Strongly Agree
1. I am glad to belong to this group.	1	2	3	4	5	6	7
2. Overall, I have a low opinion of this group.	1	2	3	4	5	6	7
3. Right now, I do not feel close to this group.	1	2	3	4	5	6	7
4. I feel strong ties to this group.	1	2	3	4	5	6	7
5. I feel positive towards this group.	1	2	3	4	5	6	7
6. Right now I do not think highly of this group.	1	2	3	4	5	6	7
7. Right now, it feels good to be a member of this group.	1	2	3	4	5	6	7
8. I find it hard to be enthusiastic about this group.	1	2	3	4	5	6	7
9. Right now, it feels pleasant to be in this group.	1	2	3	4	5	6	7

This is the end of the questionnaire. Now, please turn over the booklet and then wait silently for more instructions.

Appendix 3.7

Tajfel matrices used in the studies

a) The matrix type F *vs.* MD•MIP On the matrix type F *vs.* MD•MIP for a start, one allocates equal points to a person in the first raw and a person in the second raw if one chooses the most left pair of points; if one chooses the most right pair of points, the point is biggest for the person in the first raw and smallest for the person in the second raw, thus the difference between the points is largest. The sum of points for any pair is the same across the matrix.

Therefore, if the person in the first raw is an ingroup member (on the sub-type $[^{in}_{out}]$), choosing the left extreme means maximizing fairness on this matrix (*i.e.*, F). And choosing the right extreme means maximizing the point to the ingroup member, and at the same time, maximizing the difference between the two people in favour of the ingroup member (*i.e.*, MD•MIP). Any pair of points between the two extremes is supposed to represent the degree of the strategies to the extent how close it is to each extreme.[1] The assumption is true to all matrix types and sub-types described hereafter.

On the other hand, if the person in the first raw is an outgroup member (on the sub-type $[^{out}_{in}]$), the left extreme means not only maximal fairness but also the least disadvantageous difference and the most point for the ingroup member (*i.e.*, F•MD•MIP), while the right extreme means the least point to the ingroup member, the worst difference against the ingroup member, and the least fairness on this matrix (*i.e.*, ~F•MD•MIP).

b) The matrix type MD•MIP *vs.* MJP On the matrix type MD•MIP *vs.* MJP, one allocates the most point to a person in the first raw and the least

---

[1] This "spatial scale" assumption is important especially when "pull" scores are calculated from the matrix scores (the "pull" scores are explained in the results section). See, for this issue, Brown, Tajfel & Turner(1980) and Aschenbrenner & Schaefer (1980).

point to a person in the second raw if one chooses the most left pair of points; if one chooses the most right pair of points, the point is biggest for the person in the second raw and smallest for the person in the first raw. The sum of points for a pair is largest at the right extreme and smallest at the left extreme.

If the person in the first raw is an ingroup member (on the sub-type $[\begin{smallmatrix}\text{in}\\ \text{out}\end{smallmatrix}]$), choosing the left extreme means maximizing the point to the ingroup member, and at the same time, maximizing the difference between the two people in favour of the ingroup member (*i.e.*, MD•MIP). And choosing the right extreme means maximizing the sum point to the ingroup member and the outgroup member (*i.e.*, MJP).

On the other hand, if the person in the first raw is an outgroup member, thus the person in the second raw is an ingroup member (on the sub-type $[\begin{smallmatrix}\text{out}\\ \text{in}\end{smallmatrix}]$), the left extreme means the largest difference in points against the ingroup member, the least point to the ingroup member, and the smallest sum point to the ingroup and the outgroup member (*i.e.*, ~MD•MIP•MJP), while the right extreme means the largest difference in points in favour of, and the most points to, the ingroup member, and the largest sum point to the ingroup and the outgroup member (*i.e.*, MD•MIP•MJP).

c) The matrix type MD *vs.* MIP•MJP On the matrix type MD *vs.* MIP•MJP, one allocates the least point to a person in the first raw and also the least point to a person in the second raw if one chooses the most left pair of points. At this left extreme, moreover, the point to the person in the first raw is larger than the person in the second raw. If one chooses the most right pair of points, the point is biggest for the person in the first raw and also for the person in the second raw. At this right extreme the point to the person in the second raw is larger than the person in the first raw. The sum of points for a pair is smallest at the left extreme and largest at the right extreme.

If the person in the first raw is an ingroup member (on the sub-type $[\begin{smallmatrix}\text{in}\\ \text{out}\end{smallmatrix}]$), choosing the left extreme means, although the smallest point to the

ingroup member, the largest difference in points in favour of the ingroup member (*i.e.*, MD). And choosing the right extreme means the largest point to the ingroup member, and the largest sum point to the ingroup member and the outgroup member (*i.e.*, MIP•MJP).

On the other hand, if the person in the first raw is an outgroup member, thus the person in the second raw is an ingroup member (on the sub-type $[\,{}^{out}_{in}\,]$), the left extreme means the largest difference in points against the ingroup member, the least point to the ingroup member, and the smallest sum point to the ingroup and the outgroup member (*i.e.*, ~MD•MIP•MJP), while the right extreme means the largest difference in points in favour of, and the most points to, the ingroup member, and the largest sum point to the ingroup and the outgroup member (*i.e.*, MD•MIP•MJP).

Matrix type [F *vs.* MD•MIP]

Sub-type A^{in}_{out}

	F						MD•MIP
For a person from X group	7	8	9	10	11	12	13
For a person from Y group	7	6	5	4	3	2	1

Sub-type A^{out}_{in}

	F •MD•MIP						~F •MD•MIP
For a person from Y group	7	8	9	10	11	12	13
For a person from X group	7	6	5	4	3	2	1

Matrix type [MD•MIP *vs.* MJP]

Sub-type B^{in}_{out}

	MD•MIP						MJP
For a person from X group	10	9	8	7	6	5	4
For a person from Y group	1	3	5	7	9	11	13

Sub-type B^{out}_{in}

	~MD•MIP•MJP						MD•MIP•MJP
For a person from Y group	10	9	8	7	6	5	4
For a person from X group	1	3	5	7	9	11	13

Matrix type [MD *vs.* MJP• MIP]

Sub-type C^{in}_{out}

	MD						MIP•MJP
For a person from X group	6	7	8	9	10	11	12
For a person from Y group	3	5	7	9	11	13	15

Sub-type C^{out}_{in}

	~MD•MIP•MJP						MD•MIP•MJP
For a person from Y group	6	7	8	9	10	11	12
For a person from X group	3	5	7	9	11	13	15

Fig. A3.7.1 Point allocation matrix types

Group X : ingroup, Y: outgroup; A combination of X-Y: either "red"-"blue" or "blue"-"red"

Matrix type [MD•MIP *vs.* MJP] ver. 2

Sub-type D_{out}^{in}

	MD•MIP						MJP
For a person from X group	20	19	18	17	16	15	14
For a person from Y group	11	13	15	17	19	21	23

Sub-type D_{in}^{out}

	~MD•MIP•MJP						MD•MIP•MJP
For a person from Y group	20	19	18	17	16	15	14
For a person from X group	11	13	15	17	19	21	23

Fig. A3.7.2 Point allocation matrix types (supplements)

Appendix 3.8

Supplementary tables for Experiment 1

Table A3.8.1 Experimental design and the number of subjects by the booklet versions and the group assignment

Distraction booklet versions group division	Group membership salience: Salient	Non-salient	
DISTRACTION	24	22	
Version 1	11	12	
"red"	3	5	
"blue"	8	7	
Version 2	13	10	
"red"	9	8	
"blue"	4	2	
NO DISTRACTION	23	23	
Version 1	11	11	
"red"	7	5	
"blue"	4	6	
Version 2	12	12	
"red"	4	6	
"blue"	8	6	
TOTAL			92

Note: In the version 1, the allocation tasks were followed by the rating task. The reverse was true for the version 2.

Table A3.8.2 Distance between ratings for ingroup and outgroup

	Distraction		No distraction		*F* value		
"Pull"	Salient (n=24)	Non salient (n=21)	Salient (n=23)	Non salient (n=22)	distraction	salience	interaction
Warmth	.83	1.19	1.09	1.05	.02	.33	.49
Honesty	.79	1.10	1.13	.68	.01	.09	1.53
Friendliness	.54	1.24	1.17	.96	.43	.68	2.66
Trustworthiness	1.00	1.19	.91	.73	1.08	.01	.49
Generosity	1.00	1.24	1.00	1.09	.06	.28	.06

1) The figure indicates absolute value of difference in ratings for ingroup and outgroup. The higher the number, the more intergroup differention.
2) *F* value: df=1/85 for all effects. Group division was entered as a covariate. No effects were significant.

Table A3.8.3 Mean discrepancy between self-report and strategies in point allocation

	Distraction		No distraction		*F* value		
	Salient	Non salient	Salient	Non salient	distraction	salience	interaction
DscFair	-.31	.26	.13	-.06	.13	.65	3.07†
DscMJP	.25	-.01	-.24	.00	.84	.00	.70
DscMD	-.33	.44	-.17	.09	.12	3.65†	.90
absDscFair	.74	.81	.90	.75	2.00	2.20	.28
absDscMJP	.92	1.37	1.24	.91	.26	.12	5.12*
absDscMD	.96	.92	1.24	.85	1.03	2.59	.78

1) The figure indicates relative (for the upper three raws) and absolute (for the lower three raws) discrepancies between actual allocation and self-reported strategy measures with the following formulas, where: CogFair, CogMJP, and CogMD respectively mean Z-score of self-reported strategies of Fairness, Maximun Joint Profit, and Group Win, while PullFair, PullMJP, and PullMD respectively mean Z-scores of the pull score of F (on MD•MIP), MJP (on MD•MIP), and MD (on MJP•MIP).

DscFair = CogFair – PullFair; absDscFair = |CogFair – PullFair|;
DscMJP = CogMJP – PullMJP; absDscMJP = |CogMJP – PullMJP|;
DscMD = CogMD – PullMD; absDscMD = |CogMD – PullMD |.

2) *F* value: † $p < .10$, * $p < .05$; df=1/85 for all effects.

Table A3.8.4 Sex distribution in each cell

	Distraction		No distraction		Total
Sex	Salient	Non salient	Salient	Non salient	
Male	9	9	13	11	42
Female	15	13	10	12	50

1) The figure is the number of the subjects.
2) Chi squares of every combination of sex, distraction, and salience were not significant.

Table A3.8.5 Sex differences: mean scores in each varible

Variables	Male	Female	*F* value
Self-reported strategies §			
1. fair to everyone	4.52	5.16	3.57†
2. fair to each group	4.55	5.38	6.91**
3. self interest	3.38	2.26	11.76***
4. group interest	3.64	2.68	6.89**
5. joint profit	3.62	3.82	.37
6. to feel good	3.93	3.02	6.79*
7. maximum difference	3.52	2.38	10.17*
8. nothing in particular	4.45	4.22	.34
Manipulation checks §			
9. group thoughts in allocation	4.22	3.28	6.30*
10. concentration on the tasks	5.19	4.86	1.37
11. distraction	2.66	2.78	.14
12. comparison with own group in ratings	3.68	3.62	.04
13. general task difficulty	2.88	3.86	8.25**
14. difficulty in finding italics	2.56	2.54	.02
Rating bias §§			
15. warmth	.78	.14	4.35*
16. honesty	.85	.04	6.40*
17. friendliness	.42	.25	.37
18. trustworthiness	.73	.04	8.11**
19. generosity	.93	.06	9.02**
(Sum score in rating bias	3.71	.53	7.82**)
Preference bias §§	.71	.25	4.21*

§ The figure is arranged so that it varies from 1. not at all to 7. very much for variables from 1 to 14. See the method section for the question forms.

§§ The more, the more in favour of ingroup (range from -6 to 6).

$ † $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$; df =1/90 for self-reported strategies, df = 1/89 for manipulation checks except 14 where df =1/44, and df =1/82 for rating bias and the rest.

APPENDIX

1) General instruction

(1) "Thank you very much for taking part in our research. This is a study about decisions and groups. On the desk, you should have 1 small and 1 big envelope, a questionnaire booklet, and an instruction sheet. Don't turn them over, and please just listen to the instructions I give you, and I will explain more to you about the research later on. "

2) Manipulation of social categorisation

(2.0) " Ok, before explaining what you are going to do, I'd like you all to draw lots from these boxes. The lot gives you your number and group name. Each of you will have a different number. This is to divide you into two groups. "

(2.1) " When you pick up the lot, remember the number and group name, and put the lot in the small envelope. Don't tell or show the number and the group name to anybody. Keep it a secret. "

(Subjects draw a slip. Assistant & Experimenter walk around).

(2.2) " (After everyone picks up one) Has everyone taken the slip? Now, Turn over the booklet and write your number and group on the bottom boxes of the first page. (After a while) Have you written them down? "

(2.3) " The numbers you've just had are taken from the groups of numbers described on this sheet. So, if your number is Zero, your group must be red. And if your number is ten, your group must be blue. You are going to make a team with the people of the same group, red or blue, and afterwards, each group will play a game and see which group performs best. As you can see on the sheet, by chance, roughly half of the class belong to the red group and the other half belong to the blue group. "

3) Filling in the questionnaire

(3.0) " (Posters are attached to the blackboard to explain tasks)

Ok, now I'll explain ~~to you~~ how to use the booklet. All the instructions and some examples are written out on the separate sheet of paper, just in case you need to check them, but I'll go through them now. Basically, what I'd like you to do are two things. Please look at the poster here(while pointing). "

(3.1) " One part of the booklet asks you to decide how many points you are going to give to each of the groups in a pair. Look at this example. (Reading aloud the text of the poster). "

(3.2) " The other part of the booklet asks you to show what you think about the people from red group and blue group. Look at this example. (Reading aloud the text of the poster) "

4) Notes (Distracting task)

(4.0) " Now, turn the first page and listen to the instruction at the top of the page as I read aloud" (Read aloud page1)

(4.1)

" So, for example in this [~~allocation~~] poster, you would also copy the italic letter *p* in the right margin, when you see it. And in this [~~rating~~] poster, you would also copy the italic letter *t* in the right margin."

5) End

(5.0) " If you have any questions, first of all, look at the instruction sheet. If you still have a question, put up your hand. Don't ask your neighbours. Now, start from page one, please.

(5.1) (Towards the end of the session) When you finish the questionnaire, please turn it over so that nobody can see it.

(5.2) Please put everything in the big envelope and write down your sex on it. If you are male, write down M, and if you are female, please write down F.

MAKING DECISIONS

This is a study about decisions and groups.

Your number [ ] Your group name [ ]

Please work on your own, without talking. Pages inside the questionnaire may be different in order from your neighbours'. So, don't worry about your neighbours. If you need any extra help, put up your hand and someone will come over to see you. Begin with the first page and remember not to miss any pages out.

IMPORTANT

1) Write your number and group name in the boxes at the top of every page.

2) Make your decisions quite **quickly** because there is only just enough time to make them in.

3) We are also interested in how well you can find italic letters, as this tells us something about how observant you are. The letters you have to find are slanted like *this*. There are several *italic* letters on each page. When you come across *italic* letters, please copy them in the margin on the righthand side. Copy the *italics* as soon as you come across them, not before or after you make your decisions.

your number [ ] your group name [ ]

Remember to write out the italics in the margin when you see them.

Your impressions of members of the two groups

1 Circle the numbers to show what you think about the people in **red** group?

People in **red** group are.....

a.	warm	1	2	3	4	5	6	7	cold
b.	dishonest	1	2	3	4	5	6	7	honest
c.	friendly	1	2	3	4	5	6	7	unfriendly
d.	untrustworthy	1	2	3	4	5	6	7	trustworthy
e.	generous	1	2	3	4	5	6	7	selfish

How much would you like to make friends with people of **red** group?

very much 1 2 3 4 5 6 7 not at all

your number [ ] your group name [ ]

Remember to write out the italics in the margin when you see them.

2 Next, circle the numbers to show what you think about the people in **blue** group?

People in **blue** group are.....

a.	warm	1	2	3	4	5	6	7	cold
b.	dishonest	1	2	3	4	5	6	7	honest
c.	friendly	1	2	3	4	5	6	7	unfriendly
d.	untrustworthy	1	2	3	4	5	6	7	trustworthy
e.	generous	1	2	3	4	5	6	7	selfish

How much would you like to make friends with people of **blue** group?

very much 1 2 3 4 5 6 7 not at all

3 Circle the word that you think describes the biggest difference between the **red** and the **blue** group

warmth honesty friendliness trustworthiness generosity

1 Write down :

your number | your group name

Remember to write out the italics in the margin when you see them.

Giving points

2 Circle a box to give points to the two groups

*P*erson number **15** of t*h*e **blue** group

Person nu*m*ber **9** of the **red** group

7	8	9	10	11	12	13
7	6	5	4	3	2	1

Write *b*elow, the details of the points that you *h*ave chosen:

Points for person number **15** of the **blue** group: _____

Points for person number **9** of the **red** group: _____

3 Check that you have circled a box, and copied the numbers and the italics

1 Write down :

your number | your group name

Remember to write out the italics in the margin when you see them.

2 Circle a box to give points to the two groups

Person num*b*er **4** of the **red** group

Person numbe*r* **18** of the **blue** group

10	9	8	7	6	5	4
1	3	5	7	9	11	13

Write be*l*ow, the details of the points that you have chosen:

Points for person number **4** of the **red** group: _____

Points *f*or person number **18** of the **blue** group: _____

3 Check that you have circled a box, and copied the numbers and the italics

Making decisions

1 Write down :

your number | your group name

Remember to write out the italics in the margin when you see them.

2 Circle a box to give points to the two groups

Person number **13** of the **blue** group	6	7	8	9	10	11	12
Person number **6** of the **red** group	3	5	7	9	11	13	15

Write below, the details of the points that you have chosen:

Points for person number **13** of the **blue** group: _____

Points for person number **6** of the **red** group: _____

3 Check that you have circled a box, and copied the numbers and the italics

Making decisions

1 Write down :

your number | your group name

Remember to write out the italics in the margin when you see them.

2 Circle a box to give points to the two groups

Person number **8** of the **red** group	7	8	9	10	11	12	13
Person number **11** of the **blue** group	7	6	5	4	3	2	1

Write below, the details of the points that you have chosen:

Points for person number **8** of the **red** group: _____

Points for person number **11** of the **blue** group: _____

3 Check that you have circled a box, and copied the numbers and the italics

Making decisions

1 Write down :

your number | your group name

Remember to write out the italics in the margin when you see them.

2 Circle a box to give points to the two groups

Person number **19** of the **blue** group

10	9	8	7	6	5	4
1	3	5	7	9	11	13

Person number **5** of the **red** group

Write below, the details of the points that you have chosen:

Points for person number **19** of the **blue** group: _____

Points for person number **5** of the **red** group: _____

3 Check that you have circled a box, and copied the numbers and the italics

Making decisions

1 Write down :

your number | your group name

Remember to write out the italics in the margin when you see them.

2 Circle a box to give points to the two groups

Person number **7** of the **red** group

Person number **17** of the **blue** group

6	7	8	9	10	11	12
3	5	7	9	11	13	15

Write below, the details of the points that you have chosen:

Points for person number **7** of the **red** group: _____

Points for person number **17** of the **blue** group: _____

3 Check that you have circled a box, and copied the numbers and the italics

The following concerns your feelings about your group

Please answer the folloing by circling the appropriate number.

Where 1 = " Strongly Disagree " and 7 = " Strongly Agree "

PLEASE CIRCLE THE GROUP YOU ARE IN :

BLUE **OR** **RED**

	Strongly Disagree						Strongly Agree
1. I am glad to belong to this group.	1	2	3	4	5	6	7
2. Overall, I have a low opinion of this group.	1	2	3	4	5	6	7
3. Right now, I do not feel close to this group.	1	2	3	4	5	6	7
4. I feel strong ties to this group.	1	2	3	4	5	6	7
5. I feel positive towards this group.	1	2	3	4	5	6	7
6. Right now I do not think highly of this group.	1	2	3	4	5	6	7
7. Right now, it feels good to be a member of this group.	1	2	3	4	5	6	7
8. I find it hard to be enthusiastic about this group.	1	2	3	4	5	6	7
9. Right now, it feels pleasant to be in this group.	1	2	3	4	5	6	7

Thank you very much. We would like next to ask you the questions about how you made your decisions.

❒

1 When you gave points to people, how much did you try to do each of the things listed below?

a. be fair to each person

very much 1 2 3 4 5 6 7 not at all

b. be fair to each group

very much 1 2 3 4 5 6 7 not at all

c. give yourself most points

very much 1 2 3 4 5 6 7 not at all

d. give your group most points

very much 1 2 3 4 5 6 7 not at all

e. give everyone as much as possible

very much 1 2 3 4 5 6 7 not at all

f. make yourself feel good

very much 1 2 3 4 5 6 7 not at all

g. try to make your group win

very much 1 2 3 4 5 6 7 not at all

h. nothing in particular

very much 1 2 3 4 5 6 7 not at all

2 How much do you think what you tried to do is what people like your parents or teachers would want you to do?

very much 1 2 3 4 5 6 7 not at all

❐❐

3 When you gave points to people, how much did you think about your <u>own</u> group?

very much 1 2 3 4 5 6 7 not at all

4 How much did you concentrate on the questions when you answered to them?

very much 1 2 3 4 5 6 7 not at all

5 How much were you distracted when you answered to them?

very much 1 2 3 4 5 6 7 not at all

6 When you gave your views about the <u>other</u> group, how much did you compare it with your own group?

very much 1 2 3 4 5 6 7 not at all

7 How difficult was it to answer the questions?

very difficult 1 2 3 4 5 6 7 very easy

8 How difficult was it to find the italics?

very difficult 1 2 3 4 5 6 7 very easy

This is the end of the questionnaire. Now, please turn over the booklet and then wait silently for more instructions.

Giving points

Look at the example below. The number of each person and the name of their group is written next to some boxes which contain points for each of the people. Imagine the points stand for pence. You must choose one box.

In this example, suppose you circled the box which gives 9 points to the person of number 37 from the blue group and 13 points to person number 25 from the red group. You then copy these numbers into the spaces below the boxes.

You would also write out the *italic* letter *p* in the right margin.

(**Example**). Circle a box to give points to the two groups

Person number 37 of the blue group	7	8	9	10	11	12	13
Person number 25 of the red group	15	14	13	12	11	10	9

Write below, the details of the points that you have chosen:

Points for person number 37 of the blue group: 9

Points for person number 25 of the red group: 13

p

Your impressions of members of the two groups

We would like to ask you about your view of the two groups (blue and red). Answer the questions carefully but do not spend too long on each one. There are no right or wrong answers

1 Think of the people in Red group, and circle a number to show what you think they are like. For example, if you think people in the Red group are quite tall you would circle 3, but if you think they are very tall you would circle 1. If you think they are very short you would circle 7. You would also write out the *italic* letter *t* in the right margin.

EXAMPLE

People in red group are.....

tall 1 2 3 4 5 6 7 short

t

Appendix 4.4

Supplementary tables for Experiment 2

Table A4.4.1 Experimental design and the number of subjects by the booklet versions and the group assignment

Booklet versions / Group division	DISTRACTION: No	Moderate	Strong	
	22	25	22	
Version 1	12	10	14	
"red"	7	6	7	
"white"	5	4	7	
Version 2	10	15	8	
"red"	5	7	3	
"white"	5	8	5	
TOTAL				69

Note: In the version 1, the allocation tasks were followed by the rating task. The reverse was true for the version 2.

Appendix 5.1

Pilot study 2

Recently, much effort has been directed towards understanding the role of distraction in stereotyping, impression formation, and causal attribution (e.g. Gilbert & Osborne, 1989; Macrae & Shepherd, 1991; Stangor & Duan, 1991). Distraction manipulation used in these area includes: concurrent distracting task such as digits rehearsal, time limit on the task, and task complexity. Whereas the process which is hypothesized to be affected by distraction in this project seems different from those in the areas above, the digits rehearsal task was adopted in this experiment. While eight digits are widely used, the numbers of digits were varied in this study from 3, 5, to 7 because it is not known what level of distraction works at what level of processes.

Another purpose of this study was to develop a better measure to tap the cognitive process of category differentiation. One effect of categorisation is thought to be accentuation of differences between categories (see McGarty & Penny, 1988). Therefore, verbal scales for differences between categories were included. Besides this, simply because differentiation is thought to occur on perceptual level, two scales with colour gradation were used. One scale has red at one extreme and blue at the other extreme. The colours gradually decrease in hue towards the centre, and white in the centre of the scale. A blue and a red sheets of gradation paper ([Decadry DP214 and DP207) were photographically attached and reduced to the size of the scale (see the examples in Appendix 5.2). Another colour band scale has dense brown at one extreme and pale one at the other ([Decadry DP221]). This was also photographically reduced to the size of the scale. On the scales, the more category differentiation, the more distance is expected between the categories.

A "spatial" scale with a similar idea was also included, adopted from an interpersonal relations study (Kogawa, Fujihara, Inoue, Ishii & Fukuda, 1983).

In this study, the independent variable was only the degree of distraction. Salience of group membership was designed to be kept constant to the salient conditions of Experiment 1. This was achieved by employing the same manipulation for the salient conditions in Experiment 1.

In order to make sure that subjects have thought about the groups, they will be asked to write, before the ingroup bias measures, the "first three things which come to your mind about the group"

Method

Subjects Two classes of 12-13 year old pupils (n =42) at Barton Court Grammar School (co-ed) participated in the pre-test. A session was run in a class.

Materials Each subject was provided with three small envelopes: number 1, 2 and 3; and five booklets: an example set, set 1, set 2, set 3, and set 4. The three small envelope 1, 2, and 3 contained a slip of paper on which a digits low 395, 27198, or 5319302 was written respectively.[1] Each set has a pair of targets. Subjects were asked to make judgements on these pairs of targets. These pairs were sunrise and sunset for the example set, Labour and the Conservatives for the set 1, British people and French people, Americans and Chinese, Hawaiians and Malaysians for the set 2, 3, and 4. The order of the last three pairs were rotated.

The main part of each booklet consists of judgements about similarity between two targets on four verbal scales, one spatial scale, and two colour bands. The verbal scales ask directly how similar the subjects think the two targets are in 1) their favourite food, 2) favourite colour, 3) hobbies, and 4) general. The spatial scale is adopted from an interpersonal relations study

[1] In Experiment 3, "531930284" was used as a nine digit number.

(e.g., Kogawa *et al.*, 1983). Subjects were asked to write down letters X and Y, which represent target A and target B respectively, on a square space to indicate how close the targets are (see Appendix 5.2).

The colour band scales were the same as the ones described above except that a black-grey-white gradation band was substituted for the brown gradation band, and that actual colour bands were either 1) presented only on the example set, which subjects were asked to refer to when they completed the other sets (for one class), or 2) presented only on the example set, and colour dots corresponding the bands were substituted in the other sets (for the other class).

Check items were included at the end of the sets. The items were on 1) how much the subjects were distracted in general, and by remembering the digits, 2) how difficult to remember the digit numbers, 3) how willing to participate the research again, and so on. To test social facilitation explanation, items such as "how much did you enjoy the judgement task?" was included. Affective measure included "how much were you annoyed with the task?".

Procedure Upon entering the classroom, each subject was given an big envelope, in which were the three small envelopes and the five booklets. General instructions were given in the beginning. The research was introduced as examining how people can perform two different tasks at the same time. It was emphasized that the session was not an ability test. Then, subjects were explained, with the example set, how to answer the verbal scales, the spatial scale and the colour band scales. Next, the set 1 was carried out. First, subjects were given 25 seconds to remember the first digits on a slip from the envelope number 1. They were told not to write the figure down anywhere. After 25 seconds, they started the booklet: the set 1. After everyone finished the booklet, the set 2 was similarly carried out together, with the

second digits from the envelope number 2. So was the set 3 and the set 4. The session took about 30 minutes altogether.

Results

1) Interrelations among the similarity scales There are at least two ways of examining the relationship between the different similarity scales. One is to look at the patterns of responses towards different target pairs on each scale, and to compare them. The other is a correlational approach: to factor analyze the scale scores for each target pair, and compare the factors. The results of these analyses are described below in order.

Similarity measures Table A5.1.1 shows the means and *SD* s of the similarity measures. On the verbal similarity scales in general, the pairs Labour - the Conservatives, British people - French people, and Hawaiian people - Malaysian people, were rated at around mid-points. But the pair, American people - Chinese people, was rated towards the dissimilar extreme. In the meantime, similarity in favourite colour (smlt2) for the American - Chinese pair was as small as for the Brithish - French and the Hawaiian - Malaysian pair, and the one for the pair, Labour - the Conservatives, was larger than those for the other pairs. This pattern seems to show that the verval scales reflect the perceived cultural similarity between these pairs, but the similarity in favourite colour.

The index of similarity on the spatial scale and the colour bands was the distance (mm) between the two letters, each representing one of the two targets. The spatial scale showed different pattern from the verbal scales. The pairs, Labour - the Conservatives and American people - Chinese people, were placed more distant from one another than the pairs, British people - French people and Hawaiian people - Malaysian people. One may speculate that the spatial scale in this study reflected somehow the perception of ideological differences between targets. This tendency was true to the black-

grey-white band scale. On the blue-red band scale, the distinctively larger distance was notable for the pair, Labour - the Conservatives. It may be due to the strong association between the two targets and the colours: red for Labour, and blue for the Conservatives.

In short, each scale seems to capture different aspects of similarity between target pairs. And among all, the red-blue colour band scale seems to tap the colour image difference between Labour and the Conservatives.

Rating differences Ratings of each target groups are shown in Table A5.1.2. As another similarity index, the absolute value of the rating difference between the pair targets were calculated (Table A5.1.3).

Table A5.1.1 The means on the similarity scales

Target pairs	smlt1[1]	smlt2	smlt3	smlt4	spatial[2]	band1[3]	band2
Lbr—Csrv[4]	5.07_a	6.45_a	5.02_c	5.21_b	92.12_{ab}	77.52	101.71_a
	(2.46)[5)]	(2.35)	(2.30)	(2.29)	(57.70)	(49.08)	(42.25)
Amc—Chns	7.50_b	5.74	7.36_a	6.52_a	101.62_a	83.48_a	87.64
	(1.95)	(2.10)	(1.90)	(1.97)	(54.09)	(48.99)	(46.51)
Brt—Frnch	6.67_b	4.93_b	5.17_{bc}	5.38_b	67.14_{bc}	65.70	90.54
	(2.23)	(2.35)	(2.16)	(2.10)	(63.23)	(49.08)	(46.82)
Hwn—Malyn	6.00_b	5.48_b	6.00_b	5.50_b	64.60_c	63.96_b	75.32_b
	(2.10)	(2.08)	(2.16)	(2.30)	(49.21)	(47.71)	(47.59)

1 The figure for smlt1 to smlt4 is a mean rating on the scale from 1 very similar to 9 very dissimilar.

2 The figure for spatial is the distance between two targets (mm) on a 135 x 150 mm white square.

3 The figure for band1 and band2 is the distance between two targets (mm) on a 143mm gradation colour band. Band1 is black-grey-white; band2 blue-red.

4 The pairs of targets were: Labour - the Conservatives, American people–Chinese people, British people–French people, and Hawaiian people–Malaysian people.

5 The figure in brackets is a standard deviation.

* The repeated multi-variate effects of pairs, scales, and the interaction were significant (F =5.38, df =3, $p < .01$; F =48.43, df =6, $p < .001$; F =3.84, df =18, $p < .05$). Valid cases for the multivariate analysis was 27.

** Valid cases for each scales were from the left: 42, 42, 42, 42, 42, 27, and 28 respectively. The effects of pairs on each of the scales were all significant. $F(3)$ =9.87, $p < .001$, for smlt1; F (3)=4.93, $p < .01$, for smlt2; F (3)=13.48, $p < .001$, for smlt3; F (3)=3.78, $p < .05$, for smlt4; F (3)=5.38, $p < .01$, for spatial; F (3)=2.40, $p < .075$, for band1; F (3)=2.75, $p < .05$, for band2. Figures which do not share the same subscripts in a scale are different at the risk probability of .05.

Table A5.1.2 The mean ratings of each target

Target group	warmth[1)]	friendliness			generosity
		honesty		trustworthiness	
Labour [2)]	3.21	3.41	3.57	3.26	3.00
	(1.34)	(1.65)	(1.31)	(1.61)	(1.50)
The Conservatives	4.48	4.74	4.74	4.52	4.43
	(1.70)	(1.68)	(1.53)	(1.67)	(1.50)
American people	4.83	3.86	4.95	4.24	4.05
	(1.32)	(1.44)	(1.21)	(1.25)	(1.48)
Chinese people	4.59	4.86	4.93	4.67	4.74
	(1.50)	(1.22)	(1.24)	(1.30)	(1.29)
British people	5.43	5.00	5.48	5.29	4.98
	(1.43)	(1.40)	(1.40)	(1.22)	(1.47)
French people	4.19	3.86	3.98	3.88	4.07
	(1.81)	(1.42)	(1.70)	(1.33)	(1.55)
Hawaiian people	5.74	4.88	5.57	5.05	4.83
	(1.08)	(1.27)	(1.19)	(1.29)	(1.46)
Malaysian people	4.55	4.19	4.52	4.60	4.17
	(1.37)	(1.33)	(1.19)	(1.17)	(1.06)

1) Adjective pairs on the SD scales are: warm - cold, honest - dishonest, friendly - unfriendly, trustworthy - untrustworthy, and generous - mean. Subjects rated them on the scale 1 very much to 9 not at all. But, the figures presented here are mean ratings across 42 subjects which were recoded such that the more the more positive. Figures in brackets are standard deviations.

2) Every two targets from the top are paired in the sets.

* The repeated multi-variate effects of targets, scales, and the interaction were significant (F =14.45, df =7/34, $p < .001$; F =4.40, df =4/37, $p < .01$; F =2.52, df =28/13, $p < .05$). Valid cases for the multivariate analysis was 41.

Table A5.1.3 The absolute value of rating differences

Target pairs	warmth[1)]	honesty	friendliness	trustworthiness	generosity	Average of five scales
Lbr—Csrv [2)]	1.98_a (1.97)	1.90_a (2.08)	1.83_a (1.99)	1.93_a (2.03)	1.95_a (1.96)	1.92_a (1.70)
Amc—Chns	1.67 (1.62)	1.19_b (1.37)	1.12_b (1.09)	1.14_b (1.34)	1.46 (1.58)	1.32_b (0.90)
Brt—Frnch	1.95 (2.07)	1.62 (1.78)	2.07_a (1.98)	1.69_{ab} (1.67)	1.67_a (1.63)	1.80_a (1.65)
Hwn—Malyn	1.29_b (1.35)	1.17_b (1.17)	1.10_b (1.30)	$.64_c$ (1.06)	$.95_b$ (1.29)	1.03_b (1.65)

1) Adjective pairs on the SD scales are: warm - cold, honest - dishonest, friendly - unfriendly, trustworthy - untrustworthy, and generous - mean. The figures are means of absolute values of difference in rating on the scale from 1 very much to 9 not at all, between the targets in pair. The more the more difference. Figures in brackets are standard deviations

2) The pairs of targets were: Labour - the Conservatives, American people - Chinese people, British people - French people, and Hawaiian people - Malaysian people.

* The repeated multi-variate effects of pairs, scales were significant(F =4.11, df =3, $p < .05$; F =3.04, df =3, $p < .05$), but not the interaction (F =1.43, df =9, $p > .1$). Valid cases for the multivariate analysis was 42.

** Some of the effects of pairs on each of the scales were significant. F (3)=1.85, $p > .1$, for warmth; F (3)=2.73, $p < .06$, for honesty; F (3)=3.64, $p < .05$, for friendliness; F (3)=4.54, $p < .01$, for trustworthiness; F (3)=5.17, $p < .01$, for generosity. Figures which do not share the same subscripts in a scale are different at the risk probability of .05.

Factor analyses In order to explore the interrelations among various similarity scales, factor analyses were conducted to the similarity scales scores for each pair of targets. Then, rating differences were added to the factor analyses.

In short, the four verbal scales and the spatial scale formed the first factor across most of the target pairs while the two colour band scales formed another factor. When rating differences were added, they tended to form the third factor. The results are shown from Table A5.1.4 to Table A5.1.11: Table A5.1.4 to 7 are without, Table A5.1.8 to 11 are with, the rating differences. The pairwise deletion was used for the analyses reported here as only the colour band scales had smaller completion rate. The results patterns with casewise

deletion, however, were found to be alike (These results are not reported here). The correlations between the scales are based on the total sample of 42 subjects.

Table A5.1.4 The factor matrix of the similarity scales for the Labour-the Conservatives pair

Items were subject to a principal-components analysis. Two factors were extracted on the basis of eigen values (3.14 for factor 1; 1.27 for factor 2), and obliquely rotated. 44.9% and 18.1% of the total variance are explained by the factor 1 and 2 respectively.

Similarity scales	Factor 1	Factor 2
smlt3	.825	
smlt4	.799	
smlt1	.775	
smlt2	.716	
spatial	.681	
red-blue band		.864
black-white band		.813

1) The figure is the factor loading of the item after the oblique rotation. Absolute loading value less than .30 are omitted.
2) The correlation between the factors is .26.

Table A5.1.5 The factor matrix of the similarity scales for the American people-Chinese people pair

Items were subject to a principal-components analysis. Two factors were extracted on the basis of eigen values (3.54 for factor 1; 1.32 for factor 2), and obliquely rotated. 50.6% and 18.8% of the total variance are explained by the factor 1 and 2 respectively.

Similarity scales	Factor 1	Factor 2
smlt4	.977	
smlt1	.763	
smlt3	.751	
spatial	.678	
smlt2	.664	
red-blue band		.908
black-white band		.851

1) The figure is the factor loading of the item after the oblique rotation. Absolute loading value less than .30 are omitted.
2) The correlation between the factors is .32.

Table A5.1.6 The factor matrix of the similarity scales for the British people-French people pair

Items were subject to a principal-components analysis. Two factors were extracted on the basis of eigen values (3.29 for factor 1; 1.71 for factor 2), and obliquely rotated. 47.0% and 24.4% of the total variance are explained by the factor 1 and 2 respectively.

Similarity scales	Factor 1	Factor 2
smlt4	.893	
smlt3	.819	
smlt1	.798	
spatial	.751	
smlt2	.708	
black-white band		.892
red-blue band		.842

1) The figure is the factor loading of the item after the oblique rotation. Absolute loading value less than .30 are omitted.
2) The correlation between the factors is .07.

Table A5.1.7 The factor matrix of the similarity scales for the Hawaiian people-Malaysian people pair

Items were subject to a principal-components analysis. Two factors were extracted on the basis of eigen values (3.17 for factor 1; 1.43 for factor 2), and obliquely rotated. 45.4% and 20.4% of the total variance are explained by the factor 1 and 2 respectively.

Similarity scales	Factor 1	Factor 2
smlt4	.844	
smlt3	.773	
smlt2	.767	-.371
spatial	.692	
black-white band		.839
red-blue band		.776
smlt1	.525	.537

1) The figure is the factor loading of the item after the oblique rotation. Absolute loading value less than .30 are omitted.
2) The correlation between the factors is .20.

Table A5.1.8 The factor matrix of the similarity scales for theLabour-the Conservatives pair (with rating differences score)

Items were subject to a principal-components analysis. Three factors were extracted on the basis of eigen values (3.79, 3.19, and 1.25 for factor 1, 2, and 3 respectively), and obliquely rotated. 31.6%, 26.6%, and 10.5% of the total variance are explained by the factor 1, 2, and 3 respectively.

Similarity scales	Factor 1	Factor 2	Factor 3
rating difference 3	.924		
rating difference 1	.892		
rating difference 5	.855		
rating difference 4	.843		
rating difference 2	.718		
smlt4		.833	
spatial		.806	
smlt2		.744	
smlt3		.726	
smlt1		.691	
black-white band			.879
red-blue band			.788

1) The figure is the factor loading of the item after the oblique rotation. Absolute loading value less than .30 are omitted.
2) Rating differences scores are the absolute values of differences in the pair of targets on SD scales: 1. warm - cold, 2. honest - dishonest, 3. friendly - unfriendly, 4. trustworthy - untrustworthy, and 5. generous - mean
3) The correlations between the factors are -.05 between factor 1 & 2, .10 between 1 & 3, .26 between 2 & 3.

Table A5.1.9 The factor matrix of the similarity scales for the American people-Chinese people pair (with rating differences score)

Items were subject to a principal-components analysis. Four factors were extracted on the basis of eigen values (3.74, 2.19, 1.47, and 1.04 for factor 1, 2, 3, and 4 respectively), and obliquely rotated. 31.2%, 18.3%, 12.3%, and 8.6% of the total variance are explained by the factor 1, 2, 3, and 4 respectively.

Similarity scales	Factor 1	Factor 2	Factor 3	Factor 4
smlt4	.968			
smlt3	.793			
smlt1	.783			
spatial	.747			
smlt2	.593			
rating difference 5		.789		
rating difference 3		.765		
rating difference 1		.692		
rating difference 2			-.808	
rating difference 4			-.806	
black-white band				-.888
red-blue band				-.847

1) The figure is the factor loading of the item after the oblique rotation. Absolute loading value less than .30 are omitted.
2) Rating differences scores are the absolute values of differences in the pair of targets on SD scales: 1. warm - cold, 2. honest - dishonest, 3. friendly - unfriendly, 4. trustworthy - untrustworthy, and 5. generous - mean
3) The correlations between the factors are .10 between 1 &2, .05 between 1 &3,.33 between 1 & 4, -.12 between 2 & 3, -.07 between 2 & 4, and .16 between 3 & 4.

Table A5.1.10 The factor matrix of the similarity scales for the British people-French people pair (with rating differences score)

Items were subject to a principal-components analysis. Three factors were extracted on the basis of eigen values (5.42, 2.30, and 1.61 for factor 1, 2, and 3 respectively), and obliquely rotated. 45.2%, 19.2%, and 13.4% of the total variance are explained by the factor 1, 2, and 3 respectively.

Similarity scales	Factor 1	Factor 2	Factor 3
rating difference 3	.918		
rating difference 2	.907		
rating difference 4	.896		
rating difference 1	.892		
rating difference 5	.865		
smlt3		.904	
smlt2		.822	
smlt4	.320	.758	
smlt1		.687	
spatial	.352	.592	
black-white band			.958
red-blue band			.834

1) The figure is the factor loading of the item after the oblique rotation. Absolute loading value less than .30 are omitted.
2) Rating differences scores are the absolute values of differences in the pair of targets on SD scales: 1. warm - cold, 2. honest - dishonest, 3. friendly - unfriendly, 4. trustworthy - untrustworthy, and 5. generous - mean
3) The correlations between the factors are .25 between factor 1 & 2, .23 between 1 & 3, .07 between 2 & 3.

Table A5.1.11 The factor matrix of the similarity scalesfor the Hawaiian people-Malaysian people pair (with rating differences score)

Items were subject to a principal-components analysis. Three factors were extracted on the basis of eigen values (5.42, 2.30, and 1.61 for factor 1, 2, and 3 respectively), and obliquely rotated. 45.2%, 19.2%, and 13.4% of the total variance are explained by the factor 1, 2, and 3 respectively.

Similarity scales	Factor 1	Factor 2	Factor 3
rating difference 4	.804		
rating difference 2	.791		
rating difference 5	.778		
rating difference 3	.766		
rating difference 1	.723		
smlt4		.857	
smlt3		.809	
smlt2		.714	.351
spatial		.667	
smlt1		.601	-.477
red-blue band			-.790
black-white band	.331		-.745

1) The figure is the factor loading of the item after the oblique rotation. Absolute loading value less than .30 are omitted.
2) Rating differences scores are the absolute values of differences in the pair of targets on SD scales: 1. warm - cold, 2. honest - dishonest, 3. friendly - unfriendly, 4. trustworthy - untrustworthy, and 5. generous - mean
3) The correlations between the factors are .13 between factor 1 & 2, -.15 between 1 & 3, -.13 between 2 & 3.

2) Perception of the degree of distraction Subjects rated difficulty in remembering the rehearsal numbers at the end of the last set 4. The other ratings about the task itself were after the similarity measures in every set. These ratings include: difficulty in answering the similarity questions, concentration on the tasks, busyness and distraction with remembering the rehearsal numbers, extra effort on judgements task (supposedly caused by rehearsal numbers), and affective elements in the task (annoyed, enjoyed, motivation in engagement).

1. Difficulty in remembering the number subjects reported that the longer the number the more difficult to remember (Table A5.1.12). The length

of the number, however, was not counterbalanced in the booklet set 1, 2, and 3. The shortest number was always in the set 1, the middle number in the set 2, and the longest in the set 3. Therefore, the actual difficulty may be more with the longer numbers when taking account the habituation to the task.

As can be seen in Table A5.1.12, even the longest digits (5319302) were perceived only slightly difficult. Therefore, longer digits should be used for the strong distraction.

2. *Difficulty in answering the question* The results on difficulty to answer the question in general are shown in Table A5.1.13a. Perception of difficulty increased along with the set order, up to the set 3. There were the memory tasks in the set 1, 2, and 3 which were designed to increase the cognitive load with the order, while no memory task was included in the set 4. The results seem to reflect this memory task load.

3. *Concentration on the similarity task* Subjects' reported concentration on the task is shown in Table A5.1.13b. As the ratings were less than the neutral point 5, subjects seem generally to have concentrated on the task. Meanwhile, there is a similarity with the "difficulty" item in that the value goes down from the set 1 to set 3, and comes back in the set 4. This may be again because of the degree of the memory task load. It seem that the more demanding the memory task is, the less subjects concentrated on the judgement task.

4. *Busyness and distraction by remembering digits* Self-reported busyness and distraction caused by remembering the digits are shown in Table A5.1.14. There were great and significant difference among conditions. Subjects reported rather not to be busy and distracted with the memory task in the set 1 and 2, while they were rather busy and distracted with remembering the digits in the set 3. It seems that three digits (set 1) and five digits (set 2) are not enough at least to make subjects subjectively busy and distracted.

5. Extra effort for task caused by memory task Subjects' cognition of effort for the judgement task caused by the memory task is shown in Table A5.1.15. Cognition of effort in the set 3 was significantly different from the neutral point 5 ($p < .05$). The seven-digit was perceived to be demanding more effort.

Table A5.1.12 Difficulty in remembering the rehearsal numbers [1)]

Numbers	Three digits	Five digits	Seven digits	*F* value
Difficulty	8.35_a	6.78_b	4.93_c	750.24^*

1 The question was "How difficult was it to try to remember each of the numbers?" (on the scale 1. very difficult - 9. not at all).

* $df = 39/3, p < .001$

** Figures which does not share the same subscripts in a scale are different at the risk probability of .05.

Table A5.1.13a Difficulty in answering the question in general [1)]

	Set 1	Set 2	Set 3	Set 4	*F* value
Difficulty	5.98	5.60	5.18_a	6.43_b	2.76^*

1) The question was "How difficult was it to answer the question?" (on the scale 1. very difficult - 9. not at all).

* $df = 117/3, p < .05$

** Figures which does not share the same subscripts in a scale are different at the risk probability of .05.

Table A5.1.13b Concentration on the task [1)]

	Set 1	Set 2	Set 3	Set 4	*F* value
Concentration	3.85_a	4.43_b	4.83_b	4.15	3.72^*

1) The question was "How much did you concentrate on the judgement task?" (on the scale 1. very much - 9. not at all).

* $df = 117/3, p < .05$

** Figures which does not share the same subscripts in a scale are different at the risk probability of .05.

Table A5.1.14 Busyness and distraction by remembering digits [1)]

	Set 1	Set 2	Set 3	Set 4	*F* value
Busyness	7.40_a	5.15_b	3.95_c	$(3.95)^{2)}$	44.75^*
Distraction	7.60_a	5.73_b	4.58_c	(6.63)	31.24^*

1) The questions were " How busy were you (this time) in trying to remember the number?"(on the scale 1. very busy - 9. not at all); and "How much were you distracted by trying to remember the number?"(on the scale 1. very much - 9. not at all).

2) The figure in brackets are not the response to the questions described above. For busyness, "How busy were you this time with the judgement task?"; for distraction, "How much were you distracted?" They were not included for statistical analyses.

* $df = 78/2, p < .001$

** Figures which does not share the same subscripts in a scale are different at the risk probability of .05.

Table A5.1.15 Extra effort for judgement task [1)]

	Set 1	Set 2	Set 3	Set 4	*F* value
Effort	5.53_a	5.05_{ac}	3.93_b	$(4.65)_{bc}^{2)}$	6.15^*

1) The questions were " How much more effort did you have to make to do the judgement task?"(on the scale 1. very much - 9. not at all). For the set 4, the word "more" was not used.

2) The figure in brackets are not the response to the questions described above. For the set 4, the word "more" was not used in the question.

* $df = 117/3, p < .001$

** Figures which does not share the same subscripts in a scale are different at the risk probability of .05.

6. Affective aspects in the task affective aspects of the distracting memory task were measured. These were: how much the subjects were annoyed by ,and enjoyed, the memory task; and how willing they would be to participate in the research again. The last item is not necessarily for the memory task, but may be suggestive.

As can be seen in Table16, subjects were not annoyed in the set 1 and 2 (significantly different from the neutral point $p < .05$) while they were slightly annoyed by remembering the seven-digits number. The results of "enjoyed" item are consistent with this pattern. Compared with the set 1, 2, and 4, subjects enjoyed less in the set 3 where they had to remember the seven-digits. In connection to willingness to the research, subjects were generally willing. There was no difference across the conditions.

Table A5.1.16 Affective aspects of the memory task [1]

	Set 1	Set 2	Set 3	Set 4	*F* value
Annoyed	7.75_a	6.08_b	4.40_c	$(6.33_{bd})^{2)}$	16.01^{**}
enjoyed	4.43_a	4.88	5.43_b	4.50_a	3.57^{*}
willing to do again	3.10	3.55	3.43	3.20	1.01

1) The questions were "How much were you annoyed (this time) by trying to remember the number?"; "How much did you (this time) enjoy the memory task?"; and "How willing would you be to take part in the research again?"(all on the scale 1. very much to 9. not at all).
2) The figure in brackets are not the response to the questions described above. The question was: "How much were you annoyed with the task this time?" (on the scale 1. very much to 9. not at all).
3) Figures which does not share the same subscripts in a scale are different at the risk probability of .05.
* $df = 117/3, p < .001$, ** $df = 117/3, p < .05$

Table A5.1.17 Number of correctly recalled digits by distraction condition

Distraction:	Set 1 (3-digit)	Set 2 (5-digit)	Set 3 (7-digit)
Number of strings correctly recalled			
1		1	
2	1	2	
3	39		
4		2	1
5		35	1
6			4
7			35

Note: Data for two subjects were missing

Summary of the results and discussions

1. Interrelations amoung the similarity scales The similarity scores on the scales revealed differential pattern of similarity among the scales. Especially, the black-white band scale and the red-blue colour band scale showed different configulation. The pattern of the black-white band scale was alike to that of the spatial scale, while the red-blue colour band scale tapped specially the difference between the target pair, Labour and the Conservatives.

Meanwhile, factor analyses showed that the colour band scales formed a single factor independent of the other scales, quite consistently across the target pairs, and that the spatial scale, a seemingly similar scale, constituted unanimously a factor together with the verbal similarity scales.

A possible interpretation of these results, one set from comparison among target pairs and another from factor analyses, can be that the factor analyses captured the abstruct similarity and the differences among the scales whereas comparison of target pairs showed concrete, or realistic differences among scales.

2 Perception of distraction by the memory task Generally, the 3 digits and the 5 digits number were perceived not to be: difficult to remember, distracting, demanding, and annoying. Meanwhile, the 7 digits number was reported to be not very difficult to remember, but to be: slightly distracting, and demanding. Subjects were slightly annoyed by remembering the 7 digits number; they yet reported to be willing to participate in the research again.

These results may indicate that rehearsal of the 7 digits number can be moderately distracting, at least so perceived. On the other hand, it is difficult to conclude what degree of distraction the distracting task evokes. The first reason is that there is no evidence of the perception being a good index of inner distraction. The second reason is that the degree of distraction may interact with the main task subjects are engaging, and the task used here, the similarity judgement, may not interact in the same way as point allocations and so on.

EXAMPLE

Target 1: Sunrise

Target 2: Sunset

1.1 Think of, and write down the first thing which comes to your mind about sunrise.

1. [ ]

1.2 Think of, and write down the first thing which comes to your mind about sunset.

1. [ ]

1.3 How similar do you think sunrise is to sunset?

a. in their size

very similar 1 2 3 4 5 6 7 8 9 very dissimilar

b. in their length of time

very similar 1 2 3 4 5 6 7 8 9 very dissimilar

c. in general

very similar 1 2 3 4 5 6 7 8 9 very dissimilar

☆☆ Next, we would like to ask your images about sunrise and sunset

2.1 Imagine sunrise and sunset. Please put down letters X and Y on the colour band according to where you feel each of them belongs.

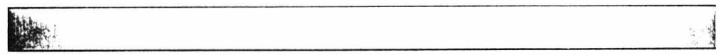
X for sunrise

Y for sunset

Band 1



Band 2



☆☆ Next, we would like to ask your images about sunrise and sunset

2.1 Imagine sunrise and sunset. Please put down letters X and Y on the colour band according to where you feel each of them belongs.

X for sunrise

Y for sunset

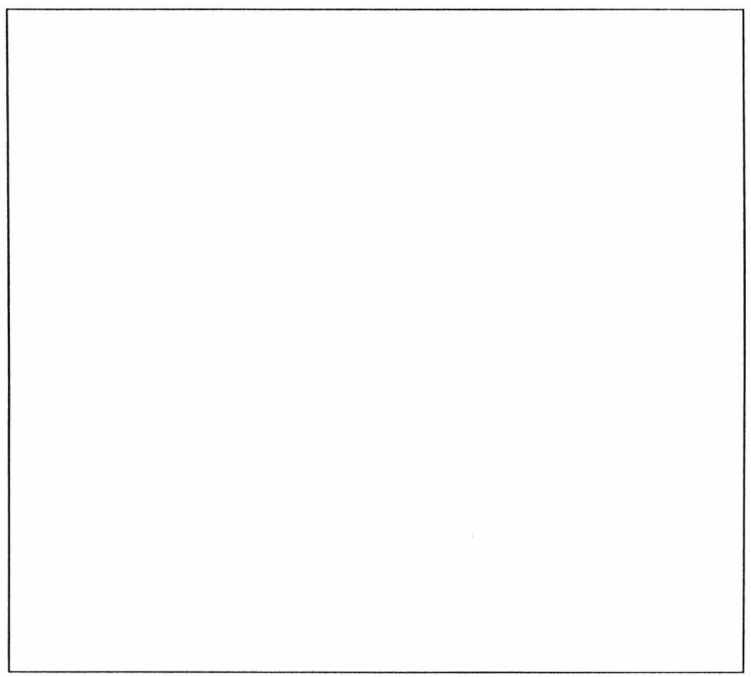
Band 1



Band 2



2.2 Imagine sunrise and sunset. Please put down one letter X and Y in the space below to show how much in common you think they have. The closer they are the more they have in common. X: sunrise Y: sunset



3.1 Circle the numbers to show what you think about sunrise?

Sunrise is .....

a.	warm	1	2	3	4	5	6	7	cold
b.	friendly	1	2	3	4	5	6	7	unfriendly

3.2 Circle the numbers to show what you think about sunset?

Sunset is .....

a.	warm	1	2	3	4	5	6	7	cold
b.	friendly	1	2	3	4	5	6	7	unfriendly

SET 1

Group 1: Labour
Group 2: the Conservatives

1.1 Write down the first three things which come to your mind about Labour.

1. [ ]
2. [ ]
3. [ ]

1.2 Write down the first three things which come to your mind about the Conservatives.

1. [ ]
2. [ ]
3. [ ]

1.3 How similar do you think Labour are to the Conservatives?

a. in their favourite food

very similar 1 2 3 4 5 6 7 8 9 very dissimilar

b. in their favourite colour

very similar 1 2 3 4 5 6 7 8 9 very dissimilar

c. in their hobbies

very similar 1 2 3 4 5 6 7 8 9 very dissimilar

d. in general

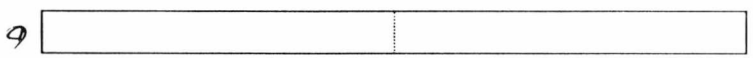
very similar 1 2 3 4 5 6 7 8 9 very dissimilar

☆☆ Next, we would like to ask your images about people of the groups

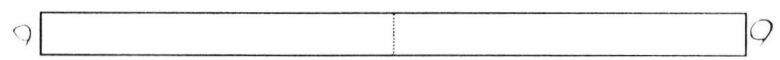
2.1 Imagine people of the two groups. Please put down letters X and Y on the colour band according to where you feel that group belongs.

X for Labour
Y for the Conservatives

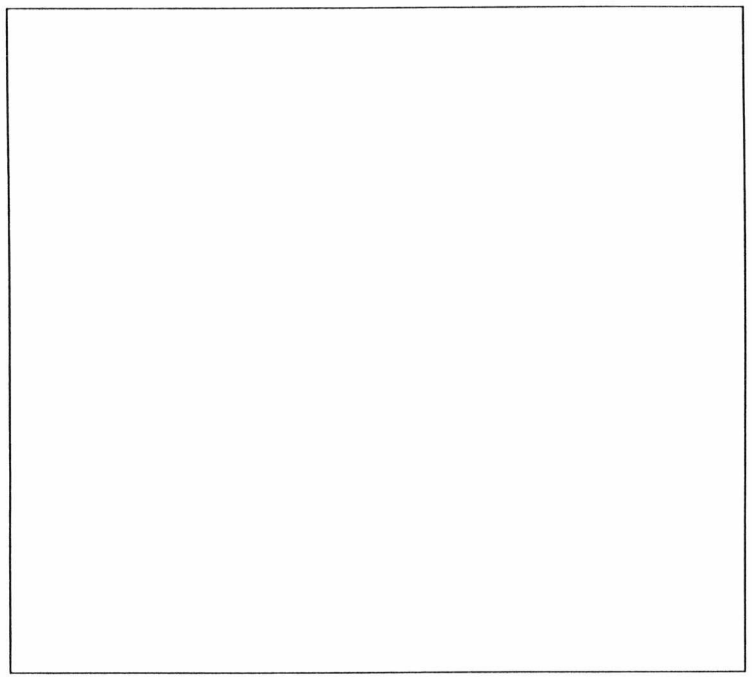
Band 1



Band 2



2.2 Imagine people of the two groups. Please put down one letter X and Y in the space below to show how much in common you think they have. The closer they are the more they have in common. X: Labour Y: the Conservatives



3.1 Circle the numbers to show what you think about Labour?

Labour are .....

a.	warm	1	2	3	4	5	6	7	cold
b.	dishonest	1	2	3	4	5	6	7	honest
c.	friendly	1	2	3	4	5	6	7	unfriendly
d.	untrustworthy	1	2	3	4	5	6	7	trustworthy
e.	generous	1	2	3	4	5	6	7	selfish

3.2 How much would you like to make friends with people with Labour?

very much 1 2 3 4 5 6 7 not at all

3.3 Circle the numbers to show what you think about the Conservatives?

the Conservatives are .....

a.	warm	1	2	3	4	5	6	7	cold
b.	dishonest	1	2	3	4	5	6	7	honest
c.	friendly	1	2	3	4	5	6	7	unfriendly
d.	untrustworthy	1	2	3	4	5	6	7	trustworthy
e.	generous	1	2	3	4	5	6	7	selfish

3.4 How much would you like to make friends with the Conservatives?

very much 1 2 3 4 5 6 7 not at all

4.0 Write down the number you were asked to remember. [ ]

☆☆☆ Now, answer the questions below about the two tasks.

a. How difficult was it to answer the question ?

very difficult 1 2 3 4 5 6 7 8 9 not at all

b. How busy were you in trying to remember the number?

very busy 1 2 3 4 5 6 7 8 9 not at all

c. How much were you annoyed by trying to remember the number?

very much 1 2 3 4 5 6 7 8 9 not at all

d. How much did you concentrate on the judgement task?

very much 1 2 3 4 5 6 7 8 9 not at all

e. How much were you distracted by trying to remember the number?

very much 1 2 3 4 5 6 7 8 9 not at all

f. How much more effort did you have to make to do the judgement tasks?

very much 1 2 3 4 5 6 7 8 9 not at all

g. How much did you enjoy the memory task?

very much 1 2 3 4 5 6 7 8 9 not at all

h. How much did you enjoy the judgement task?

very much 1 2 3 4 5 6 7 8 9 not at all

i. How willing would you be to take part in the research again?

very willing 1 2 3 4 5 6 7 8 9 not at all

This is the end of SET 1. Please turn over the booklet and then wait silently for more instructions.

SET 2

Group 1: American people

Group 2: Chinese people

1.1 Write down the first three things which come to your mind about American people.

1. [ ]
2. [ ]
3. [ ]

1.2 Write down the first three things which come to your mind about Chinese people.

1. [ ]
2. [ ]
3. [ ]

1.3 How similar do you think American people are to Chinese people?

a. in their favourite food

very similar 1 2 3 4 5 6 7 8 9 very dissimilar

b. in their favourite colour

very similar 1 2 3 4 5 6 7 8 9 very dissimilar

c. in their hobbies

very similar 1 2 3 4 5 6 7 8 9 very dissimilar

d. in general

very similar 1 2 3 4 5 6 7 8 9 very dissimilar

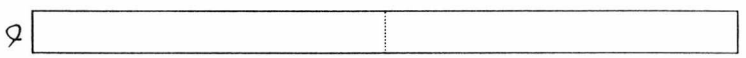
☆☆ Next, we would like to ask your images about people of the groups

2.1 Imagine people of the two groups. Please put down letters X and Y on the colour band according to where you feel that group belongs.

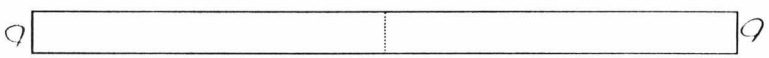
X for American people

Y for Chinese people

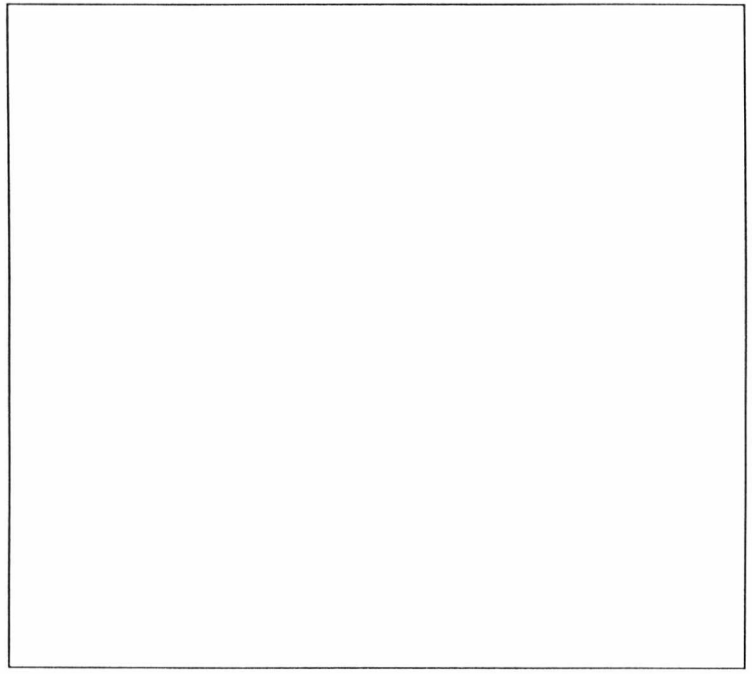
Band 1



Band 2



2.2 Imagine people of the two groups. Please put down one letter X and Y in the space below to show how much in common you think they have. The closer they are the more they have in common. X: American people Y: Chinese people



3.1 Circle the numbers to show what you think about American people?

American people are .....

a.	warm	1	2	3	4	5	6	7	cold
b.	dishonest	1	2	3	4	5	6	7	honest
c.	friendly	1	2	3	4	5	6	7	unfriendly
d.	untrustworthy	1	2	3	4	5	6	7	trustworthy
e.	generous	1	2	3	4	5	6	7	selfish

3.2 How much would you like to make friends with people with American people?

very much 1 2 3 4 5 6 7 not at all

3.3 Circle the numbers to show what you think about Chinese people?

Chinese people are .....

a.	warm	1	2	3	4	5	6	7	cold
b.	dishonest	1	2	3	4	5	6	7	honest
c.	friendly	1	2	3	4	5	6	7	unfriendly
d.	untrustworthy	1	2	3	4	5	6	7	trustworthy
e.	generous	1	2	3	4	5	6	7	selfish

3.4 How much would you like to make friends with Chinese people?

very much 1 2 3 4 5 6 7 not at all

4.0 Write down the number you were asked to remember. [ ]

☆☆☆ Now, answer the questions below about the two tasks.

a. How difficult was it this time to answer the question ?

very difficult 1 2 3 4 5 6 7 8 9 not at all

b. How busy were you this time in trying to remember the number?

very busy 1 2 3 4 5 6 7 8 9 not at all

c. How much were you annoyed this time by trying to remember the number?

very much 1 2 3 4 5 6 7 8 9 not at all

d. How much did you concentrate this time on the judgement task?

very much 1 2 3 4 5 6 7 8 9 not at all

e. How much were you distracted this time by trying to remember the number?

very much 1 2 3 4 5 6 7 8 9 not at all

f. How much more effort did you this time have to make to do the judgement tasks?

very much 1 2 3 4 5 6 7 8 9 not at all

g. How much did you this time enjoy the memory task?

very much 1 2 3 4 5 6 7 8 9 not at all

h. How much did you this time enjoy the judgement task?

very much 1 2 3 4 5 6 7 8 9 not at all

i. How willing would you be to take part in the research again?

very willing 1 2 3 4 5 6 7 8 9 not at all

This is the end of SET 2. Please turn over the booklet and then wait silently for more instructions.

SET 3

Group 1: British people

Group 2: French people

1.1 Write down the first three things which come to your mind about British people.

1. [ ]
2. [ ]
3. [ ]

1.2 Write down the first three things which come to your mind about French people.

1. [ ]
2. [ ]
3. [ ]

1.3 How similar do you think British people are to French people?

a. in their favourite food

very similar 1 2 3 4 5 6 7 8 9 very dissimilar

b. in their favourite colour

very similar 1 2 3 4 5 6 7 8 9 very dissimilar

c. in their hobbies

very similar 1 2 3 4 5 6 7 8 9 very dissimilar

d. in general

very similar 1 2 3 4 5 6 7 8 9 very dissimilar

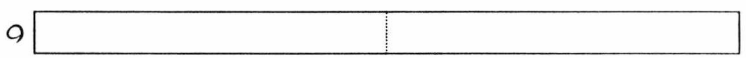
☆☆ Next, we would like to ask your images about people of the groups

2.1 Imagine people of the two groups. Please put down letters X and Y on the colour band according to where you feel that group belongs.

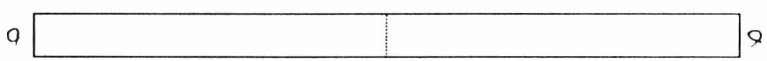
X for British people

Y for French people

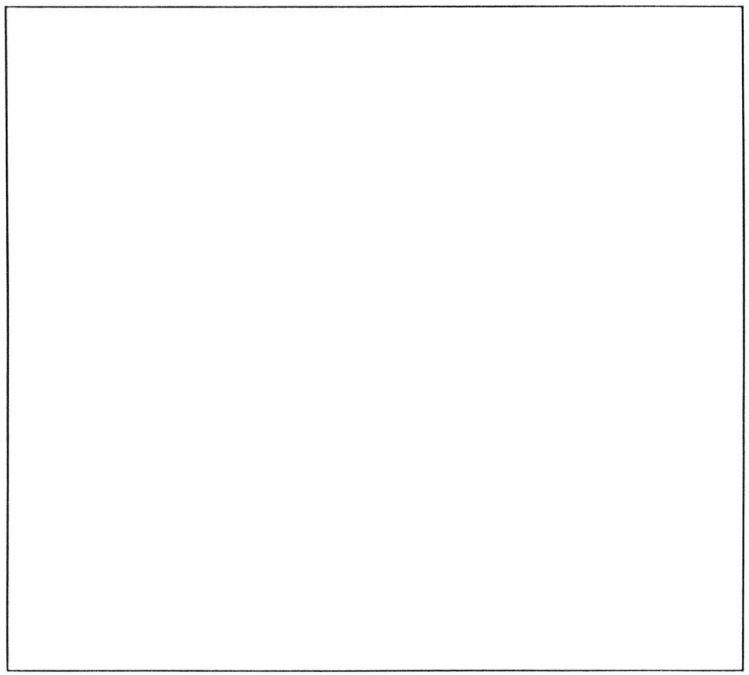
Band 1



Band 2



2.2 Imagine people of the two groups. Please put down one letter X and Y in the space below to show how much in common you think they have. The closer they are the more they have in common. X: British people Y: French people



3.1 Circle the numbers to show what you think about British people?

British people are .....

a.	warm	1	2	3	4	5	6	7	cold
b.	dishonest	1	2	3	4	5	6	7	honest
c.	friendly	1	2	3	4	5	6	7	unfriendly
d.	untrustworthy	1	2	3	4	5	6	7	trustworthy
e.	generous	1	2	3	4	5	6	7	selfish

3.2 How much would you like to make friends with people with British people?

very much 1 2 3 4 5 6 7 not at all

3.3 Circle the numbers to show what you think about French people?

French people are .....

a.	warm	1	2	3	4	5	6	7	cold
b.	dishonest	1	2	3	4	5	6	7	honest
c.	friendly	1	2	3	4	5	6	7	unfriendly
d.	untrustworthy	1	2	3	4	5	6	7	trustworthy
e.	generous	1	2	3	4	5	6	7	selfish

3.4 How much would you like to make friends with French people?

very much 1 2 3 4 5 6 7 not at all

4.0 Write down the number you were asked to remember. [ ]

☆☆☆ Now, answer the questions below about the two tasks.

a. How difficult was it this time to answer the question ?

very difficult 1 2 3 4 5 6 7 8 9 not at all

b. How busy were you this time in trying to remember the number?

very busy 1 2 3 4 5 6 7 8 9 not at all

c. How much were you annoyed this time by trying to remember the number?

very much 1 2 3 4 5 6 7 8 9 not at all

d. How much did you concentrate this time on the judgement task?

very much 1 2 3 4 5 6 7 8 9 not at all

e. How much were you distracted this time by trying to remember the number?

very much 1 2 3 4 5 6 7 8 9 not at all

f. How much more effort did you this time have to make to do the judgement tasks?

very much 1 2 3 4 5 6 7 8 9 not at all

g. How much did you this time enjoy the memory task?

very much 1 2 3 4 5 6 7 8 9 not at all

h. How much did you this time enjoy the judgement task?

very much 1 2 3 4 5 6 7 8 9 not at all

i. How willing would you be to take part in the research again?

very willing 1 2 3 4 5 6 7 8 9 not at all

This is the end of SET 3. Please turn over the booklet and then wait silently for more instructions.

SET 4

Group 1: Hawaiian people

Group 2: Malaysian people

1.1 Write down the first three things which come to your mind about Hawaiian people.

1. [ ]
2. [ ]
3. [ ]

1.2 Write down the first three things which come to your mind about Malaysian people.

1. [ ]
2. [ ]
3. [ ]

1.3 How similar do you think Hawaiian people are to Malaysian people?

a. in their favourite food

very similar 1 2 3 4 5 6 7 8 9 very dissimilar

b. in their favourite colour

very similar 1 2 3 4 5 6 7 8 9 very dissimilar

c. in their hobbies

very similar 1 2 3 4 5 6 7 8 9 very dissimilar

d. in general

very similar 1 2 3 4 5 6 7 8 9 very dissimilar

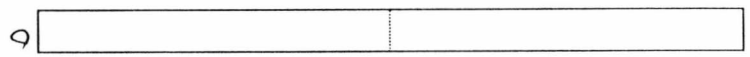
☆☆ Next, we would like to ask your images about people of the groups

2.1 Imagine people of the two groups. Please put down letters X and Y on the colour band according to where you feel that group belongs.

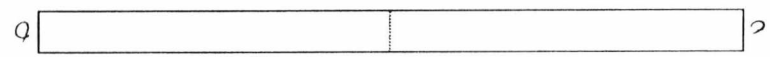
X for Hawaiian people

Y for Malaysian people

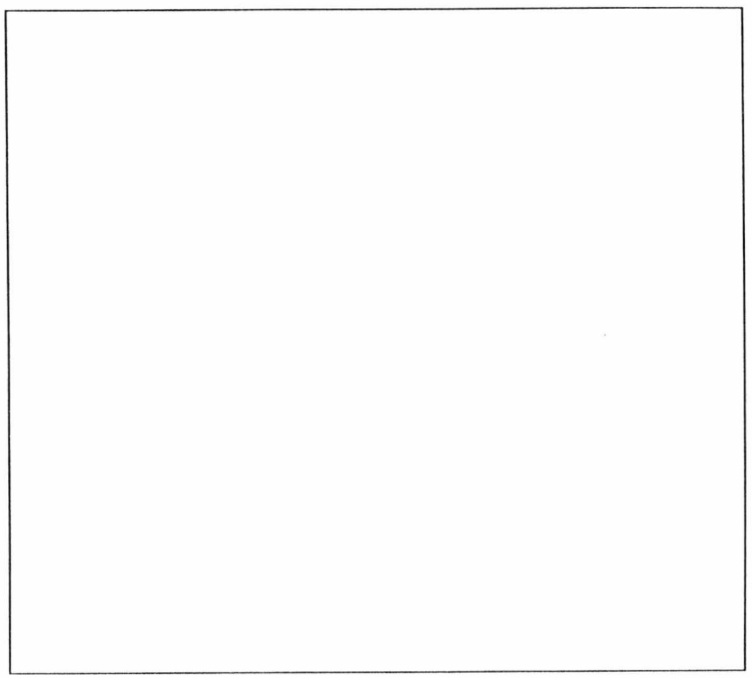
Band 1



Band 2



2.2 Imagine people of the two groups. Please put down one letter X and Y in the space below to show how much in common you think they have. The closer they are the more they have in common. X: Hawaiian people Y: Malaysian people



3.1 Circle the numbers to show what you think about Hawaiian people?

Hawaiian people are .....

a.	warm	1	2	3	4	5	6	7	cold
b.	dishonest	1	2	3	4	5	6	7	honest
c.	friendly	1	2	3	4	5	6	7	untriendly
d.	untrustworthy	1	2	3	4	5	6	7	trustworthy
e.	generous	1	2	3	4	5	6	7	selfish

3.2 How much would you like to make friends with people with Hawaiian people?

very much 1 2 3 4 5 6 7 not at all

3.3 Circle the numbers to show what you think about Malaysian people?

Malaysian people are .....

a.	warm	1	2	3	4	5	6	7	cold
b.	dishonest	1	2	3	4	5	6	7	honest
c.	friendly	1	2	3	4	5	6	7	unfriendly
d.	untrustworthy	1	2	3	4	5	6	7	trustworthy
e.	generous	1	2	3	4	5	6	7	selfish

3.4 How much would you like to make friends with Malaysian people?

very much 1 2 3 4 5 6 7 not at all

☆☆☆ Now, answer the questions below.

a. How difficult was it this time to answer the question?

very difficult 1 2 3 4 5 6 7 8 9 not at all

b. How busy were you this time with the judgement task?

very much 1 2 3 4 5 6 7 8 9 not at all

c. How much were you annoyed with the task this time?

very much 1 2 3 4 5 6 7 8 9 not at all

d. How much did you concentrate on the judgement task?

very much 1 2 3 4 5 6 7 8 9 not at all

e. How much were you distracted this time?

very much 1 2 3 4 5 6 7 8 9 not at all

f. How much effort did you make this time to do the judgement task?

very much 1 2 3 4 5 6 7 8 9 not at all

g. How much did you enjoy the judgement task this time?

very much 1 2 3 4 5 6 7 8 9 not at all

h. How willing would you be to take part in the research again?

very willing 1 2 3 4 5 6 7 8 9 not at all

☆☆☆☆ How difficult was it to try to remember each of the numbers?

a. [395]

very difficult 1 2 3 4 5 6 7 8 9 very easy

b. [27198]

very difficult 1 2 3 4 5 6 7 8 9 very easy

c. [5319302]

very difficult 1 2 3 4 5 6 7 8 9 very easy

This is the end of all the sets. Please turn over the booklet and then wait silently for more instructions.

INSTRUCTIONS

(to be read out loud)

1 We are interested in how well people can perform two different tasks at the same time: a memory task and a judgemental task.

2 These tasks are not to test your abilities, and you don't have to write your name. So, please answer honestly.

3 It is important that you answer the questions one by one from the beginning, in order and silently.

4 Please put up your hand if you have a question. Don't ask your neighbours.

[Materials are handed out to participants]

0.1 "Now, I'll explain the first task. This involves making judgements about groups of people. Look at the piece of paper at hand. (Reading aloud the text of the instruction sheet.)"

[Administration of the first set of materials]

1.0 "Ok, the second task is simple. You just have to remember a number."

1.1 "Open envelope No.1, and find a number that you are given. The number may be different from your neighbours, so don't worry about others. This is the number you are asked to remember until you write it down later. Don't write it down anywhere until you are told to do so.

Now, try to learn the number silently. You have 25 seconds. After you learn it, please put the paper back to the envelope"

1.2 "OK, while you are keeping the number in mind, I'd like to ask you to do the judgement task I've already explained. Please take out the **set 1** from a big envelope, and start from page one. Don't think too much. Just answer according to your image."

[Administration of the second set of materials]

2.0 "Has everyone finished the **set 1**? Then, we go on to the **set 2**.

2.1 "Now, open the envelope 2, and find a number that you are given. This is another number you are asked to hold in memory until you write it down later. Don't write it down anywhere until you are told to do so. Now, try to learn the number silently. Again, you have 25 seconds. After you learn it, please put the paper back to the envelope 2."

2.2 "OK, while you are keeping the number in mind, you have the judgement task. Please take out the **set 2** from a big envelope, and start from page one. Don't think too much. Just answer according to your image."

[Administration of the third and fourth set of materials]

The same as above

Appx 5.4

INSTRUCTIONS ("salient")

1) General instruction

(1) "Thank you very much for taking part in our research. This is a study about decisions and groups. On the desk, you should have a small and a big envelope, a questionnaire booklet, and an instruction sheet. Don't turn them over, and please just listen to the instructions I give you, and I will explain more to you about the research later on. "

2) Manipulation of social categorisation

(2.0) " Ok, before explaining what you are going to do, I'd like you all to draw lots from these boxes. The lot gives you your personal code and group name. Each of you will have a different personal code. This is to divide you into two groups. "

(2.1) " When you pick up the lot, remember the personal code and group name, and put the lot in the ~~small~~ big envelope. Don't tell or show the personal code and the group name to anybody. Keep it a secret. "

(Subjects draw a slip. Experimenter & Assistant walk around).

(2.2) " (After everyone picks up one) Has everyone taken the slip? Now, Turn over the booklet and write your personal code and group on the bottom boxes of the first page. (After a while) Have you written them down? "

(2.3) " The personal code you've just had are taken from the groups of codes described on this sheet. So, if your personal code is Zero, your group must be red. And if your personal code is ten, your group must be blue. You are going to make a team with the people of the same group, red or blue, and afterwards, each group will play a game and see which group performs best. As you can see on the sheet, by chance, roughly half of the class belong to the red group and the other half belong to the blue group. "

3) Filling in the questionnaire

(3.0) " (Posters are attached to the blackboard to explain tasks)

Ok, now I'll explain to you how to use the booklet. All the instructions and some examples are written out on the separate sheet of paper, just in case you need to check them, but I'll go through them now. Basically, what I'd like you to do are two things. Please look at the poster here(while pointing). "

(3.1) " One part of the booklet asks you to decide how many points you are going to give to each of the groups in a pair. Look at this example. (Reading aloud the text of the poster). "

(3.2) " The other part of the booklet asks you to show what you think about the people from red group and blue group. Look at this example. (Reading aloud the text of the poster) "

4) Notes (Distracting task)

(4.0) " Now, turn the first page and listen to the instruction at the top of the page as I read aloud" (Read aloud page1)

(4.1)a " So, Does everyone have a rehearsal number? Now, try to remember the rehearsal number silently. You have 25 seconds. After you learn it, please put the paper back to the envelope. " (After 25 seconds) " Now, put it back to the envelope."

5) End

(5.0) " If you have any questions, first of all, look at the instruction sheet. If you still have a question, put up your hand. Don't ask your neighbours. Now, start from page one, please.

... ...

(5.1) (Towards the end of the session) When you finish the questionnaire, please turn it over so that nobody can see it.

(5.2) Please put everything in the big envelope and write down your sex on it. If you are male, write down M, and if you are female, please write down F.

Appdx 5.5

Giving points

Look at the example below. The code of each person and the name of their group is written next to some boxes which contain points for each of the people. Imagine the points stand for pence. You must choose one box.

In this example, suppose you circled the box which gives 9 points to the person of code **37** from the **blue** group and 13 points to person code **25** from the **red** group. You then copy these numbers into the spaces below the boxes.

(**Example**). Circle a box to give points to the two groups

Person code **37** of the **blue** group	7	8	9	10	11	12	13
Person code **25** of the **red** group	15	14	13	12	11	10	9

Write below, the details of the points that you have chosen:

Points for person code **37** of the **blue** group: _____

Points for person code **25** of the **red** group: _____

Your impressions of members of the two groups

We would like to ask you about your view of the two groups (**blue** and **red**). Answer the questions carefully but do not spend too long on each one. There are no right or wrong answers

1 Think of the people in **Red** group, and circle a number to show what you think they are like. For example, if you think people in the **Red** group are quite tall you would circle 3, but if you think they are very tall you would circle 1. If you think they are very short you would circle 7.

EXAMPLE

People in **red** group are.....

tall 1 2 3 4 5 6 7 short

Appx 5.6

MAKING DECISIONS

This is a study about decisions and groups.

Your personal code [ ] Your group name [ ]

Please work on your own, without talking. Pages inside the questionnaire may be different in order from your neighbours'. So, don't worry about your neighbours. If you need any extra help, put up your hand and someone will come over to see you. Begin with the first page and remember not to miss any pages out.

IMPORTANT

1) Write your personal code and group name in the boxes at the top of every page.

2) Make your decisions quite **quickly** because there is only just enough time to make them.

3) We are also interested in how well people can perform two different tasks at the same time. So, we are going to ask you to do one more task. This task is simple. You just have to remember a **rehearsal number**. Now, open the small envelope and find the rehearsal number that you have been given. The rehearsal number may be different from your neighbours', so don't worry about other people. This is the number you are asked to remember until you write it down later. Don't write it down anywhere until you are told to do so — this is not to test your abilities and you don't have to write your name.

Making decisions

personal code

group name

IMPORTANT: Don't forget the rehearsal number!

Your impressions of members of the two groups

1 Circle the numbers to show what you think about the people in red group?

People in red group are.....

a.	warm	1	2	3	4	5	6	7	cold
b.	dishonest	1	2	3	4	5	6	7	honest
c.	friendly	1	2	3	4	5	6	7	unfriendly
d.	untrustworthy	1	2	3	4	5	6	7	trustworthy
e.	generous	1	2	3	4	5	6	7	selfish

How much would you like to make friends with people of red group?

very much 1 2 3 4 5 6 7 not at all

Making decisions

personal code

group name

IMPORTANT: Don't forget the rehearsal number!

2 Next, circle the numbers to show what you think about the people in blue group?

People in blue group are.....

a.	warm	1	2	3	4	5	6	7	cold
b.	dishonest	1	2	3	4	5	6	7	honest
c.	friendly	1	2	3	4	5	6	7	unfriendly
d.	untrustworthy	1	2	3	4	5	6	7	trustworthy
e.	generous	1	2	3	4	5	6	7	selfish

How much would you like to make friends with people of blue group?

very much 1 2 3 4 5 6 7 not at all

3 Circle the word that you think describes the biggest difference between the red and the blue group

warmth honesty friendliness trustworthiness generosity

1 Write down :

personal code | group name

IMPORTANT: Don't forget the rehearsal number!

☆ How similar do you think the **red** group people are to the **blue** group people?

a. in their favourite food

very similar 1 2 3 4 5 6 7 8 9 very dissimilar

b. in their favourite colour

very similar 1 2 3 4 5 6 7 8 9 very dissimilar

c. in their hobbies

very similar 1 2 3 4 5 6 7 8 9 very dissimilar

d. in general

very similar 1 2 3 4 5 6 7 8 9 very dissimilar

Making decisions

1 Write down :

personal code | group name

IMPORTANT: Don't forget the rehearsal number!

Giving points

2 Circle a box to give points to the two groups

Person code 15 of the blue group

Person code 9 of the red group

7	8	9	10	11	12	13
7	6	5	4	3	2	1

Write below, the details of the points that you have chosen:

Points for person code 15 of the blue group: _____

Points for person code 9 of the red group: _____

3 Check that you have circled a box and copied the points

1 Write down :

personal code | group name

IMPORTANT: Don't forget the rehearsal number!

2 Circle a box to give points to the two groups

Person code **4** of the **red** group

Person code **18** of the **blue** group

10	9	8	7	6	5	4
1	3	5	7	9	11	13

Write below, the details of the points that you have chosen:

Points for person code **4** of the **red** group: _____

Points for person code **18** of the **blue** group: _____

3 Check that you have circled a box and copied the points

1 Write down :

personal code | group name

IMPORTANT: Don't forget the rehearsal number!

2 Circle a box to give points to the two groups

Person code **13** of the **blue** group

Person code **6** of the **red** group

6	7	8	9	10	11	12
3	5	7	9	11	13	15

Write below, the details of the points that you have chosen:

Points for person code **13** of the **blue** group: _____

Points for person code **6** of the **red** group: _____

3 Check that you have circled a box and copied the points

1 Write down :

personal code | group name

IMPORTANT: Don't forget the rehearsal number!

2 Circle a box to give points to the two groups

Person code 8 of the red group

Person code 11 of the blue group

7 / 7	8 / 6	9 / 5	10 / 4	11 / 3	12 / 2	13 / 1

Write below, the details of the points that you have chosen:

Points for person code 8 of the red group: _____

Points for person code 11 of the blue group: _____

3 Check that you have circled a box and copied the points

Making decisions

1 Write down :

personal code | group name

IMPORTANT: Don't forget the rehearsal number!

2 Circle a box to give points to the two groups

Person code 19 of the blue group

Person code 5 of the red group

10 / 1	9 / 3	8 / 5	7 / 7	6 / 9	5 / 11	4 / 13

Write below, the details of the points that you have chosen:

Points for person code 19 of the blue group: _____

Points for person code 5 of the red group: _____

3 Check that you have circled a box and copied the points

1 Write down :

personal code [ ] group name [ ]

IMPORTANT: Don't forget the rehearsal number!

2 Circle a box to give points to the two groups

Person code 7 of the red group	6	7	8	9	10	11	12
Person code 17 of the blue group	3	5	7	9	11	13	15

Write below, the details of the points that you have chosen:

Points for person code 7 of the red group: _____

Points for person code 17 of the blue group: _____

3 Check that you have circled a box and copied the points

personal code [ ] group name [ ]

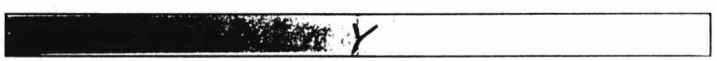
IMPORTANT: Don't forget the rehearsal number!

4 Imagine people of the two groups. Please put down letters X and Y on the colour band according to where you feel that group belongs.

X for the **red** group

Y for the **blue** group

EXAMPLE



Band 1



Band 2



personal code

group name

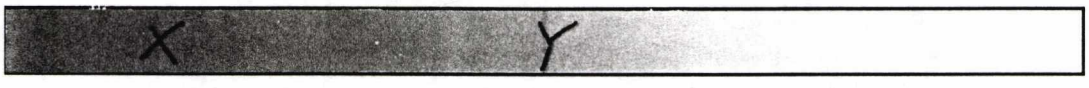
IMPORTANT: Don't forget the rehearsal number!

4 Imagine people of the two groups. Please put down letters X and Y on the colour band according to where you feel that group belongs.

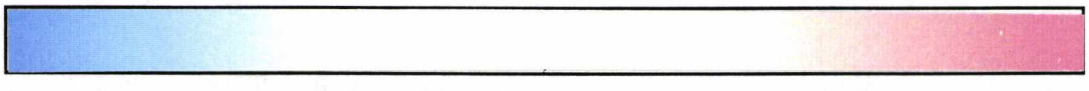
X for the **red** group

Y for the **blue** group

EXAMPLE



Band 1



Band 2



☆ **Now, write down the rehearsal number you were asked to remember.**

[ ]

Making decisions

I Write down :

personal code [ ] group name [ ]

☆☆ The following concern your feelings about your group

Please answer the folloing by circling the appropriate number.

Where 1 = " Strongly Disagree " and 7 = " Strongly Agree "

PLEASE CIRCLE THE GROUP YOU ARE IN :

BLUE OR RED

	Strongly Disagree						Strongly Agree
1. I am glad to belong to his group.	1	2	3	4	5	6	7
2. Overall, I have a low opinion of this group.	1	2	3	4	5	6	7
3. Right now, I do not feel close to this group.	1	2	3	4	5	6	7
4. I feel strong ties to this group.	1	2	3	4	5	6	7
5. I feel positive towards this group.	1	2	3	4	5	6	7
6. Right now I do not think highly of this group.	1	2	3	4	5	6	7
7. Right now, it feels good to be a member of this group.	1	2	3	4	5	6	7
8. I find it hard to be enthusiastic about this group.	1	2	3	4	5	6	7
9. Right now, it feels pleasant to be in this group.	1	2	3	4	5	6	7

Thank you very much. We would like next to ask you the questions about <u>how</u> you made your decisions.

❒

1 When you gave points to people, how much did you try to do each of the things listed below?

a. be fair to each person

very much 1 2 3 4 5 6 7 not at all

b. be fair to each group

very much 1 2 3 4 5 6 7 not at all

c. give yourself most points

very much 1 2 3 4 5 6 7 not at all

d. give your group most points

very much 1 2 3 4 5 6 7 not at all

e. give everyone as much as possible

very much 1 2 3 4 5 6 7 not at all

f. make yourself feel good

very much 1 2 3 4 5 6 7 not at all

g. try to make your group win

very much 1 2 3 4 5 6 7 not at all

h. nothing in particular

very much 1 2 3 4 5 6 7 not at all

2 How much do you think what you tried to do is what people like your parents or teachers would want you to do?

very much 1 2 3 4 5 6 7 not at all

❒❒

3 When you gave points to people, how much did you think about your <u>own</u> group?

very much 1 2 3 4 5 6 7 not at all

4 How much did you concentrate on the questions when you answered to them?

very much 1 2 3 4 5 6 7 not at all

5 How much were you distracted when you answered to them?

very much 1 2 3 4 5 6 7 not at all

6 When you gave your views about the <u>other</u> group, how much did you compare it with your own group?

very much 1 2 3 4 5 6 7 not at all

7 How difficult was it to answer the questions?

very difficult 1 2 3 4 5 6 7 very easy

8 How willing would you be to take part in the research again?

very willing 1 2 3 4 5 6 7 not at all

9 How difficult was it to try to remember the number?

very difficult 1 2 3 4 5 6 7 very easy

Thank you very much. This is the end of the questionnaire. Now, please turn over the booklet and then wait silently for more instructions.

Appendix 5.7

Supplemental results for Experiment 3

Table A5.7.1 Experimental design and the number of subjects by the booklet versions and the group assignment

Booklet versions / Group division	DISTRACTION 3-digit	5-digit	7-digit	9-digit	
	13	13	14	14	
Version 1	8	7	7	6	
"red"	4	4	4	3	
"blue"	4	3	3	3	
Version 2	4	4	4	6	
"red"	2	1	2	4	
"blue"	2	3	2	2	
Version 3	1	2	3	2	
"red"	1	1	1	0	
"blue"	0	1	2	2	
TOTAL					54

Note: Order of task in Version 1: allocation, bands, ratings, & verbal measures;
Version 2: ratings, verbal measures, allocation & bands; and
Version 3: allocation, verbal measures, ratings & bands.

Factor analysis

Both point allocation bias scores (pull scores) and rating bias scores were subject to factor analyses. The pattern matrices are shown in Table A5.7.2 and Table A5.7.3. Unlike Experiments 1 and 2, three competitive pulls did not form a single factor; nor rating bias scores form a single factor. The reason is not clear.

Comparison of point allocation bias and rating ingroup bias

Indices for comparison of point allocation bias and rating ingroup bias were calculated following the previous study. Three competitive pulls scores were summed to form a composite allocation bias index, and all of the five rating dimensions were summed to make a rating bias index. Multiple homogeneity test showed that there was a marginally significant difference between variances of both indices (Box M=17.02, F =1.80, df =9/22551, p =.062).

While overall means for both indices were significantly greater than zero (M s=.63, .63,), no effect was significant.

Table A5.7.2 The factor matrix of the "pull" scores

Items were subject to a principal-components analysis. Three factors were extracted on the basis of eigen values (1.41,1.19, & 1.12, for factor 1, 2, & 3), and oblimine rotated. 23.5%, 19.9%, and 18.6% of the total variance are explained by the factor 1, 2, & 3 respectively.

"pulls"	Factor 1	Factor 2	Factor 3
MJP (on MD•MIP)	-.81021		
MJP•MIP (on MD)	.78749		
F (on MD•MIP)		-.80489	
MD•MIP (on F)		.57952	
MD (on MJP•MIP)		.30473	.76304
MD•MIP (on MJP)			.70889

1) The figure is the factor loading of the item. Absolute loading value less than .30 are omitted.
2) Correlations between the factors were .07, .06, -.05 between factor 1 & 2, 1 & 3, and 2 & 3 respectively.

Table A5.7.3 The factor matrix of the rating ingroup bias

Items were subject to a principal-components analysis. Two factors were extracted on the basis of eigen values (2.10 & 1.01, for factor 1, 2, & 3), and oblimine rotated. 41.9%, and 20.1% of the total variance are explained by the factor 1 & 2 respectively.

"pulls"	Factor 1	Factor 2
bias2 (honesty)	.87166	
bias4 (trustworthiness)	.81939	
bias3 (friendliness)	.50762	.40731
bias1 (warmth)	.39883	.91494
bias5 (generosity)		.41305

1) The figure is the factor loading of the item. Absolute loading value less than .30 are omitted.
2) The correlation between the factors was .24.

Table A5.7.4 Comparison between allocation bias and rating bias

Distraction: indices	Weak	Moderate	Strong	Extra strong
allocation bias	.50 (1.19)	.50 (1.91)	.31 (1.25)	1.14# (1.70)
rating bias**	.53 (1.18)	.70 (1.62)	.77 (.81)	.54 (.66)

1) The allocation and the rating bias are respectively composites of MD-MJP•MIP & MD•MIP, MD Mip - MJP, and MD Mip - F, and bias 1, 2, 3, 4 & 5. The more, the more in favour of ingroup. The figures in brackets are standard deviations.
2) # denotes the figure is significantly different from neutral point zero ($p < .05$).
3) The main effect of distraction on ingroup bias either in point allocations and in ratings was not significant ($F = .74$, $df = 3/46$; $F = .13$, $df = 3/46$). Multivariate effects of distraction, measures, and the interaction were not significant. (F s= .32, .01, .76, df s =3/46, 1/46, 3/46)
4) The numbers of subjects were 12, 12, 12, & 14 in the weak, the moderate, the strong, and the extra strong distraction condition.

** *SD* s were significantly different among conditions. Bartlett-Box$F$ (3, 3767)= 3.57, $p < .05$

Table A5.7.5 Number of correctly recalled digits by distraction condition

Distraction:	3-digit	5-digit	7-digit	9-digit
Number of strings correctly recalled	(*n*=13)	(*n*=13)	(*n*=14)	(*n*=13)
1				
2				1
3	13			
4			1	1
5		13	1	
6				
7			12	
8				2
9				9

Note: Data for one subject in the 9-digit condition is missing

App. 6.1

1992.12.11　吹田一中

教示　〔集団成員性顕著条件〕

1クラス全員が理科室などの別室で、できれば出席簿順に着席。
材料は予め机の上に。回答冊子は裏向きにして置いてある。

1）一般的教示

《1。0》　今日は、調査に参加していただき有り難うございます。今日皆さんにしてもらうのは、集団に関する簡単な意思決定課題です。
私たちは普段から、さまざまな事柄についての意思決定をしなければなりません。自分が次に何をどのようにするか、人をどう判断・評価するかといったことから、もっと抽象的な数学の問題といったものまで、さまざまです。この調査では皆さんのそういった意思決定が、どのようにされているのかということを調べます。

《1。1》　まず皆さんの机の上に、次のものがあるか確認して下さい。まだ中を見たりしないで下さい。
大きな封筒が1つ、
小さい封筒が4つ、
回答冊子が1つ、
両面に印刷された紙が1枚、
黒いボールペンが1本
小さいカードが1枚
です。他のものは机の中か下に片づけて下さい。

2）くじ引き

《2。0》　さてこれから、実際に何をしてもらうかを説明しますが、その前にこのクラスを2つに分けるために、皆さんにここにある箱から「くじ」を引いてもらいます。くじには、グループ名と個人番号が、書かれています。グループは赤組と白組の2つがありますから、このクラスは2つに分かれます。個人番号は一人づつ違っています。

《2。1》　くじを引いたら、そこに書かれてあるグループ名と個人番号を覚えて、それからそのくじを大きな封筒の中にしまって下さい。このグループ名と個人番号は、誰にも言ったり見せたりしないで、秘密にしておいて下さい。

（実験者とその協力者はくじの入った箱をもって教室をまわる。
被験者はくじを引く。）

《2。2》　（全員がくじを引いた後）　まだくじを引いてない人はいませんか。さて、それでは「回答冊子」を表に返して表紙の下の枠の中に、あなたのグループ名と個人番号を書き入れて下さい。（しばらくして）書き入れましたか。

《2。3》　あなたがくじで引いた個人番号は、このポスターに描かれた個人番号に対応しています。例えば、もしあなたの個人番号が0（ゼロ）なら、あなたのグループは赤組ということになります。(実)それから、赤組の人は赤組の人同士、白組の人は白組の人同士と一緒にチームを作ってもらい、あとでゲームをします。赤組と白組のどっちのチームが、うまくゲームができるかを試します。
このポスターを見れば分かるように、大体クラスの半分の人が赤組、残りの半分の人が白組になります。

[※ 顕著条件]「ここでちょっと確認しておきましょう」の両手を両眼の左右に当てる。両眼をつむって両手を前の人の肩を叩いて頂いてお自組の人を同定。「大体半分の人が赤組で、残りの方が白でした」「目をつむって
この方が赤白それぞれに分かれたところを想像して下さい。」
「この赤と白でチームを作り(上記と同じ)、伝言ゲームのようなものをしますよ。どう伝わるかを

3）回答冊子の記入法の説明

《3。0》　（説明用のポスターが黒板上に貼ってある。）
それでは回答冊子にどうやって書き込むかを説明します。やり方と例は、後で見直せるように「説明シート」にも書かれていますが、一度、皆で一緒に見てみましょう。やったもらいたいことは、大きく言って2つあります。（指さしながら）まずこちらのポスターを見て下さい。

《3。1》　一つの課題では、ペアになっている2人の人のそれぞれに、何点の得点をあげるかを決めてもらいます。（「説明シート」の説明文を読み上げる）

《3。2》　もうひとつの別の課題では、赤組と白組の人に対してあなたがどういう印象を持っているかを尋ねています。こちらのポスターを見て下さい。（「説明シート」の説明文を読み上げる）

4）回答上の注意と暗唱番号について（回答冊子の1頁目）

《4。0》　さて、では回答冊子の表紙をめくって下さい。1ページ目の上にある「回答上の注意」を読みますので、注意して聞いて下さい。（「注意」を読む）

《4。1》　この注意の4についてですが、暗唱番号は、机の上の小さい4つの封筒の中に入っています。それでは、まず1と書いてある封筒からだけ、中に入っている紙切れを取り出して下さい。この番号は、まわりの人のものと違っているかも知れませんが、気にしないで下さい。これは記憶力のテストではありませんから、どこかに書いておいてカンニングする必要はありませんよ。忘れたら忘れたで結構です。ただし記憶力についての研究によると、時々思い出すようにすると長く覚えていられます。ですから、回答冊子中に「暗唱番号を思い出して下さい」という合図が時々ありますから、その時には暗唱番号を思い出すようにするとよいでしょう。

《4。2》　それでは紙切れに書かれている暗唱番号を覚えて下さい。25秒あげます。（25秒後）それではやめて下さい。紙切れは封筒1に戻して、その封筒ごと大きな封筒の中に入れて下さい。その数字を後で書き込んでもらうまで覚えていて下さいね。

5）実施

《5。0》　分からないことがあれば、説明シートをまず見て、それでも分からない場合には、手を挙げて下さい。まわりの人に聞かないで下さい。それではページをめくって、最初のページからはじめて下さい。

《5。1》　セット1は全員終わりましたか。要領は分かったでしょうか。それでは、セット2にうります。小さい封筒の2の中から紙切れを出して下さい。また25秒あげますから、そこに書かれている暗唱番号を覚えて下さい。
（25秒後）25秒たちました、やめて下さい。それでは、紙切れを封筒2に戻してその封筒ごと大きな封筒に入れて下さい。その数字を後で書き込んでもらうまで覚えていて下さいね。それでは、ページをめくってセット2を始めて下さい。

（以下セット4まで同じ。セット4の途中、「記憶にもとづく得点表」を配布）

《5。2》　全員終わりましたか。では、他は全部大きな封筒にいれて、最後に配った1枚の紙を、回答冊子中でどうやったかを思い出して記入して下さい。

Level 1	2 (5)	3 (6)	4
83693	3894626 41	946285 76254	064
74064	8464395 72	- 2 - 736327 07265	474
38474	4383764 73	7438843 7476	663
47663	9748204 74	0443737 3828	693

グループの名前と個人番号

赤組

0, 1, 2, 3, 4,
5, 6, 7, 8, 9

20, 21, 22, 23, 24,
25, 26, 27, 28, 29

40, 41, 42, 43, 44,
45, 46, 47, 48, 49

白組

10, 11, 12, 13, 14,
15, 16, 17, 18, 19

30, 31, 32, 33, 34,
35, 36, 37, 38, 39

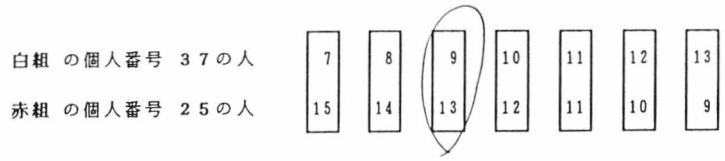
50, 51, 52, 53, 54,
55, 56, 57, 58, 59

得点の分配

この課題では、赤組と白組の人にたいしてどう得点を与えるかを決めてもらいます。下の例を見て下さい。左側に２人の人のグループ名と個人番号が、その右の長方形の中には、それぞれの人に与える得点の組み合わせが示されています。得点１点は１円にあたると想像して下さい。得点の組み合わせを示す長方形をひとつだけ選び、それに○印をつけて下さい。正しい答というのはないので、思った通りに答えて下さい。

この例では、左から３番目の長方形を選び、上の白組の３７番の人に９点を、下の赤組の２５番の人に１３点をあげています。次に、その下の点線部にそれぞれへの得点を書き写しています。

（例）２つのグループへの得点の組み合わせを選び、１つ○印をつけて下さい



選択した得点の組み合わせを、記入して下さい。

白組 の ３７ 番の人に ..9.. 点

赤組 の ２５ 番の人に ..13.. 点

第一印象

この課題では、赤組の人と白組の人についての印象をお尋ねします。下の例を見て下さい。この例では赤組の人について聞いています。あなたがそのグループの人をどのような人だと思うかについて、最も適当だと思う番号に○印をつけて下さい。例えば、もしあなたがそのグループの人は「やや背が高い」、と思えば３に○印をつけ、「非常に高い」と思えば１に○印をつけて下さい。「非常に背が低い」と思えば７に○印をつけて下さい。

正しい答というものはありませんから、あまり考え込まず、頭に思い浮かんだままを答えてください。

（例）

赤組の人はどのような人でしょうか？ それぞれについて、最も適当だと思う番号に、１つだけ○印をつけて下さい。

赤組の人は……	非常に	かなり	やや	どちらとも言えない	やや	かなり	非常に	
a. 背が高い	1	2	3	4	5	6	7	背が低い
b. …… ……								

Appendix 6.4

Rehearsal numbers for Experiment 4

064	474	663	693
474	663	693	064
663	693	064	474
693	064	474	663
693	663	474	064
83693	74064	38474	47663
74064	38474	47663	83693
38474	47663	83693	74064
47663	83693	74064	38474
47663	38474	74064	83693
389462641	846439572	438376473	974820474
846439572	438376473	974820474	389462641
438376473	974820474	389462641	846439572
974820474	389462641	846439572	438376473
974820474	438376473	846439572	389462641
73632907265	74388437476	04437373828	94628576254
94628576254	73632907265	74388437476	04437373828
74388437476	04437373828	94628576254	73632907265
04437373828	94628576254	73632907265	74388437476
94628576254	04437373828	74388437476	73632907265

意思決定に関するアンケート

これは集団と意思決定に関する研究です

あなたのグループ　あなたの個人番号

A1

回答上の注意

話をせずに、一人で回答して下さい。隣の人のをのぞいたりしないように。分からないことがあれば、静かに手を挙げて指示を待って下さい。最初のページから順番に回答していって下さい。あやまってページをとばしたりしないように気をつけて下さい。

1) 1ページめくるごとに、ページの上部にある枠内に、グループ名と個人番号を記入して下さい。

2) すばやく回答していって下さい。時間は丁度だけしかありません。

3) 回答冊子はいくつかのセットに分かれています。ひとつのセットが終わったら、調査者への合図として、**終了カード**を机の上で立てておいて下さい。

4) この調査では、別の課題を同時にどれだけうまくやれるか、ということも調べます。そこで、別の課題をもうひとつやってもらいます。この別の課題は簡単です。いくつかの**暗唱番号**をこれからの約10分の間、覚えていてもらうだけです。暗唱番号は後で回答冊子中に記入してもらいますが、それまではどこにも書かないで下さい。

A1

意思決定に関するアンケート

1 最初に記入して下さい ↓

あなたのグループ　あなたの個人番号

注意　暗唱番号を思い出して下さい。

得点の分配

2 ふたつのグループへの得点の組み合わせを選び、1つ○印をつけて下さい

グループ 白組　個人番号 15	7	8	9	10	11	12	13
グループ 赤組　個人番号 9	7	6	5	4	3	2	1

選択した得点の組み合わせを、以下に記入して下さい。

白組 の 15 番の人に　　..... 点

赤組 の 9 番の人に　　..... 点

A1

意思決定に関するアンケート

1 最初に記入して下さい ↓

あなたのグループ　あなたの個人番号

注意　暗唱番号を思い出して下さい。

得点の分配

2 ふたつのグループへの得点の組み合わせを選び、1つ○印をつけて下さい

グループ 赤組　個人番号 4	10	9	8	7	6	5	4
グループ 白組　個人番号 18	1	3	5	7	9	11	13

選択した得点の組み合わせを、以下に記入して下さい。

赤組 の 4 番の人に　　..... 点

白組 の 18 番の人に　　..... 点

A1

意思決定に関するアンケート

1 最初に記入して下さい ↓

あなたのグループ　あなたの個人番号

注意　暗唱番号を思い出して下さい。

得点の分配

2 ふたつのグループへの得点の組み合わせを選び、１つ○印をつけて下さい

グループ **白組**　個人番号 13	6	7	8	9	10	11	12
グループ **赤組**　個人番号　6	3	5	7	9	11	13	15

選択した得点の組み合わせを、以下に記入して下さい。

白組 の **13** 番の人に　　..... 点

赤組 の　**6** 番の人に　　..... 点

A1

注意　暗唱番号を思い出して下さい。

ここまでが最初のセットです。

最初の暗唱番号を次の［　］の中に書き入れて下さい。

［　　］

次にセット２にうつりますが、みんなで一斉に始めますので、

他の人が最初のセットを終えるまで、終了カードを立てて、静かに待って下さい。

次のページをめくらずに、そのままの状態で待って下さい。

A1

意思決定に関するアンケート　　**1 最初に記入して下さい ↓**

あなたのグループ　あなたの個人番号

注意　暗唱番号を思い出して下さい。

第一印象

（1）

赤組の人はどのような人でしょうか？ それぞれについて、最も適当だと思う番号に、1つだけ○印をつけて下さい。

赤組の人は……		非常に	かなり	やや	どちらとも言えない	やや	かなり	非常に	
a.	暖かい	1	2	3	4	5	6	7	冷たい
b.	不正直な	1	2	3	4	5	6	7	正直な
c.	親しみやすい	1	2	3	4	5	6	7	親しみにくい
d.	信頼できない	1	2	3	4	5	6	7	信頼できる
e.	気前がいい	1	2	3	4	5	6	7	けちだ

A1

意思決定に関するアンケート　　**1 最初に記入して下さい ↓**

あなたのグループ　あなたの個人番号

注意　暗唱番号を思い出して下さい。

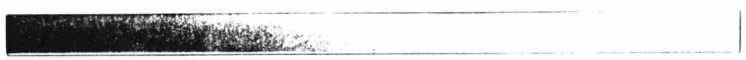
● ふたつのグループの人たちのことを想像してみて下さい。それぞれのグループは、次の色バンドのどこに属すると感じますか。あなたの感じにしたがって、文字 X と Y をそれぞれの色バンドの上に書き入れて下さい。

赤組を表すものとして — X
白組を表すものとして — Y

（例）



色バンド1



色バンド2



A1

注意　暗唱番号を思い出して下さい。

これでセット２は終わりです。
セット２の暗唱番号を次の［　］の中に書き入れて下さい。

［　　］

次にセット３にうつりますが、みんなで一斉に始めますので、
他の人が最初のセットを終えるまで、終了カードを立てて、静かに待って下さい。
次のページをめくらずに、そのままの状態で待って下さい。

A1

意思決定に関するアンケート

1 最初に記入して下さい ↓

あなたのグループ　あなたの個人番号

注意　暗唱番号を思い出して下さい。

得点の分配

2 ふたつのグループへの得点の組み合わせを選び、１つ○印をつけて下さい

グループ 赤組　個人番号 8	7	8	9	10	11	12	13
グループ 白組　個人番号 11	7	6	5	4	3	2	1

選択した得点の組み合わせを、以下に記入して下さい。

赤組 の 8 番の人に　　..... 点

白組 の 11 番の人に　　..... 点

A1

意思決定に関するアンケート

1 最初に記入して下さい ↓

あなたのグループ　あなたの個人番号

[　　]　[　　]

注意　暗唱番号を思い出して下さい。

得点の分配

2 ふたつのグループへの得点の組み合わせを選び、1つ○印をつけて下さい

グループ **白組**　個人番号 19	10	9	8	7	6	5	4
グループ **赤組**　個人番号 5	1	3	5	7	9	11	13

選択した得点の組み合わせを、以下に記入して下さい。

白組 の 19 番の人に　　..... 点

赤組 の 5 番の人に　　..... 点

A1

意思決定に関するアンケート

1 最初に記入して下さい ↓

あなたのグループ　あなたの個人番号

[　　]　[　　]

注意　暗唱番号を思い出して下さい。

得点の分配

2 ふたつのグループへの得点の組み合わせを選び、1つ○印をつけて下さい

グループ **赤組**　個人番号 7	6	7	8	9	10	11	12
グループ **白組**　個人番号 17	3	5	7	9	11	13	15

選択した得点の組み合わせを、以下に記入して下さい。

赤組 の 7 番の人に　　..... 点

白組 の 17 番の人に　　..... 点

注意　暗唱番号を思い出して下さい。

これでセット３は終わりです。
セット３の暗唱番号を次の［　］の中に書き入れて下さい。

［　　］

次にセット４にうつりますが、みんなで一斉に始めますので、
他の人が最初のセットを終えるまで、終了カードを立てて、静かに待って下さい。
次のページをめくらずに、そのままの状態で待って下さい。

意思決定に関するアンケート　　**1** 最初に記入して下さい ↓

あなたのグループ　あなたの個人番号

注意　暗唱番号を思い出して下さい。

第一印象

（２）
白組の人はどのような人でしょうか？ それぞれについて、最も適当だと思う番号に、１つだけ○印をつけて下さい。

白組の人は……		非常に	かなり	やや	どちらとも言えない	やや	かなり	非常に	
a.	暖かい	1	2	3	4	5	6	7	冷たい
b.	不正直な	1	2	3	4	5	6	7	正直な
c.	親しみやすい	1	2	3	4	5	6	7	親しみにくい
d.	信頼できない	1	2	3	4	5	6	7	信頼できる
e.	気前がいい	1	2	3	4	5	6	7	けちだ

● 赤組と白組で最も違う点は、次のうちのどれだとあなたは思いますか。ひとつ選んでその言葉に○印をつけて下さい。

暖かさ　　正直さ　　親しみやすさ　　信頼できるか　　気前のよさ

注意　暗唱番号を思い出して下さい。

セット４の暗唱番号を次の［　］の中に書き入れて下さい。

［　　］

ページをめくって、セット４のつづきをはじめて下さい。

意思決定に関するアンケート　　**1 最初に記入して下さい ↓**

あなたのグループ　あなたの個人番号

●　あなたが、あなたのグループについてどう思うかを、お尋ねします。以下のそれぞれについて、最も適当と思う番号に○印をつけて下さい。1 は「全く反対」を、7 は「全く賛成」を指します。

あなたのいるグループに○印をつけて下さい。

白組　　**赤組**

	全く反対	かなり反対	やや反対	どちらともいえない	やや賛成	かなり賛成	全く賛成
1. このグループに属していてよかった。	1	2	3	4	5	6	7
2. 全体として、このグループを低く評価している。	1	2	3	4	5	6	7
3. 今のところ、このグループを身近には感じていない。	1	2	3	4	5	6	7
4. このグループに強いつながりを感じている。	1	2	3	4	5	6	7
5. このグループには好感がもてる。	1	2	3	4	5	6	7
6. 今のところ、このグループを高く評価してはいない。	1	2	3	4	5	6	7
7. 今のところ、このグループの一員であることがうれしい。	1	2	3	4	5	6	7
8. このグループにのめり込むことは難しいと感じる。	1	2	3	4	5	6	7
9. 今のところ、このグループは居心地がよい。	1	2	3	4	5	6	7

有り難うございました。最後に、あなたがどのように意思決定をおこなったかをお尋ねします。

1 ふたりの人に得点をあげたときに、あなたは次のそれぞれを、どの程度心がけましたか。

a. ふたりに公平になるように心がけた。

全然しなかった　1　2　3　4　5　6　7　とてもそうした

b. ２つのグループに公平にしようと心がけた。

全然しなかった　1　2　3　4　5　6　7　とてもそうした

c. 自分の利益になるようにした。

全然しなかった　1　2　3　4　5　6　7　とてもそうした

d. 自分のグループにたくさん点をあげるように心がけた。

全然しなかった　1　2　3　4　5　6　7　とてもそうした

e. みんなに出来るだけたくさん点をあげるように心がけた。

全然しなかった　1　2　3　4　5　6　7　とてもそうした

f. 人に「えこひいき」と思われないように点をあげた。

全然しなかった　1　2　3　4　5　6　7　とてもそうした

g. 自分のグループが勝つように心がけた。

全然しなかった　1　2　3　4　5　6　7　とてもそうした

h. 何も考えず適当に選んだ。

全然しなかった　1　2　3　4　5　6　7　とてもそうした

2 得点をふたりの人にあげるときに、自分のグループのことをどれくらい考えましたか。

全然考えなかった　1　2　3　4　5　6　7　非常によく考えた

3 得点をふたりの人にあげるときに、自分が他の人にどう思われるかが気になりましたか。

全然気にならなかった　1　2　3　4　5　6　7　非常に気になった

4 この回答冊子にどのくらい集中して答えましたか。

全然集中しなかった　1　2　3　4　5　6　7　非常に集中した

5 暗唱番号を覚えておくのに、どれくらい忙(いそが)しい思いをしましたか。

全然忙しくなかった　1　2　3　4　5　6　7　非常に忙しかった

6 相手のグループについての印象を答えるときに、どれくらい自分のグループと比べましたか。

全然比べなかった　1　2　3　4　5　6　7　非常に比べた

7 この回答冊子に答えるときに、どれくらい気が散りましたか。

全然散らなかった　1　2　3　4　5　6　7　非常に気が散った

8 この回答冊子の質問はどれくらい難しかったですか。

全然難しくなかった　1　2　3　4　5　6　7　非常に難しかった

9 「できればこの調査にもう一度参加したい」、とどのくらい思いますか。

全然そう思わない　1　2　3　4　5　6　7　非常にそう思う

10 暗唱番号を覚えているのは、どのくらい難しかったですか。

全然難しくなかった　1　2　3　4　5　6　7　非常に難しかった

有り難うございました。これで終わりです。
回答冊子を裏返し、終了カードを立てて、他の人が終わるまで
静かに待って下さい。

Appendix 6.6

Supplementary tables for Experiment 4

Table A6.6.1 Experimental design and the number of subjects by the booklet versions and the group assignment

Category salience booklet versions group division	Distraction Weak	Moderate	Strong	
SALIENT	13	13	13	
A-B version	6	7	7	
"red"	2	2	5	
"white"	4	5	2	
B-A version	7	6	6	
"red"	4	1	4	
"white"	3	5	2	
NON-SALIENT	12	13	14	
A-B version	7	6	6	
"red"	6	5	2	
"white"	1	1	4	
B-A version	5	7	8	
"red"	2	1	2	
"white"	3	6	6	
TOTAL				92

Note: In the booklet version A-B, matrices A appears in set 1, and B in set 3 The reverse was true for the version B-A.

Table A6.6.2 The factor matrix of the "pull" scores

Items were subject to a principal-components analysis. Three factors were extracted on the basis of eigen values (1.47 & 1.08, for factor 1, & 2), and oblimine rotated. 24.6% and 17.9% of the total variance are explained by the factor 1 & 2 respectively.

"pulls"	Factor 1	Factor 2
F (on MD•MIP)	-.675	
MD•MIP (on MJP)	-.660	
MD•MIP (on F)	.543	
MJP•MIP(on MD)		.740
MD (on MJP•MIP)		.639
MJP (on MD•MIP)		.458

1) The figure is the factor loading of the item. Absolute loading value less than .30 are omitted.
2) The correlation between the factors were .123.

Table A6.6.3 The factor matrix of the rating ingroup bias

Items were subject to a principal-components analysis. Two factors were extracted on the basis of eigen values (1.78 & 1.07, for factor 1 & 2), and oblimine rotated. 35.6%, and 21.3% of the total variance are explained by the factor 1 & 2 respectively.

"pulls"	Factor 1	Factor 2
bias2 (honesty)	.691	
bias5 (generosity)	.667	-.349
bias4 (trustworthiness)	.573	
bias1 (warmth)		-.842
bias3 (friendliness)	.388	-.673

1) The figure is the factor loading of the item. Absolute loading value less than .30 are omitted.
2) The correlation between the factors was -.128.

Table A6.6.4 Distribution of response on self-presentational concern check

Scale value	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Weak distraction	4	1	5	11	2	2	–
Moderate distraction	6	3	7	4	4	–	2
Strong distraction	5	3	3	10	2	3	1

χ^2 (12) =12.33, *n.s.*

Table A6.6.5 Distribution of response on self-presentational allocation strategy

Scale value	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Weak distraction	12	2	2	2	2	1	3
Moderate distraction	13	2	2	5	2	2	–
Strong distraction	8	4	3	6	2	1	3

χ^2 (12) =7.84, *n.s.*

Table A6.6.6 Distribution of fairness intention.

Scale value	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Weak distraction	4	3	3	6	3	3	3
Moderate distraction	7	–	8	5	2	2	2
Strong distraction	5	2	7	6	3	3	1

χ^2 (12) =7.66, *n.s.*

Table A6.6.7 Self-reported allocation strategies

Group membership:	Salient			Non-salient		
Distraction:	Weak	Moderate	Strong	Weak	Moderate	Strong
Self-reported strategy	(n =12)	(n =13)	(n =13)	(n =12)	(n =13)	(n =14)
"To be fair to two people"	4.25	3.31	3.62	3.50	3.92	3.14
"To be fair to two groups"	4.00	3.23	3.62	3.58	3.46	3.36
"To be of my interest"	2.83#	3.23	3.39	3.25	3.15	2.71
"more points to my group"	3.08#	2.85#	3.15	3.58	3.23	3.50
"As many as possible to everyone"$	4.25	3.31	3.31	3.25	2.77#	2.86#
"The way others wouldn't think I am unfair"	3.33	3.62	3.54	3.67	2.77#	3.50
"To make my group win"	3.17	2.54#	3.23	3.00	2.46	3.36
"With no thoughts"	4.42	4.62	4.85	3.67	4.92	4.50

1 The figure is a mean response on the scale 1. not at all ...— 7. very ...
2 # denotes the figure is significantly different from neutral point ($p < .05$).
3 The grand mean of all but the first and the last item was significantly smaller than the neutral point. ($p < .05$, two-tailed)
$ The main effect of salience was marginally significant. F (1,71)=3.12, $p < .10$

Table A6.6.8 Distribution of sex by condition

	Distraction			
	Weak	Moderate	Strong	
Category salience				
SALIENT	13	13	13	
male	8	9	4	
femail	5	4	9	
NON-SALIENT	12	13	14	
male	7	6	7	
femail	5	7	7	
TOTAL				78

Table A6.6.9 Three way interaction among sex, distraction and category salience on Collective Self-Regard

	Group membership:	Salient			Non-salient		
	Distraction:	Weak	Moderate	Strong	Weak	Moderate	Strong
SEX	Male	37.25	38.67	34.50	33.29	34.50	42.71
	Female	38.00	39.50	45.75	45.00	41.86	38.29

1 The figure is a mean collective self-regard scale score by condition (range 9-63).
2 Three way interaction was significant [F (2,65)= 4.42, $p < .05$].

Appendix 6.7

Correlational analysis of colour band scales (Experiment 4)

To assess the characteristics of the colour band scales, correlational analyses were conducted. Two kinds of correlation coefficients with the colour band scale indices are reported here. The first kind concerns those variables with which the band scale indices can expect to have significant relations on the theoretical basis. The second kind concerns those varibles with which the band indices did have significant relations. These coefficients are shown in Table A6.7.

Table A6.7 Pearson's correlation coefficients between the colour band scale indices and other variables

Association	Red band			Brown band		
	Distance	Index A	Index B	Distance	Index A	Index B
Predicted						
Collective Self-Regard score	-.05	-.07	-.07	-.01	.05	.04
Its cognitive component	-.14	-.15	-.17	-.07	.09	.06
Composite score of rating bias	.08	.08	.09	.17	.04	.08
Its absolute value	.16	-.06	.01	.12	-.02	.02
Not predicted						
C 6 (self-presentational concern)	-.17	-.23	-.24*	-.14	-.07	-.10
C 9 (group thoughts in allocations)	-.07	-.39**	-.34**	-.02	-.10	-.09
C 13 (group comparison in ratings)	.04	.01	.02	-.01	.27*	.23*

* $p < .05$, ** $p < .01$.

1 Distance is the distance on the colour bands in mm.

2 Direction of the colour by 16 and 28 cases on the red and the brown band respectively out of 73 who completed the scales (23.3% and 38 %) was reverse to the expectation (*i.e.*, the red group point at the whiter side of the both bands compared with the white group point)

3 Index A was corrected such that the distance was given minus value when the direction of the band colour and the group colour was reversed

4 Index B was corrected such that the distance was given zero value when the direction of the band colour and the group colour was reversed.

Appendix 6.8

Analyses involving time (Experiment 4)

A 2 (time 1 *vs.* time 2) x 2 (ingroup *vs.* outgroup) x 2 (red *vs.* white groups) x 2 (booklet types: matrices set A-B *vs.* B-A) mixed model ANOVA was performed, on total points, with repeated measures on the first two factors. There were two significant interactions involving time. The first was between time and ingroup/outgroup factor [F (1,74)=7.22, p <.01]. Table A6.8.1 shows total points allocated to ingroup and outgroup in time 1 and time 2. Regardless of the booklet types, subjects allocated less points to ingroup than outgroup members in time 1 [*M*s=22.54 and 24.28 for ingroup and outgroup, t (77) = -2.02, p <.05], and more points to ingroup than outgroup in time 2 [*M*s=24.79 and 22.00 for ingroup and outgroup, t (77)= 2.95, p <.01]. This interaction was qualified by its further interaction with booklet types (matrices set A-B *vs.* B-A) and group division (red *vs.* white groups) [a four-way interaction: F (1,74)=72.06, p <.001]. Namely, while this pattern of interaction holds for "red" subjects with booklet type A-B and "white" subjects with booklet type B-A, it was reversed for "red" subjects with booklet type B-A and "white" subjects with booklet type A-B, where subjects allocated more points to ingroup than outgroup in time 1 (see Fig. A6.8.1).

Discussion on the four-way interaction on total points

Effects of time on total points It was found that ingroup bias was significant in the second set of point allocation matrices while there was a significant outgroup favouritism in the first set of matrices (Table A6.8.1). However, this interaction should be carefully considered because its four-way interaction with group division (red *vs.* white) and booklet types (matrices order A-B *vs.* B-A) was also highly significant. Recall that there was an unfortunate near-significant dependency between group division and booklet

types. Therefore, the effect of time on total points to ingroup and outgroup members may be well confounded with the effects of matrix types.

"Red" subjects were likely to engage in booklet type A-B and "white" subjects in booklet type B-A (see Resuls section). It is thought that the four-way interaction resulted in the interaction between time and ingroup/outgroup factor partly because of this dependency.

Table A6.8.1 Total points allocated to ingroup and outgroup by booklet types and order of point allocation matrices

booklet type	recipients	Time 1 §	Time 2 §
AB (matrices order 123 - 456)	ingroup	22.8	25.3
	outgroup	24.1	22.4
BA (matrices order 456 - 123)	ingroup	22.3	24.3
	outgroup	24.5	21.6

§ Total points from the first three matrices.
§ Total point from the second three matrices.

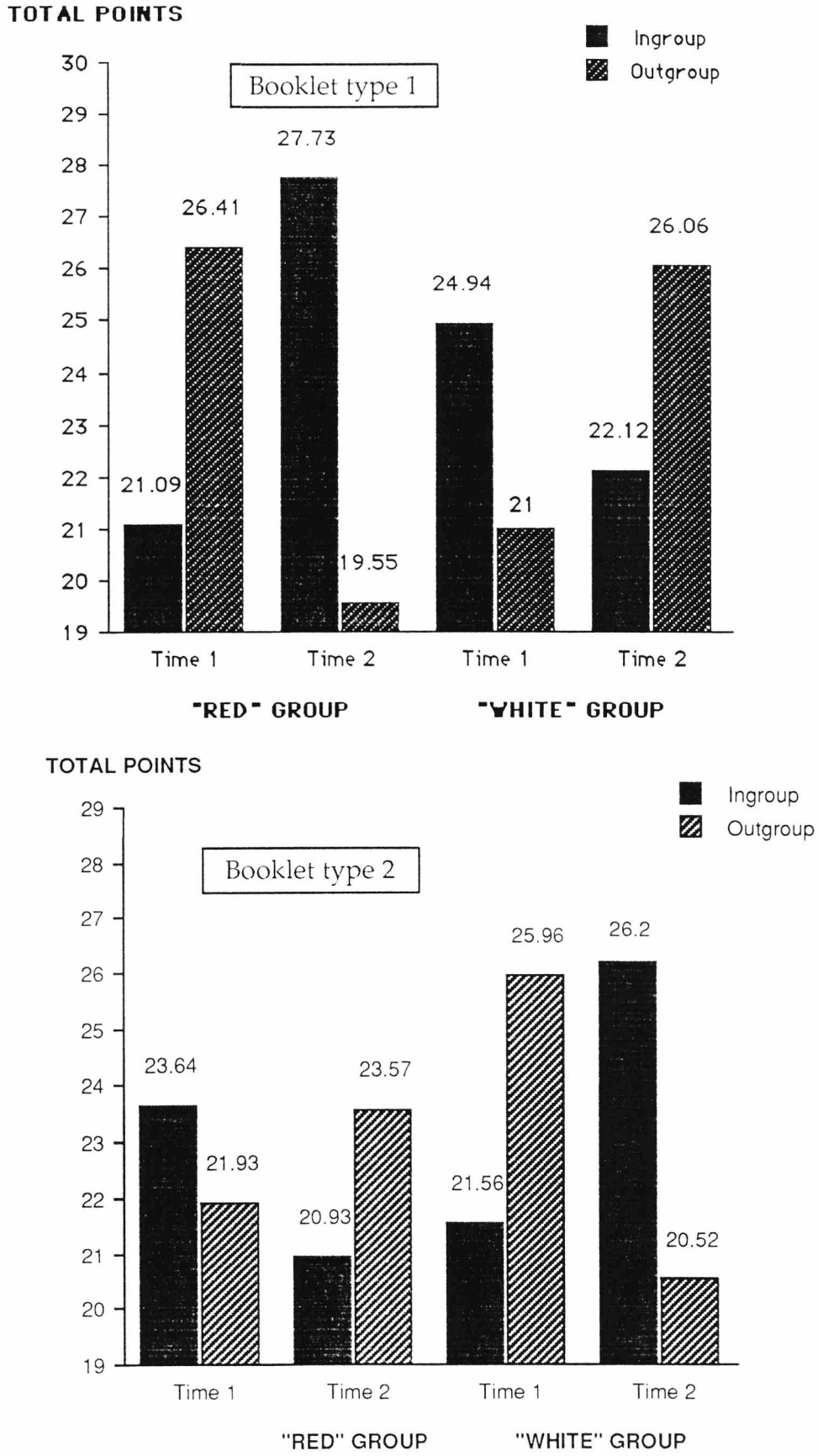


Fig. A6.8.1 Total points by booklet types, group division, time, and ingroup/ourgroup factor

Appendix 6.9

An alternative analysis of the noise hypothesis

Table A6.9.1 Indices of ingroup bias among subjects with high and low self-reported Fairness/Joint Profit intentions

Index	F/JP intentions	Distraction: Weak	Moderate	Strong
Total points bias index*[1]	High §[1]	-.25 (12)	1.13 (8)	2.25 (8)
	Low §[2]	8.71_a# (7)	6.64_a# (11)	-4.20_b (10)
Allocation bias index*[2]	High	.11 (12)	.42 (8)	.29 (8)
	Low §[3]	1.33_a# (7)	1.06_a (11)	$-.57_b$ (10)
Rating bias index*[3]	High	-.03 (12)	.28 (8)	.65 (8)
	Low §	-.08 (5)	-.60 (11)	.62 (10)

1) # denotes the figure is significantly different from zero point ($p < .05$).
2) Different subscripts on a line denote means which are significantly different (Duncan's test, $p < .05$).
* The effect of intentions: 1.F (1,50)=.99, 2.F (1,50)=.58, 3.F (1,48)=.62, all *n.s.*; the effect of distraction: 1.F (2,50)=1.55, 2.F (2,50)=1.70, 3.F (2,48)=1.64, all *n.s.*; the interaction effect: 1.F (1,50)=2.98, $p < .06$, 2.F (1,50)=1.94, *n.s.*, 3.F (1,48)=.51, *n.s.*
§ Unweighted linear trend tests: 1. F (1,25)=.61. *n.s.*; 2. F (1,25)=8.49, $p < .01$; 3. F (1,25)=6.31, $p < .05$
§ The figure in brackes is the number of subjects in the cell

An alternative way to investigate the noise hypothesis is to contrast subjects whose fairness/joint-profit intentions were high *vs.* low, and to see if an interaction would be observed between distraction and fairness/joint-profit intentions. Predictions concerning these analyses, however, are less easy to formulate. On the one hand, among subjects with strong

fairness/joint-profit intentions, distraction may result in less fairness (manifested as more bias). On the other hand, this relationship may not be linear because distraction may also reduce other intentions that may compete with fairness/joint-profit intentions. Subjects with low fairness/joint-profit intentions will show less ingroup bias (this corresponds to the prediction of the main text).

A scale was constructed from those three items which loaded heavily on factor 1 in Table 6.6 (Fairness/join-profit factor). Subjects with the top and the bottom third of the scale scores were used in the analysis. The results of analyses with this method were inconclusive. There was a nearly significant interaction effect on the total points bias index with the pattern expected by the former prediction [F (2, 50)=2.98, p <.06]. However, there was no such interaction on the allocation bias index [F (2, 50)=1.94, *n.s.*]. Incidentally, ingroup bias for the subjects with high fairness/joint-profit intentions remained low in all distraction conditions. This may indicate that subjects with strong fairness/joint-profit intentions persisted in fairness despite distraction. See Table A6.9.1 for further details.

Apdx 7.1

MAKING DECISIONS

This is a study about decisions and groups.

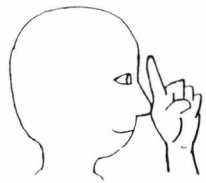
There are many distinctions among us. Some have fairer hair colour, others have darker one. Some are taller, and others shorter. Here is a relatively new distinction: RIGHT EYE users or LEFT EYE users.

This means which eye one uses more. You may not be aware of it, but you surely use one of your eyes more than the other. According to a survey, about half people are right eye users, and the other half left eye users. For now, let us call the first group as RIGHT EYE GROUP, and the second as LEFT EYE GROUP. In this study, we would like you to make series of decisions on the two groups.

To find out which group you are in, the simplest way is explained later. But before you try it, please remember not to tell it to anyone which group you are in until we finish this session.

Right eye / Left eye Test

Put your left fist on your nose with the index finger up (see the figure below). Look straight some metres ahead naturally and then blink your right eye slowly several times. If the vague image of your left fist moves to right, you are in the RIGHT EYE group; if the vague image of your left fist does not move, you are in the LEFT EYE group. If you find it out, please write it down in the box below.



Your group name

[ ]

What you do in the booklet

Here is another thing. Each of you has a personal code number (yours is in the box below). This code is a secret. So don't tell anybody. What you do in the booklet is to decide various things about people from the Right Eye Group and Left Eye Group. Examples are shown at the separate sheet of paper. Look at the sheet now.

Your personal code

[27]

IMPORTANT

1) Write your group name in the box at the top of every page.

2) Make your decisions quite **quickly** because there is only just enough time to make them.

3) Work on your own, without talking. Pages inside the questionnaire may be different in order from your neighbours'. So, don't worry about your neighbours. Begin with the first page and remember not to miss any pages out.

NOW START

Write down :

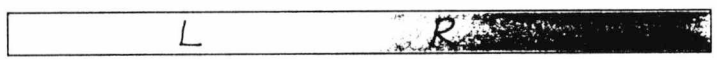
Your group name

☆ Imagine people of the two groups. Please put down letters **R** and **L** on the colour band according to where you feel that group belongs.

R for the **right eye** group

L for the **left eye** group

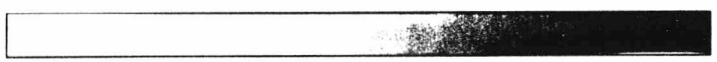
EXAMPLE



Band 1



Band 2



How difficult was it to decide?

not at all 1 2 3 4 5 6 7 very difficult

1 Write down :

Your group name

Giving points

2 Circle a box to give points to the two groups

Person code 5 of the **left eye** group	7	8	9	10	11	12	13
Person code 9 of the **right eye** group	7	6	5	4	3	2	1

Write below, the details of the points that you have chosen:

Points for person code 5 of the **left eye** group: _____

Points for person code 9 of the **right eye** group: _____

3 Check that you have circled a box and copied the points

4 How difficult was it to decide which box to circle?

not at all 1 2 3 4 5 6 7 very difficult

1 Write down :

Your group name

2 Circle a box to give points to the two groups

Person code 4 of the **right eye** group	10	9	8	7	6	5	4
Person code 8 of the **left eye** group	1	3	5	7	9	11	13

Write below, the details of the points that you have chosen:

Points for person code 4 of the **right eye** group: _____

Points for person code 8 of the **left eye** group: _____

3 Check that you have circled a box and copied the points

4 How difficult was it to decide which box to circle?

not at all 1 2 3 4 5 6 7 very difficult

1 Write down :

Your group name

2 Circle a box to give points to the two groups

Person code 3 of the **left eye** group	6	7	8	9	10	11	12
Person code 6 of the **right eye** group	3	5	7	9	11	13	15

Write below, the details of the points that you have chosen:

Points for person code 3 of the **left eye** group: _____

Points for person code 6 of the **right eye** group: _____

3 Check that you have circled a box and copied the points

4 How difficult was it to decide which box to circle?

not at all 1 2 3 4 5 6 7 very difficult

1 Write down :

Your group name

2 Circle a box to give points to the two groups

Person code 2 of the **right eye** group	20	19	18	17	16	15	14
Person code 7 of the **left eye** group	11	13	15	17	19	21	23

Write below, the details of the points that you have chosen:

Points for person code 2 of the **right eye** group: _____

Points for person code 7 of the **left eye** group: _____

3 Check that you have circled a box and copied the points

4 How difficult was it to decide which box to circle?

not at all 1 2 3 4 5 6 7 very difficult

Write down :

Your group name

Your impressions of members of the two groups

Circle the numbers to show what you think about the people in **right eye** group?

People in **right eye** group are.....

a. warm 1 2 3 4 5 6 7 cold

How difficult was it to choose?

not at all 1 2 3 4 5 6 7 very difficult

Making decisions

Write down :

Your group name

People in **right eye** group are.....

b. dishonest 1 2 3 4 5 6 7 honest

How difficult was it to choose?

not at all 1 2 3 4 5 6 7 very difficult

Making decisions

Write down :

Your group name

People in **right eye** group are.....

c. friendly 1 2 3 4 5 6 7 unfriendly

How difficult was it to choose?

not at all 1 2 3 4 5 6 7 very difficult

Making decisions

Write down :

Your group name

People in **right eye** group are.....

d. untrustworthy 1 2 3 4 5 6 7 trustworthy

How difficult was it to choose?

not at all 1 2 3 4 5 6 7 very difficult

Making decisions

I Write down :

Your group name

People in **right eye** group are.....

e. generous 1 2 3 4 5 6 7 selfish

How difficult was it to choose?

not at all 1 2 3 4 5 6 7 very difficult

Write down :

Your group name

How much would you like to make friends with people of **right eye** group?

very much 1 2 3 4 5 6 7 not at all

How difficult was it to choose?

not at all 1 2 3 4 5 6 7 very difficult

1 Write down :

Your group name

Giving points

2 Circle a box to give points to the two groups

Person code 11 of the **right eye** group	7	8	9	10	11	12	13
Person code 10 of the **left eye** group	7	6	5	4	3	2	1

Write below, the details of the points that you have chosen:

Points for person code 11 of the **right eye** group: _____

Points for person code 10 of the **left eye** group: _____

3 Check that you have circled a box and copied the points

4 How difficult was it to decide which box to circle?

not at all 1 2 3 4 5 6 7 very difficult

1 Write down :

Your group name

2 Circle a box to give points to the two groups

Person code 12 of the **left eye** group	10	9	8	7	6	5	4
Person code 15 of the **right eye** group	1	3	5	7	9	11	13

Write below, the details of the points that you have chosen:

Points for person code 12 of the **left eye** group: _____

Points for person code 15 of the **right eye** group: _____

3 Check that you have circled a box and copied the points

4 How difficult was it to decide which box to circle?

not at all 1 2 3 4 5 6 7 very difficult

Making decisions

1 Write down :

Your group name

2 Circle a box to give points to the two groups

Person code 17 of the **right eye** group	6	7	8	9	10	11	12
Person code 18 of the **left eye** group	3	5	7	9	11	13	15

Write below, the details of the points that you have chosen:

Points for person code 17 of the **right eye** group: _____

Points for person code 18 of the **left eye** group: _____

3 Check that you have circled a box and copied the points

4 How difficult was it to decide which box to circle?

not at all 1 2 3 4 5 6 7 very difficult

1 Write down :

Your group name

2 Circle a box to give points to the two groups

Person code 13 of the **left eye** group	20	19	18	17	16	15	14
Person code 14 of the **right eye** group	11	13	15	17	19	21	23

Write below, the details of the points that you have chosen:

Points for person code 13 of the **left eye** group: _____

Points for person code 14 of the **right eye** group: _____

3 Check that you have circled a box and copied the points

4 How difficult was it to decide which box to circle?

not at all 1 2 3 4 5 6 7 very difficult

Write down :

Your group name

Your impressions of members of the two groups

Circle the numbers to show what you think about the people in **left eye** group?

People in **left eye** group are.....

a. warm 1 2 3 4 5 6 7 cold

How difficult was it to choose?

not at all 1 2 3 4 5 6 7 very difficult

- 500 -

Making decisions

Write down :

Your group name

People in **left eye** group are.....

b. dishonest 1 2 3 4 5 6 7 honest

How difficult was it to choose?

not at all 1 2 3 4 5 6 7 very difficult

- 501 -

KENT TEMPLEMAN LIBRARY UNIVERSITY

Making decisions

Write down :

Your group name

People in **left eye** group are.....

c. friendly 1 2 3 4 5 6 7 unfriendly

How difficult was it to choose?

not at all 1 2 3 4 5 6 7 very difficult

Write down :

Your group name

People in **left eye** group are.....

d. untrustworthy 1 2 3 4 5 6 7 trustworthy

How difficult was it to choose?

not at all 1 2 3 4 5 6 7 very difficult

Write down :

Your group name

People in **left eye** group are.....

e. generous 1 2 3 4 5 6 7 selfish

How difficult was it to choose?

not at all 1 2 3 4 5 6 7 very difficult

Write down :

Your group name

How much would you like to make friends with people of **left eye** group?

very much 1 2 3 4 5 6 7 not at all

How difficult was it to choose?

not at all 1 2 3 4 5 6 7 very difficult

Write down :

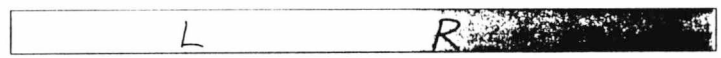
Your group name

☆ Imagine people of the two groups. Please put down letters R and L on the colour band according to where you feel that group belongs.

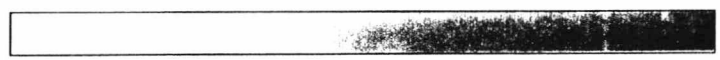
R for the **right eye** group

L for the **left eye** group

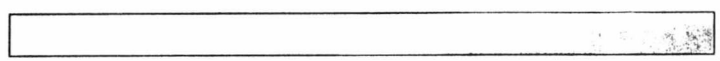
EXAMPLE



Band 1



Band 2



How difficult was it to decide?

not at all 1 2 3 4 5 6 7 very difficult

Write down :

Your group name

☆☆ The following concern your feelings about your group

Please answer the folloing by circling the appropriate number.

Where 1 = " Strongly Disagree " and 7 = " Strongly Agree "

PLEASE CIRCLE THE GROUP YOU ARE IN :

LEFT EYE **OR** **RIGHT EYE**

	Strongly Disagree						Strongly Agree
1. I am glad to belong to this group.	1	2	3	4	5	6	7
2. Overall, I have a low opinion of this group.	1	2	3	4	5	6	7
3. Right now, I do not feel close to this group.	1	2	3	4	5	6	7
4. I feel strong ties to this group.	1	2	3	4	5	6	7
5. I feel positive towards this group.	1	2	3	4	5	6	7
6. Right now I do not think highly of this group.	1	2	3	4	5	6	7
7. Right now, it feels good to be a member of this group.	1	2	3	4	5	6	7
8. I find it hard to be enthusiastic about this group.	1	2	3	4	5	6	7
9. Right now, it feels pleasant to be in this group.	1	2	3	4	5	6	7

Thank you very much. We would like next to ask you the questions about how you made your decisions.

❒

1 When you gave points to people, how much did you try to do each of the things listed below?

a. to be fair to each person

not at all 1 2 3 4 5 6 7 very much

b. to be fair to each group

not at all 1 2 3 4 5 6 7 very much

c. to give yourself most points

not at all 1 2 3 4 5 6 7 very much

d. to give your group most points

not at all 1 2 3 4 5 6 7 very much

e. to give everyone as much as possible

not at all 1 2 3 4 5 6 7 very much

f. to give points such that others won't think you are unfair

not at all 1 2 3 4 5 6 7 very much

g. to try to make your group win

not at all 1 2 3 4 5 6 7 very much

h. nothing in particular

not at all 1 2 3 4 5 6 7 very much

❒❒

2 When you gave points to people, how much did you think about your own group?

not at all 1 2 3 4 5 6 7 very much

3 When you gave points to people, were you concerned as to how others would think of you ?

not at all 1 2 3 4 5 6 7 very much

4 How much did you concentrate on the questions when you answered to them?

not at all 1 2 3 4 5 6 7 very much

5 When you gave your views about the <u>other</u> group, how much did you compare it with your own group?

not at all 1 2 3 4 5 6 7 very much

6 How much were you distracted when you answered to them?

not at all 1 2 3 4 5 6 7 very much

7 How difficult were the questions on the whole?

very easy 1 2 3 4 5 6 7 very difficult

8 How willing would you be to take part in the research again?

not at all 1 2 3 4 5 6 7 very willing

Thank you very much. This is the end of the questionnaire.

EXPLANATION SHEET

Making decisions

1 Write down :
Your group name

Giving points

2 Circle a box to give points to the two groups

Person code 5 of the **left eye** group	7	8	9	10	11	12	13
Person code 9 of the **right eye** group	7	6	5	4	3	2	1

Write below, the details of the points that you have chosen:

Points for person code 5 of the **left eye** group: 10

Points for person code 9 of the **right eye** group: 4

3 Check that you have circled a box and copied the points

EXPLANATION SHEET

Making decisions

1 Write down :
Your group name

People in **right eye** group are.....

e. generous 1 2 3 4 5 6 7 selfish

How difficult was it to choose?

not at all 1 2 3 4 5 6 7 very difficult

Appendix 7.3

Supplementary tables for Pilot study 3

Table A7.3.1 Distribution of subjects

	Right eyed group	Left eye group
Male	5	2
Female	14	4

χ^2 (1)=.111, p >.1

Table A7.3.2 Manipulation checks

Subjects' group: Items	Right Eye (n =19)	Left Eye (n =6)	Total (n =25)
"Concentrated"	4.79# (1.36)	4.67 (1.51)	4.76# (1.36)
"Distracted"	2.58# (1.43)	3.50 (2.26)	2.80# (1.66)
"Difficulty" 1)	2.63# (1.42)	4.17 (2.40)	3.00# (1.78)
Group membership salience			
CSR scale score	44.42 (9.43)	42.60 (14.26)	44.04 (10.27)
Cognitive component	8.63 (2.54)	8.20 (3.70)	8.54 (2.73)
Others			
group thoughts in allocation	4.00 (1.83)	4.00 (2.00)	4.00 (1.83)
group comparison in rating	3.68 (1.70)	2.67 (1.37)	3.44 (1.66)
self-presentational concern	2.63# (2.08)	2.67 (1.97)	2.64# (2.03)
"Willing to participate in the research again"	5.90# (1.33)	4.83 (2.56)	5.64# (2.03)

* The figures are mean ratings on the scale from 1 not at all - 7 very ... , except for Group membership salience items which are composite scale scores.

** # denotes the figure is significantly different from neutral point,4 (p < .05, two-tailed)

*** Different subscripts on a line denotes they are significantly different (p < .05)

1) The effect of situation: F (1,23) =3.79, p < .07

Table A7.3.3 Colour band measures by Time and Booklet types

Time:	Time 1		Time 2	
Booklet version:	version 1	version 2	version 1	version 2
Indices				
Distance index				
Brown band [S]	71.82[#] (10.17)	79.43[#] (28.69)	78.82[#] (23.02)	72.00[#] (31.98)
Red band	88.64[#] (17.44)	–	–	74.36[#] (31.65)
Blue band	–	78.43[#] (20.19)	72.46[#] (20.62)	–
Vector index				
Brown band	57.82[#] (45.82)	-6.43 (87.02)	64.46[#] (52.86)	46.00[#] (65.78)
Red band	70.64[#] (58.80)	–	–	26.21 (78.84)
Blue band	–	53.86[#] (62.51)	57.36[#] (50.80)	–

1 Distance is in mm between the two letters representing the groups. The figures in brackets are standard deviations. For details of Vector index, see chapter 6. Means with [#] were significantly different from that of the example (51mm, $p < .05$) for Distance index, and zero for Vector index.

2 Measurements were taken before (Time 1) and after (Time 2) the main tasks (point allocation and ratings). In Booklet version 1, measurements were on the red and the blue band for Time 1 and 2 respectively. In Booklet version 2, reversal was the case. "–" means there was no measurement. Eleven and fourteen subjects completed Booklet versions 1 and 2 respectively.

[$] The interaction effect of Time and Booklet type: F (1,23)=4.21, $p < .06$;

Table 7.3.4 Total points in point allocation tasks

Subjects' group: / Recipient	Right Eye (n =19)	Left Eye (n =6)	Total (n =25)
Ingroup members	89.26 1)	78.50	81.36
	(6.18)	(8.31)	(6.76)
Outgroup members	78.37 1)	82.00	79.24
	(5.71)	(3.23)	(5.40)
Difference (Ingroup - Outgroup points)	3.89	-3.50	2.12
	(7.53)	(7.58)	(8.06)

* # denotes the figure is significantly different from zero point ($p < .05$)
** The figures in brackets are standard deviations.
*** The interaction effect of recipient and group: F (1,23)=4.38, $p < .05$
1) The difference between the two means was signifincantly different$t$ (18)=2.25, p <.05

Table A7.3.5 The mean "pull" scores of each strategy

Subjects' group: "Pulls"	Right Eye (n =19)	Left Eye (n =6)	Total (n =25)
MD•MIP (on MJP)	.90 (2.08)	.33 (1.97)	.76 (2.03)
MD•MIP (on MJP, ver.2) [1]	.47 (2.22)	-1.50 (2.07)	.00 (2.31)
MD•MIP (on F)	-.21 (1.62)	-.17 (2.48)	-.20 (1.80)
MD (on MJP•MIP)	.21 (2.37)	.33 (4.13)	.24 (2.79)
F (on MD•MIP)	2.95# (2.66)	2.50 (3.94)	2.84# (2.93)
MJP•MIP (on MD)	.84 (2.63)	.00 (1.67)	.64 (2.43)
MJP (on MD•MIP)	-1.11 (1.91)	.33 (2.94)	-.76 (2.22)
MJP (on MD•MIP, ver.2)	-.79 (2.55)	.17 (3.06)	-.56 (2.65)

* # denotes the figure is significantly different from zero point ($p < .05$)
** The figures in brackets are standard deviations.
*** Different subscripts on a line denotes they are significantly different ($p < .05$)
1. The effect of group: F (1,23) =3.71, $p < .07$

Table A7.3.6 The mean rating bias on each dimension

Subjects' group: dimension	Right Eye (n =19)	Left Eye (n =6)	Total (n =25)
warmth	-.11 (1.88)	1.17 (1.60)	.20 (1.87)
honesty	.05 (1.84)	.67 (1.21)	.20 (1.71)
friendliness	.26 (1.41) [1]	1.83 (2.86) [1]	.64 (1.91)
trustworthiness	.47 (1.61)	1.67 (2.73)	.76 (1.94)
generosity	-.58 [2] (1.90)	2.00 [2] (2.90)	.04 (2.39)
Composite score (summed)	.11 [3] (6.76)	7.33 [3] (9.75)	1.84 (8.00)

* The figure indicates ingroup bias. The more, the more in favour of ingroup.
** Multiple homogeneity of variance test: Boxs M=81.13 p <.001
*** Multiple range tests showed no difference among means on any dimension.
1. Homogeneity test: Bartlett-Box F (1, 600)=4.54, p < .05
2. The difference: t (23)=-2.56, p < .05
3. The difference: t (23)=-2.06, p < .06

Table A7.3.7 Difficulty in judgement for each dependent measures

Subjects' group: measures	Right Eye (n =19)	Left Eye (n =6)	Total (n =25)
Bands in Time 1	3.00# (1.41)	4.00 (2.53)	3.24# (1.74)
Bands in Time 2 [1]	3.28 (1.71)	3.00 (2.55)	3.22 (1.86)
matrix type A^{in}_{out}	2.90# (1.49)	3.83 (2.48)	3.12# (1.76)
matrix type A^{out}_{in}	2.63# (1.61)	1.67# (1.03)	2.40# (1.53)
matrix type B^{in}_{out}	2.37# (1.01)	3.17 (2.14)	2.56# (1.36)
matrix type B^{out}_{in}	2.68# (1.25)	4.00 (1.67)	3.00# (1.44)
matrix type C^{in}_{out}	2.32# (1.20)	3.83 (2.48)	2.68# (1.73)
matrix type C^{out}_{in}	2.53 (1.47)	4.00 (1.79)	2.88 (1.64)
matrix type D^{in}_{out}	2.26# (1.05)	3.17 (2.40)	2.48# (1.48)
matrix type D^{out}_{in}	2.37# (1.57)	4.17 (1.94)	2.80# (1.80)
rating 1 for ingroup	2.74# (1.48)	2.33 (2.34)	2.64# (1.68)
rating 1 for outgroup	2.42# (1.07)	3.50 (2.07)	2.68# (1.41)
rating 2 for ingroup [2]	2.53# (1.22)	1.17# (.41)	2.20# (1.22)
rating 2 for outgroup	2.74# (1.28)	2.67 (2.25)	2.72# (1.51)
rating 3 for ingroup	2.32# (1.38)	2.17 (2.40)	2.28# (1.63)
rating 3 for outgroup	2.53# (1.22)	2.00# (.89)	2.40# (1.15)
rating 4 for ingroup	2.68# (1.53)	1.67# (.82)	2.44# (1.45)
rating 4 for outgroup	3.11# (1.15)	3.00 (2.28)	3.08# (1.45)

(to be continued)

rating 5 for ingroup	2.53#	2.33	2.48#
	(1.22)	(2.34)	(1.50)
rating 5 for outgroup	2.89#	2.17#	2.72#
	(1.33)	(.98)	(1.28)
socio-metrical for ingroup [3]	3.00#	1.33#	2.60#
	(1.63)	(.52)	(1.61)
socio-metrical for outgroup	2.32#	1.83#	2.20#
	(1.11)	(.75)	(1.04)

* The figure is a mean response (*SD*) on the scale 1not at all — 7 very difficult

1. The number of subjects only on this item was 18 and 5 for the right eye and the left eye group respectively.
2. The effect of subject's group: F (1,23)=7.03, p <.05
3. The effect of subject's group: F (1,23)=5.91, p <.05

Table A7.3.8 The factor matrix of the "pull" scores

Items were subject to a principal-components analysis. The first two factors were chosen to be extracted on the basis of eigen values, and oblimine rotated (Eigen values from the first factor were 2.35, 1.85 1.19, .91, .69 ...; .29.4%, 23.2%, 14.9%, 11.3%, 8.6%, .. .of the total variance were explained by the factor 1, 2, 3, ... respectively.)

"pulls"	Factor 1	Factor 2
MD•MIP (on F)	.738	
MD (on MJP•MIP)	.719	
MJP (on MD•MIP) v2	.715	-.479
MJP (on MD•MIP)	.650	
MJP•MIP(on MD)		-.807
MD•MIP (on MJP)		.780
MD•MIP (on MJP) v2	-.327	-.691
F (on MD•MIP)		

1) The figure is the factor loading of the item. Absolute loading value less than .30 are omitted.
2) The correlations between the factors was .03

Table A7.3.9 The factor matrix of the rating ingroup bias

Items were subject to a principal-components analysis. One factor was extracted on the basis of eigen values (3.30). 66.0% of the total variance is explained by the factor.

"pulls"	Factor 1
bias3 (friendliness)	.869
bias4 (trustworthiness)	.863
bias5 (generosity)	.854
bias1 (warmth)	.816
bias2 (honesty)	.637

1) The figure is the factor loading of the item.

Table A7.3.10 Intentions in allocations

Subject's group: / Intentions	Right Eye (n =19)	Left Eye (n =6)	Total (n =25)
"To be fair to two people"	5.00# (1.92)	4.33 (2.81)	4.84 (2.12)
"To be fair to two groups"	5.21# (1.27)	5.33 (2.42)	5.24# (1.56)
"To be of my interest"	2.47# (2.01)	3.17 (2.56)	2.64# (2.12)
"more points to my group"	2.84# (2.12)	1.67# (1.63)	2.56# (2.04)
"As many as possible to everyone"	4.32 (1.38)	4.83 (2.56)	4.44 (1.69)
"The way others wouldn't think I am unfair"	4.00 (2.06)	3.50 (2.07)	3.88 (2.03)
"To make my group win"	2.84 (2.09)	2.67 (2.66)	3.92 (1.94)
"With no thoughts"	3.68 (1.83)	4.67 (2.25)	3.92 (1.94)

* The figure is a mean response on the scale 1not at all ...— 7 very ...

** # denotes the figure is significantly different from neutral point ($p < .05$).

Table A7.3.11 The factor matrix of the reported intentions

Items were subject to a principal-components analysis. Three factors were extracted on the basis of eigen values (2.79, 2.26 & 1.15, for factor 1, 2 & 3), and oblimine rotated. 34.8%, 28.3% and 14.4% of the total variance are explained by the factor 1, 2 & 3 respectively.

reported intention items	Factor 1	Factor 2	Factor 3
"To be of my interest"	.926		
"To make my group win"	.892		
"most points to my group"	.846		
"As many as possible to everyone"		.852	
"To be fair to two groups"		.757	-.331
"With no thoughts"		.752	.343
"To be fair to two people"			-.828
"The way others wouldn't think I am unfair"			-.776

1) The figure is the factor loading of the item. Absolute loading value less than .30 are omitted.
2) The correlations between the factors 1 & 2, 2 & 3, and 3 & 1 were -.12, -.12, and -.22 respectively.

Appendix 7.4

Examination of the relationship between the social identity and the category differentiation processes: with different allocation indices

Table A7.4 Correlations between colour band index and allocation indices

Allocation index	Allocation index with: Colour band index at Time 1 $	Time 2 §
The pull of MD•MIP (*vs.* F)	.06	.43*
The pull of MD•MIP (*vs.* MJP)	-.16	-.16
The pull of MD•MIP (*vs.* MJP, ver.2)	.17	.03
Composite of the four discriminatory pulls	-.18	.50**

$ Pearson's correlation coefficient.
§ Partial correlation coefficient controlled by the index at Time 1.
* $p < .05$, $p < .01$.

Appendix 8.1

Instructions (St Edmunds School Experiment)

1) General instruction

(1) "Thank you very much for taking part in our research. This is a study about decisions and groups. On the desk, you should have a big envelope and four small envelops, a questionnaire booklet, and an explanation sheet. Don't turn them over, and please just listen to the instructions I give you, and I will explain more to you about the research later on." [followed by **social orientation manipulation**]

2) Manipulation of social categorisation

(2) "Now, please look at the face page of the questionnaire booklet, and listen carefully as I read (Read aloud the text on the face and the next page)"
[Right eye/left eye test: Make sure everybody hasfound out which of the two.]
[What you do in the booklet]

3) Explanation of the main task

(3.0) [(In the text on the questionnaire booklet)... Look at the explanation sheet, now.] "Basically, what I'd like you to do are two things."

(3.1) "One part of the booklet asks you to decide how many points you are going to give to each of the groups in a pair." (Reading aloud the explanation sheet).

(3.2) "The other part of the booklet asks you to show what you think about the people from Right Eye group and Left Eye group." (Reading aloud the text of the explanation sheet)

4) Distraction task

(4.0) [Reading out the NOTES, and] "Concerning the note 4, we are also interested in how you can do two tasks at the same time. I have already explained the first task— decision making about groups. The second task is simple. You just have to remember a number. This booklet has four sections, and before you start every section, I will ask you to remember a rehearsal number until you write it down later."

(4.1) "These rehearsal numbers are in the small envelops. Now, open the envelope No.1, and find a number that you are given. The number may be different from your neighbours, so don't worry about others. This is not a test, so you don't have to cheat. If you forget the number, it's alright. However, according to studies on memory, one can remember it longer if one recalls it from time to time. So, I advise you to recall the rehearsal number when you come across the sign in the booklet '**ATTENTION: recall the rehearsal number**.'"

(4.2) "Now, try to learn the rehearsal number silently. You have 25 seconds." [25 seconds later] "Now, put the slip back to the envelope, and put the envelop into the big envelop. Please remember the rehearsal number until you write it down later."

5) Administration

(5.0) "If you have any questions, look at the explanation sheet first. If you still have a question, put up your hand. Don't ask your neighbours. Now, please start from page one."

(5.1) (After everyone finish the **SECTION 1**) "Has everyone finished the **SECTION 1**? Then we move to the **SECTION 2.** Open the small envelop No.2, and remember the rehearsal number. You have 25 seconds."

[25 seconds later] "Now, put the slip back to the envelope, and put the envelop into the big envelop. Please remember the rehearsal number until you write it down later. Now turn the page and start the **SECTION 2**"

(Same until the last section 4.)

(5.3) "Please put everything in the big envelope."

(5.4) Questions and explanations

1 Any idea what the decision making was about?
2 Any idea what the relationship between remembering numbers & decision making was?
3 How difficult it was to do the two tasks?
4 Debriefing (see separate sheet).

MAKING DECISIONS

This is a study about decisions and groups.

There are many distinctions among us. Some have fairer hair colour, others have darker one. Some are taller, and others shorter. Here is a relatively new distinction: **RIGHT EYE** users or **LEFT EYE** users.

This means which eye one uses more. You may not be aware of it, but you surely use one of your eyes more than the other. According to a survey, about half people are right eye users, and the other half left eye users. For now, let us call the first group as **RIGHT EYE GROUP**, and the second as **LEFT EYE GROUP**. In this study, we would like you to make series of decisions on the two groups.

To find out which group you are in, the simplest way is explained later. But before you try it, please remember not to tell it to anyone which group you are in until we finish this session.

Right eye / Left eye Test

Put your left fist on your nose with the index finger up (see the figure below). Look straight some metres ahead naturally and then blink your right eye slowly several times. If the vague image of your left fist moves to right, you are in the **RIGHT EYE** group; if the vague image of your left fist does not move, you are in the **LEFT EYE** group. If you find it out, please write it down in the box below.

Your group name

What you do in the booklet

Here is another thing. Each of you has a personal code number (yours is in the box below). This code is a secret. So don't tell it to anybody. What you do in the booklet is to decide various things about people from the **Right Eye Group** and **Left Eye Group**. Examples are shown at the separate sheet of paper. Look at the sheet now.

Your personal code

28

NOTES

1) Work on your own, without talking. Pages inside the questionnaire may be different in order from your neighbours'. So, don't worry about your neighbours. Begin with the first page and remember not to miss any pages out.

2) Every time you turn the page, write your group name first in the box at the top.

3) Make your decisions quite **quickly** because there is only just enough time to make them.

4) There are some rehearsal numbers for you to remember.

1 Write down :

Your group name

ATTENTION: Recall the rehearsal number, now.

Giving points

2 Circle a box to give points to the two groups

Person code 5 of the **left eye** group

Person code 9 of the **right eye** group

7	8	9	10	11	12	13
7	6	5	4	3	2	1

Write below, the details of the points that you have chosen:

Points for person code 5 of the **left eye** group: _____

Points for person code 9 of the **right eye** group: _____

3 Check that you have circled a box and copied the points

Making decisions

1 Write down :

Your group name

ATTENTION: Recall the rehearsal number, now.

2 Circle a box to give points to the two groups

Person code 4 of the **right eye** group

Person code 8 of the **left eye** group

10	9	8	7	6	5	4
1	3	5	7	9	11	13

Write below, the details of the points that you have chosen:

Points for person code 4 of the **right eye** group: _____

Points for person code 8 of the **left eye** group: _____

3 Check that you have circled a box and copied the points

1 Write down :

Your group name

ATTENTION: Recall the rehearsal number, now.

2 Circle a box to give points to the two groups

Person code 3 of the **left eye** group	6	7	8	9	10	11	12
Person code 6 of the **right eye** group	3	5	7	9	11	13	15

Write below, the details of the points that you have chosen:

Points for person code 3 of the **left eye** group: _____

Points for person code 6 of the **right eye** group: _____

3 Check that you have circled a box and copied the points

Making decisions

1 Write down :

Your group name

ATTENTION: Recall the rehearsal number, now.

2 Circle a box to give points to the two groups

Person code 2 of the **right eye** group	20	19	18	17	16	15	14
Person code 7 of the **left eye** group	11	13	15	17	19	21	23

Write below, the details of the points that you have chosen:

Points for person code 2 of the **right eye** group: _____

Points for person code 7 of the **left eye** group: _____

3 Check that you have circled a box and copied the points

ATTENTION: Recall the rehearsal number, now.

This is the end of the **SECTION 1**.

Write down the first rehearsal number in the column below.

[ ]

There is a **SECTION 2**, but as we will start it together, please wait quietly until everybody finishes. Do not turn to the next page.

Write down :

Your group name

[ ]

ATTENTION: Recall the rehearsal number, now.

Your impressions of members of the two groups

Circle the numbers to show what you think about the people in **right eye** group?

People in **right eye** group are.....									
a.	warm	1	2	3	4	5	6	7	cold
b.	dishonest	1	2	3	4	5	6	7	honest
c.	friendly	1	2	3	4	5	6	7	unfriendly
d.	untrustworthy	1	2	3	4	5	6	7	trustworthy
e.	generous	1	2	3	4	5	6	7	selfish

ATTENTION: Recall the rehearsal number, now.

This is the end of the **SECTION 2**.

Write down the second rehearsal number in the column below.

[ ]

There is a **SECTION 3**, but as we will start it together, please wait quietly until everybody finishes. Do not turn to the next page.

1 Write down :

Your group name

ATTENTION: Recall the rehearsal number, now.

Giving points

2 Circle a box to give points to the two groups

Person code 11 of the **right eye** group	7	8	9	10	11	12	13
Person code 10 of the **left eye** group	7	6	5	4	3	2	1

Write below, the details of the points that you have chosen:

Points for person code 11 of the **right eye** group: _____

Points for person code 10 of the **left eye** group: _____

3 Check that you have circled a box and copied the points

1 Write down :

Your group name

ATTENTION: Recall the rehearsal number, now.

2 Circle a box to give points to the two groups

Person code 12 of the **left eye** group	10	9	8	7	6	5	4
Person code 15 of the **right eye** group	1	3	5	7	9	11	13

Write below, the details of the points that you have chosen:

Points for person code 12 of the **left eye** group: _____

Points for person code 15 of the **right eye** group: _____

3 Check that you have circled a box and copied the points

1 Write down :

Your group name

ATTENTION: Recall the rehearsal number, now.

2 Circle a box to give points to the two groups

Person code 17 of the **right eye** group	6	7	8	9	10	11	12
Person code 18 of the **left eye** group	3	5	7	9	11	13	15

Write below, the details of the points that you have chosen:

Points for person code 17 of the **right eye** group: _____

Points for person code 18 of the **left eye** group: _____

3 Check that you have circled a box and copied the points

1 Write down :

Your group name

ATTENTION: Recall the rehearsal number, now.

2 Circle a box to give points to the two groups

Person code 13 of the **left eye** group	20	19	18	17	16	15	14
Person code 14 of the **right eye** group	11	13	15	17	19	21	23

Write below, the details of the points that you have chosen:

Points for person code 13 of the **left eye** group: _____

Points for person code 14 of the **right eye** group: _____

3 Check that you have circled a box and copied the points

ATTENTION: Recall the rehearsal number, now.

This is the end of the **SECTION 3**.

Write down the third rehearsal number in the column below.

[ ]

There is a **SECTION 4**, but as we will start it together, please wait quietly until everybody finishes. Do not turn to the next page.

Write down :

Your group name

Your impressions of members of the two groups

Circle the numbers to show what you think about the people in **left eye** group?

People in **left eye** group are.....									
a.	warm	1	2	3	4	5	6	7	cold
b.	dishonest	1	2	3	4	5	6	7	honest
c.	friendly	1	2	3	4	5	6	7	unfriendly
d.	untrustworthy	1	2	3	4	5	6	7	trustworthy
e.	generous	1	2	3	4	5	6	7	selfish

Write down :

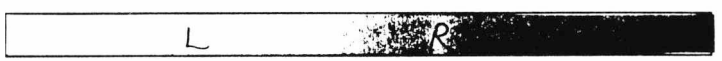
Your group name

☆ Imagine people of the two groups. Please put down letters **R** and **L** on the colour band according to where you feel that group belongs.

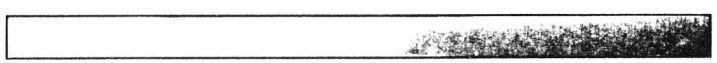
R for the **right eye** group

L for the **left eye** group

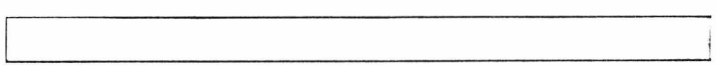
EXAMPLE



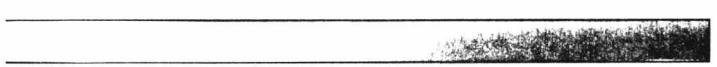
Band 1



Band 2



Band 3



ATTENTION: Recall the rehearsal number, now.

Write down the fourth rehearsal number in the column below.

[ ]

Please turn to the next page and start the rest of SECTION 4.

Write down :

Your group name

☆☆ **The following concern your feelings about your group**

Please answer the following by circling the appropriate number.

Where 1 = " Strongly Disagree " and 7 = " Strongly Agree "

PLEASE CIRCLE THE GROUP YOU ARE IN :

LEFT EYE **OR** **RIGHT EYE**

	Strongly Disagree						Strongly Agree
1. I am glad to belong to this group.	1	2	3	4	5	6	7
2. Overall, I have a low opinion of this group.	1	2	3	4	5	6	7
3. Right now, I do not feel close to this group.	1	2	3	4	5	6	7
4. I feel strong ties to this group.	1	2	3	4	5	6	7
5. I feel positive towards this group.	1	2	3	4	5	6	7
6. Right now I do not think highly of this group.	1	2	3	4	5	6	7
7. Right now, it feels good to be a member of this group.	1	2	3	4	5	6	7
8. I find it hard to be enthusiastic about this group.	1	2	3	4	5	6	7
9. Right now, it feels pleasant to be in this group.	1	2	3	4	5	6	7

Thank you very much. We would like next to ask you the questions about how you made your decisions.

❒

1 When you gave points to people, how much did you try to do each of the things listed below?

a. to be fair to each person

not at all 1 2 3 4 5 6 7 very much

b. to be fair to each group

not at all 1 2 3 4 5 6 7 very much

c. to give yourself most points

not at all 1 2 3 4 5 6 7 very much

d. to give your group most points

not at all 1 2 3 4 5 6 7 very much

e. to give everyone as much as possible

not at all 1 2 3 4 5 6 7 very much

f. to give points such that others won't think you are unfair

not at all 1 2 3 4 5 6 7 very much

g. to try to make your group win

not at all 1 2 3 4 5 6 7 very much

h. nothing in particular

not at all 1 2 3 4 5 6 7 very much

❒❒

2 When you gave points to people, how much did you think about your own group?

not at all 1 2 3 4 5 6 7 very much

3 When you gave points to people, were you concerned about how others would think of you ?

not at all 1 2 3 4 5 6 7 very much

4 How much did you concentrate on the questions when you answered them?

not at all 1 2 3 4 5 6 7 very much

5 How busy were you keeping the rehearsal numbers in mind?

not at all 1 2 3 4 5 6 7 very busy

6 When you gave your views about the other group, how much did you compare it with your own group?

not at all 1 2 3 4 5 6 7 very much

7 How competitive do you feel towards the other group?

not at all 1 2 3 4 5 6 7 very competitive

8 How much were you distracted when you answered the booklet?

not at all 1 2 3 4 5 6 7 very much

9 How difficult was it to answer the questions?

very easy 1 2 3 4 5 6 7 very difficult

10 How willing would you be to take part in the research again?

not at all 1 2 3 4 5 6 7 very willing

11 How difficult was it to try to remember the number?

very easy 1 2 3 4 5 6 7 very difficult

Thank you very much. This is the end of the booklet. Please turn over the booklet and wait until everybody finishes.

EXPLANATION SHEET

Making decisions

Write down :

Your group name

Giving points

Look at the example below. The code number of two people and the name of their group are written next to some boxes which contain points for each of the people. Imagine the points stands for pence. You must choose one box.

In this example, suppose you circled the box which gives 9 points to the person of the code **37** from the **right eye** group and 13 points to the person of the code **25** from the **left eye** group. You then copy these points into the spaces below the boxes.

(Example) Circle a box to give points to the two groups

Person code **37** of the **right eye** group	7	8	9	10	11	12	13
Person code **25** of the **left eye** group	15	14	13	12	11	10	9

Write below, the details of the points that you have chosen:

Points for person code **37** of the **right eye** group: 9

Points for person code **25** of the **left eye** group: 13

EXPLANATION SHEET

Making decisions

Write down :

Your group name

Your impressions of members of the two groups

We would like to ask you about your view of the two groups (**right eye** group and **left eye** group). Answer the questions carefully but do not spend too long on each one. There are no right or wrong answers.

Think of the people in **right eye** group, and circle a number to show what you think they are like. For example, if you think people in the **right eye** group are quite tall, you would circle 3, but if you think they are very tall you would circle 1. If you think they are very short you would circle 7.

EXAMPLE

People in **right eye** group are.....

tall 1 2 3 4 5 6 7 short

Appendix 8.4

Rehearsal numbers for Experiments 5 and 6

064	474	663	693
474	663	693	064
663	693	064	474
693	064	474	663
693	663	474	064
73632907265	74388437476	04437373828	94628576254
94628576254	73632907265	74388437476	04437373828
74388437476	04437373828	94628576254	73632907265
04437373828	94628576254	73632907265	74388437476
94628576254	04437373828	74388437476	73632907265
064	474	663	693
474	663	693	064
663	693	064	474
693	064	474	663
693	663	474	064
73632907265	74388437476	04437373828	94628576254
94628576254	73632907265	74388437476	04437373828
74388437476	04437373828	94628576254	73632907265
04437373828	94628576254	73632907265	74388437476
94628576254	04437373828	74388437476	73632907265

Appendix 8.5

Supplementary tables for Experiment 5

Table A8.5.1 Distribution of subjects by experimental conditions, sex and group division

Social orientation:	Competitive		Cooperative	
Distraction:	Weak	Strong	Weak	Strong
Sex				
Male	4	6	7	7
Female	3	2	3	2
				χ^2 (3) = .91, *n.s.*
Group division				
Right Eye group	4	6	7	7
Left Eye group	3	2	3	2
				χ^2 (3) = 1.80, *n.s.*

Table A8.5.2 The factor loadings of the "pull" scores

Items were subject to a principal-components analysis. Three factors were extracted on the basis of eigen values (3.27, 1.47 & 1.25, for factor 1, 2 & 3), and oblimine rotated.40.9, 18.4 and 15.6% of the total variance are explained by the factor 1, 2 & 3 respectively.

"pulls"	Factor 1	Factor 2	Factor 3
MD•MIP (on MJP)	.921		
MD•MIP (on MJP) v2	.885		
MD (on MJP•MIP)	.856		
MD•MIP (on F)	.735		.419
MJP (on MD•MIP)		-.863	
F (on MD•MIP)		.710	
MJP (on MD•MIP) v2			.904
MJP•MIP(on MD)			.725

1 The figure is the factor loading of the item. Absolute loading value less than .30 are omitted.

2 The correlations between the factors 1 & 2, 2 & 3, and 3 & 1 were -.09, .03, & .20 respectively.

Table A8.5.3 The factor matrix of the rating ingroup bias

Items were subject to a principal-components analysis. One factor was extracted on the basis of eigen values (2.89). 57.9% of the total variance are explained by the factor.

"pulls"	Factor 1
bias1 (warmth)	.878
bias4 (trustworthiness)	.847
bias3 (friendliness)	.787
bias2 (honesty)	.680
bias5 (generosity)	.568

1) The figure is the factor loading of the item.

Table A8.5.4 Pearson's correlation coefficients between the colour band scale indices and other variables

	Brown band		Red band		Brown band	
	Distance	Index A	Distance	Index A	Distance	Index A
Variables whose relations are expected						
Group self-esteem score	-.13	.04	-.26	-.09	-.17	.03
Its cognitive component	-.07	-.07	-.07	.13	-.31	-.14
Composite score of rating bias	.28	-.30	.32	.12	.08	-.35*
Its absolute value	.35*	-.21	.43*	.16	.17	-.26
Variables that showed relations (not exhaustive)						
C 6 (self-presentational concern)	.00	.32	-.14	-.49**	.26	.42**
C 15 (distracted)	.12	.30	.35*	-.05	.25	.23
C 16 (difficulty in questions)	-.02	.14	.26	.39*	-.18	.00
C 18 (difficulty in remembering)	.25	.23	.40*	.20	.04	.02
Pull score of MJP•MIP (on MD)	.17	.11	-.16	-.40*	.12	.43*
Pull score of MJP (on MD•MIP)	.30	-.02	.35*	-.11	.16	-.09
Pull score of F (on MD•MIP)	-.44**	.17	-.45	-.14	-.21	.17

* $p < .05$, ** $p < .01$.

#1 Distance is the distance on the colour bands in mm.

#2 Direction of the right-left by 17, 11 and 13 cases on the brown, the red, and the blue band respectively out of 34was reverse to the expectation (*i.e.*, the right eye group point at the left side of the bands compared with the left eye group point).

#3 Index A was corrected such that the distance was given minus value when the direction on the band and the group was reversed

Table A8.5.5 The factor matrix of the reported intentions

Items were subject to a principal-components analysis. Two factors were extracted on the basis of eigen values (3.56 & 1.87, for factor 1 & 2), and oblimine rotated. 44.6% and 23.4% of the total variance are explained by the factor 1 & 2 respectively.

reported intention items	Factor 1	Factor 2
"As many as possible to everyone"	.844	
"To be fair to each group"	.774	-.315
"To be fair to each person"	.772	
"Without thinking"	.641	
"To give myself most points"		.866
"To give my group most points"		.839
"To make my group win"	-.383	.720
"The way others won't think I am unfair"	.588	.609

1) The figure is the factor loading of the item. Absolute loading value less than .30 are omitted.
2) The correlation between the factors was -.16

Table A8.5.6 Response consistancy between matirces versions of [MD•MIP vs. MJP]

Distraction condition:	3-digit (n =17)	11-digit (n =17)
Absolute value of difference between: [1]		
(1a) raw scores on matrices (mx2 & mx7)[2]	1.29 (1.69)	1.00 (1.46)
(1b) raw scores on matrices (mx5 & mx8)	.82 (.95)	.94 (1.39)
(2a) scores on matrix types B^{in}_{out} & D^{in}_{out} [3]	.94 (1.09)	1.29 (1.83)
(2b) scores on matix types B^{out}_{in} & D^{out}_{in}	1.18 (1.63)	.65 (.70)
(3a) pull scores of MD•MIP *vs.* MJP, on B & D [4]	1.29 (1.53)	1.71 (2.14)
(3b) pull scores of MJP *vs.* MD•MIP, on B & D	1.76 (2.25)	1.35 (1.58)
Pearson's correlation coefficient between:		
(1a) raw scores on matrices (mx2 & mx7)	.33	.55*
(1b) raw scores on matrices (mx3 & mx8)	.77***	.73***
(2a) scores on matrix types B^{in}_{out} & D^{in}_{out}	.66**	.37
(2b) scores on matix types B^{out}_{in} & D^{out}_{in}	.39	.86**
(3a) pull scores of MD•MIP *vs.* MJP, on B & D	.75***	.69**
(3b) pull scores of MJP *vs.* MD•MIP, on B & D	.00	.13

1 The figure is a mean absolute value of the difference between the indices. No mean was significantly larger than zero in two-tailed t -test.

2 Matrices (mxX) correspond in the order to those in the booklet (Appendix 8.2).

3 Matrix types B^{in}_{out}, B^{out}_{in}, D^{in}_{out} & D^{out}_{in} correspond to those in Fig.3.7.1 and Fig.3.7.2

4 Absolute value of the difference between pull scores calculated from matrix type B^{in}_{out} & B^{out}_{in}, D^{in}_{out} & D^{out}_{in}.

** p <.01, *** p <.001 (two-tailed)

Table A8.5.7 The mean "pull" scores of each strategy excluding those who took notes of the rehearsal numbers

Social orientation:	Competitive		Cooperative	
Distraction:	Weak	Strong	Weak	Strong
Items	(n = 6)	(n = 3)	(n =8)	(n = 8)
MD•MIP (on MJP) [1]	3.33_a#	3.00	$-.13_b$	$-.13_b$
	(2.66)	(3.00)	(1.81)	(2.90)
MD•MIP (on MJP) v2 [2]	4.17_a#	1.67	$-.63_b$	1.50
	(2.40)	(6.66)	(2.26)	(2.51)
MD•MIP (on F) [3]	3.00_a#	1.33_a	-1.38_b	.38
	(2.53)	(4.51)	(2.50)	(2.93)
MD (on MJP•MIP)	3.17_a#	1.67	$-.63_b$	-1.00_b
	(2.48)	(4.51)	(2.33)	(2.73)
F (on MD•MIP)	1.00	1.33	2.63#	1.63
	(3.10)	(1.53)	(3.02)	(2.39)
MJP•MIP (on MD)	.17	.33	-.38	.00
	(3.31)	(3.51)	(1.51)	(3.46)
MJP (on MD•MIP)	.00	-1.67	-.13	.13
	(1.90)	(2.08)	(.99)	(1.64)
MJP (on MD•MIP) v2 [4]	.50	-.33	-1.13	-1.50#
	(1.23)	(.58)	(2.64)	(1.31)

* # denotes the figure is significantly different from zero point ($p < .05$)
** The figures in brackets are standard deviations.
*** Different subscripts on a line denotes they are significantly different ($p < .05$)
1 The effect of situation: F (1,21) =8.98, $p < .01$
2 The effect of situation: F (1,21) =3.49, $p < .08$;
the effect of interaction of situation and distraction: F (1,21) =3.03, $p < .10$
3 The effect of situation: F (1,21) =4.51, $p < .05$
4 The effect of situation: F (1,21) =3.16, $p < .10$

Table A8.5.8 Total points in point allocation tasks excluding those who took notes of the rehearsal numbers

Social orientation:	Competitive		Cooperative	
Distraction:	Weak	Strong	Weak	Strong
Items	(n = 6)	(n = 3)	(n =8)	(n = 8)
Ingroup members	96.33	88.67	76.00	81.25
	(11.24)	(25.15)	(8.19)	(14.10)
Outgroup members	64.67	70.33	81.63	77.38
	(11.64)	(17.01)	(7.75)	(7..84)

*1 The figures in brackets are standard deviations.
*2 The ingroup-outgroup factor effect F (1,21)=6.57, $p < .05$; the interaction effect between situation and ingroup-outgroup factor F (1,21)=7.56, $p < .05$

Table A8.5.9 Competitive and altruistic pulls composite scores

Social orientation:	Competitive		Cooperative	
Distraction:	Weak	Strong	Weak	Strong
Items	(n = 8)	(n = 7)	(n =10)	(n = 9)
Competitive pulls score [1]	11.14#	9.63	-2.20	.67
	(10.70)	(14.65)	(5.83)	(7.78)
Altruistic pulls score [2]	2.29	1.13	.60	.89
	(4.68)	(2.64)	(5.72)	(5.44)

* # denotes the figure is significantly different from zero point ($p < .05$)
** The figures in brackets are standard deviations.
1 The competitive pulls score is a simple summation of the four pull scores consisting Factor 1 presented in Table 6. The effect of situation was significant.F (1,30)=10.38, $p < .01$
2 This score may not be reliable as consisting four pull scores did not form a single factor.

Table A8.5.10 Competitive and altruistic pulls composite scores excluding those who took notes of the rehearsal numbers

Intergroup situation:	Competitive		Cooperative	
Distraction:	Weak (n =6)	Strong (n =3)	Weak (n =8)	Strong (n =8)
Index				
Competitive pulls score [1]	13.67#	7.67	-2.75	.75
	(9.16)	(18.23)	(6.48)	(8.31)
Altruistic pulls score [2]	1.67	-.33	1.00	.25
	(4.80)	(3.51)	(5.21)	(5.45)

* # denotes the figure is significantly different from zero point ($p < .05$)

** The figures in brackets are standard deviations.

1) The competitive pulls score is a simple summation of the four pull scores consisting Factor 1 presented in Table 6. The effect of situation was significant.F (1,21)=8.19, $p < .01$

2) This score may not be reliable as consisting four pull scores did not form a single factor.

Appendix 9.1

First three letters of your first name: _____
Your birth month: _____
First three letters of your mother's first name: _____
SEX: M ____ F ____

This is a mini-study in decision making. We would like you to rank your preferences for the points that you and another individual will receive. Assume that the points have value to you and the other. Within each choice set, please rank each option A, B, and C, with either a 1, 2, or 3, according to your preference for the distribution of points between you and the other. Please hold all questions or comments about this decision task until everyone has completed it. A trial example is shown in the box below:

EXAMPLE	A	B	C
	---	---	---
You get	500	500	550
Other gets	100	500	300

In this example, if you prefer **A** (500 points for you and 100 point for the other), you would put a **1** below the letter **A** and if you prefer option **C** over **B**, then you would put a **2** below the letter **C** and a **3** below the letter **B**. Nine trials follow. Please rank order your preferences for each trial.

TRIAL 1	A	B	C
	---	---	---
You get	480	540	480
Other gets	80	280	480

TRIAL 2	A	B	C
	---	---	---
You get	560	500	500
Other gets	300	500	100

TRIAL 3	A	B	C
	---	---	---
You get	560	520	520
Other gets	520	120	520

TRIAL 4	A	B	C
	---	---	---
You get	560	560	570
Other gets	560	100	300

TRIAL 5	A	B	C
	---	---	---
You get	510	560	510
Other gets	510	300	110

TRIAL 6	A	B	C
	---	---	---
You get	550	500	500
Other gets	300	100	500

TRIAL 7	A	B	C
	---	---	---
You get	560	500	500
Other gets	300	500	190

TRIAL 8	A	B	C
	---	---	---
You get	520	590	520
Other gets	300	500	520

TRIAL 9	A	B	C
	---	---	---
You get	490	490	540
Other gets	100	490	300

Appendix 9.2

Supplementary tables for Experiment 6

Table A9.2.1 Experimental design and the number of subjects by group assignment

Group division	Distraction: Weak	Distraction: Strong	
"right eyed"	15	13	
"left eyed"	10	13	
TOTAL			51

1) χ^2 (1) = .51, *n.s.*
2) Four other subjects completed only the decomposed games, thus were not incluced here.

Table A9.2.2 Experimental design and the number of subjects by social value orientations

Division by social value	Distraction: Weak	Distraction: Strong	Excluded ¢1	missing ¢2	Total	(%)
Competitors	5	5 ^{S}	0	2	12	(23%)
Individualists	5	2 ^{S}	0	0	7	(14%)
Cooperators	9	11	2	1	23	(44%)
N. A	2	4	3	1	10	(19%)
(missing) ¢3	–	–	3	–	3	
TOTAL	21	22	8	4	55	

1) χ^2 (3) = 2.18, *n.s.* , using distraction (weak and strong) and social value division.
2) Division by social value is based on one's reponse to the decomposed games. Those who chose competitive, individualistic, and prosocial allocation more than six times out of nine decomposed games, as first choise, were classified repectively as competitors, individualists, and cooperators. Those who did not fall in any of these were presented as N.A.
$ One from each has written down the rehearsal numbers against instruction.
¢ 1. Those who completed the decomposed games after the experimental session or those who did not complete them; 2. Those who did not paticipate in the experimental session; 3. Those who did not engage in the decomposed games.

Table A9.2.3 Distribution of subjects' sex in each condition

Sex	Distraction: Weak	Distraction: Strong	Excluded §	%
Male	6	12	2	39%
Female	15	10 $	6	61%
TOTAL	21	22	8	51 (100%)

1) χ^2 (1) = 2.98, p <.10, using distraction (weak and strong) and sex.
$ Two of them wrote down the rehearsal numbers against instruction.
§ Those who completed the decomposed games after the experimental session.

Table A9.2.4 Distribution of subjects' sex in social value division

Sex	Division by social value: Competitors	Prosocials	Individuals	N.A.	%
Male	2	9	5	5	39%
Female	10 $	14	2 $	8	61%
TOTAL	12	23	7	13	51 (100%)

1) χ^2 (3) = 5.64, *n.s.*, using distraction (weak and strong) and sex.
2) Division by social value is based on one's reponse to the decomposed games. Those who chose competitive, individualistic, and prosocial allocation more than six times out of nine decomposed games, as first choise, were classified repectively as competitors, individualists, and prosocials. Those who did not fall in any of these were presented as N.A.
$ One from each has written down the rehearsal numbers against instruction.

Table A9.2.5 Pearson's correlation between choice in decomposed games and competitiveness manipulation check

	The number of choise: Competitive	Individualistic	Prosocial
Competitveness check (chck15)	-.02	-.22	.33*

* p <.05, two-tailed.

Table A9.2.6 Collective Self-Regard by distraction and social value orientations

Social orientation:	Non-cooperators		Cooperators	
Distraction:	Weak (n = 12)	Strong (n = 6)	Weak (n =9)	Strong (n =11)
Collective Self-Regard score	45.58	37.67	44.56	45.00
	(9.20)	(11.59)	(11.17)	(8.50)

No effect was significant.

Table A9.2.7 Interaction between social value orientation and distraction on check items for busyness and difficulty

Social orientation:	Non-cooperators		Cooperators	
Distraction:	Weak (n = 12)	Strong (n = 6)	Weak (n =9)	Strong (n =11)
"Felt busy keeping the numbers"§	5.17	5.83	2.78	5.82
	(2.21)	(2.40)	(2.05)	(1.78)
"Difficult to answer the questions"$	3.17	2.00	2.44	3.64
	(1.99)	(1.55)	(1.67)	(1.29)

§ The interaction effect: F (1,34)=2.87, p <.10.
$ The interaction effect: F (1,34)=4.43, p <.05.

Table A9.2.8 The factor loadings of the pull scores

Items were subject to a principal-components analysis. Three factors were extracted on the basis of eigen values (2.54, 1.49 & 1.20, for factors 1, 2, and 3), and obliquely rotated. 31.8%, 18.6%, and 15.0% of the total variance are explained by the factors 1, 2, and 3 respectively.

"pulls"	Factor 1	Factor 2	Factor 3
MD (on MJP•MIP)	.784		
MD•MIP (on F)	.726	.388	
F (on MD•MIP)	-.700		
MD•MIP (on MJP)	.618		.484
MJP (on MD•MIP) version 2		.838	
MJP (on MD•MIP)		.786	
MD•MIP(on MJP) version 2			.795
MJP•MIP (on MD)			.665

1) The figure is the factor loading of the item. Absolute loading value less than .30 are omitted.
2) The correlation between the factors 1 and 2, 2 and 3, and 3 and 1 are respectively, .05, .02, and .14 (all *n.s.*).

Table A9.2.9 The factor loadings of the rating ingroup bias

Items were subject to a principal-components analysis. A single factor was extracted on the basis of eigen values (3.33), and oblimine rotated. 66.6% of the total variance are explained by the factor 1 & 2 respectively.

"pulls"	Factor 1
bias4 (trustworthiness)	.864
bias5 (generosity)	.829
bias2 (honesty)	.807
bias1 (warmth)	.803
bias3 (friendliness)	.774

The figure is the factor loading of the item. Absolute loading value less than .30 are omitted.

Table A9.2.10 Pearson's correlation coefficients

	Allocation index	Colour band index		Cooperative v.		
		Rating index		Competitive v.		Individualist v.
CSR score	-.31*	-.06	.16	-.10	.03	.07
Thinking about groups	.40**	.43**	.58**	.04	-.16	.17
Group comparison in ratings	-.02	.02	.07	.09	-.04	-.06

1 Allocation index is the composite pull scores of MD•MIP (on MJP), MD•MIP (on F), and MD (on MJP•MIP). Rating index is the composite score of the five rating bias. Colour band index is the composite of three band indices. Competitive, Cooperative, and Individualist v. indicate the number of each choice in the nine-trial decomposed games.

*p <.05, **p <.01; two-tailed.

Appendix 9.3

Analyses including subjects who completed social value orientation measurement after the minimal group experiment for Experiment 6

Table A9.3.1 Mean pull scores and ingroup bias in total points by distraction and social value orientations

Social orientation:	Non-cooperators		Cooperators	
Distraction:	Weak	Strong	Weak	Strong
Pull	(n = 14)	(n = 8)	(n =10)	(n =12)
MD•MIP (on MJP)	1.36	1.13	1.30#	-.08
	(3.00)	(3.36)	(1.70)	(1.00)
MD•MIP (on MJP, version2)	1.86#	1.38	.40	.67
	(2.85)	(2.13)	(1.27)	(1.44)
MD•MIP (on F)	1.86#	1.13	1.10	-.42
	(2.28)	(3.14)	(1.85)	(1.83)
MD (on MJP•MIP) *1, $1	2.50#	.50	.00	-.17
	(1.51)	(3.55)	(1.63)	(1.27)
F (on MD•MIP) *2	2.43#	2.88#	4.70#	4.08#
	(2.85)	(2.30)	(1.83)	(2.61)
MJP•MIP (on MD) *3	.93#	.50	-.20	1.17
	(1.39)	(2.29)	(1.62)	(2.29)
MJP (on MD•MIP) *4	.64	-.88	-.10	-.08
	(1.95)	(1.64)	(1.60)	(1.56)
MJP (on MD•MIP, version2) *5	.00	-1.88	.40	-.17
	(1.41)	(3.09)	(1.08)	(1.47)
Ingroup bias in total points $2	15.86#	10.25	7.30	.75
	(19.80)	(22.01)	(12.24)	(5.15)

The figure is significantly different from zero point ($p < .05$, two-tailed)

( ) The figures in brackets are standard deviations.

* The effect of social value: 1 and 2. Fs=6.64 and 5.16, $p < .05$; 3 and 4. Fs=3.69 and 3.39, $p < .10$; df =1/40 for all Fs.

$ The effect of distraction: 1. F (1,40)=3.66, $p < .10$; 2. F (1,40)=4.95, $p < .05$

¢ SDs of both sides are different: 1. F =2.92, $p < .10$; 2. F =5.54, $p < .01$; 3. F =4.97, $p < .05$; 4. F =5.64, $p < .01$.

\+ Means of both sides are different: 1. t (13.94)=2.27, $p < .05$, separate variance estimate; 2. t (20)=1.92, $p < .10$; 3. t (20)=1.86, $p < .10$

Table A9.3.2 Rating bias and colour band differentiation indices by distraction and social value orientations

Social orientation:	Non-cooperators		Cooperators	
Distraction:	Weak	Strong	Weak	Strong $
Band	(n = 15)	(n = 8)	(n =10)	(n =12)
Rating bias index *1	1.97# (1.77)	1.63# (2.01)	.20 (.47)	–+– 1.17# (1.37)
Colour band index *2	81.04# (25.13)	76.42# (21.37)	38.73 (30.89)	61.49 (36.81)

\# The mean is significantly different from 51mm ($p < .05$, two-tailed)
* The effect of social value: 1. F (1,41)=5.76, $p < .05$; 2. F (1,40)=10.03, $p < .01$.
† Means and standard deviations on both sides are different: t (14.02)=-2.29, $p < .05$, separate variance estimate; F=8.41, $p < .01$.
$ n =11 for the colour band index since one subject failed to complete the scales.

Table A9.3.3 Self-reported allocation strategies

Social value orientation:	Non-cooperators		Cooperators	
Distraction:	Weak	Strong	Weak	Strong
Items	(n = 12)	(n = 6)	(n =9)	(n = 11)
"To be fair to each person" $1	4.00	2.75	6.00#	5.75#
"To be fair to each group" $2	3.67	3.00	5.60#	5.83#
"To give yourself most points" $3	4.73	4.88	2.20	2.25
"To give your group most points" $4	5.00#	4.00	2.30#	2.50#
"To give everyone as much as possible" $5	3.27	2.75#	6.20#	5.17
"The way others won't think you are unfair" §	2.93#	3.38	4.80	3.08
"To make my group win" $6	4.47	3.75	2.10#	2.25#
"Nothing in particular"	3.67	4.13	3.10	3.33

* The figure is a mean response on the scale 1. not at all— 7. very much
\# The figure is significantly different from neutral point ($p < .05$).
$ The effects of social value orientations: 1. F=28.55, $p < .001$; 2. F=24.50, $p < .001$; 3. F=21.77, $p < .001$; 4. F=14.71, $p < .001$; 5. F=26.59, $p < .001$; and 6. F=10.73, $p < .01$; df=1/41 for all Fs.
§ The effect of interaction: F (1,41)=3.32, $p < .10$

Appendix 9.4

Correlational analyses involving social value orientations and intergroup bias indices for Experiment 6

Table A9.4 Relationship between intergroup bias indices and social value orientations by distraction conditions

Social values:	Weak distraction			Strong distraction		
	Individualist			Individualist		
	Competitive		Cooperative	Competitive		Cooperative
Allocation index	.24	.21	-.35†	.30	-.07	-.19
Rating index	.35†	.37*	-.55**	.06	-.08	-.00
Colour band index	.52**	.32†	-.65**	.25	-.11	-.14
(Competitiveness manipulation check)	-.02	.48*	-.34†	-.00	-.10	-.05

1 Allocation index is the composite pull scores of MD•MIP (on MJP), MD•MIP (on F), and MD (on MJP•MIP). Rating index is the composite score of the five rating bias. Colour band index is the composite of three band indices.

2 The figures are partial correlation coefficients controlled by sex, including those subjects who completed the decomposed games later: *dfs* =21 and 19, respectively, for the weak and strong distraction conditions. † p <.10; * p <.01; ** p <.01, two-tailed.

Correlational analyses

Table A9.4 displays correlation coefficients between intergroup bias indices and social value orientations, together with correlation between the check item for competitiveness and social value orientations.[1] With their correlational nature, those subjects who completed the decomposed games later than the minimal group experiment session, were also included in the analyses.

[1] The number of choice in the decomposed games was used to derive an index for each social value orientation.

As can be seen, all significant correlation coefficients were from subjects in the weak distraction condition. Among these, allocation bias index (-.35, p <.10), rating bias index (-.55, p <.01), and colour band index (-.65, p <.01) all correlated negatively with cooperative choice, while rating bias and colour band indices correlated positively with competitive and individualist choices, in the decomposed games (see Table A9.4).[2] "Competitiveness" manipulation check item correlated positively with individualist choice (.48, p <.01), and negatively with cooperative choice (-.34, p <.01).

[2] Though, three choices in the decomposed games constraint each other.

Appendix 9.5

Correspondence between self-reported and actual point allocation strategies (Experiment 6)

Table A9.5 Correlation between self-reported and actual point allocation strategies ("pull" scores)

Social orientation: Items		Non-cooperators (n = 26)	Cooperators (n =23)	Total (n = 49)
"Fairness" with F *vs.* MD•MIP		.28	.19	.34*
"Joint Profit"	with MJP *vs.* MD•MIP	-.30	.20	.01
	with MJP *vs.* MD•MIP (2)	.16	.32	.27†
	with MJP•MIP *vs.* MD	.06	.21	.12
"Ingroup Profit"	with MD•MIP *vs.* MJP	.29	.26	.27†
	with MD•MIP *vs.* MJP (2)	.44*	.33	.48**
	with MD•MIP *vs.* F	.19	-.07	.19
"Group win" with MD *vs.* MJP•MIP		.34†	.35	.45**

The figures are Pearson's correlation coefficients.
† $p < .10$; * $p < .05$; ** $p < .01$; (two-tailed)

Appendix 10.1

Factor analyses of different ingroup bias and category differentiation measures

Table A10.1.1 Factor loadings of the dependent measures (Experiment 1)

measures	Factor 1	Factor 2	Factor 3	Factor 4
Rating bias 5	.900			
Rating bias 4	.849			
Rating bias 2	.761			
Rating bias 1	.759			
Rating bias 3	.664			
MD•MIP (on MJP)		.774		
MD•MIP(on F)		.720		
MD (on MJP•MIP)		.525		
MJP•MIP (on MD)			-.829	
F (on MD•MIP)			.664	
MJP (on MD•MIP)				.947

1) Factors were extracted on the basis of eigenvalue in a principal-component analysis (3.65, 1.36, 1.22, and 1.02 respectively for Factors 1, 2, 3 and 4), and obliquely rotated. 33.1, 12.4, 11.1, and 9.3% of the total variance is explained respectively by Factors 1, 2, 3 and 4.
2) Loadings within ±.30 are omitted.
3) Rating bias indices derived from scales on: 1. warm - cold, 2. honest - dishonest, 3. friendly - unfriendly, 4. trustworthy - untrustworthy, and 5. generous - mean
4) Correlations between factor scores from Factor 1 and Factors 2, 3 and 4: .242 (p <.05 two-tailed), -.193, -.030; between Factor 2 and Factors 3 & 4: -.050, -.090; and between Factors 3 and 4: -.090.

Table A10.1.2 Factor loadings of the dependent measures (Experiment 2)

measures	Factor 1	Factor 2	Factor 3
Rating bias 5	.832		
Rating bias 2	.819		
Rating bias 1	.627		
MJP (on MD•MIP)	-.510		.338
MD•MIP (on MJP)		.813	
MD•MIP(on F)		.704	
MD (on MJP•MIP)		.685	
Rating bias 3	.393	.397	
MJP•MIP (on MD)			-.859
Rating bias 4			-.674
F (on MD•MIP)		-.403	.502

1) Factors were extracted on the basis of eigenvalue in a principal-component analysis (3.12, 1.83, and 1.34 respectively for Factors 1 to 3), and obliquely rotated. 28.4, 16.7, and 12.2% of the total variance is explained respectively by Factors 1, 2, and 3.
2) Loadings within ±.30 are omitted.
3) Rating bias indices derived from scales on: 1. warm - cold, 2. honest - dishonest, 3. friendly - unfriendly, 4. trustworthy - untrustworthy, and 5. generous - mean
4) Correlations between factor scores from Factor 1 and Factors 2, and 3: .122, -.243; between Factor 2 and Factors 3 & 4: -.069.

Table A10.1.3 Factor loadings of the dependent measures (Experiment 3)

measures	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6
Rating bias 2	.893					
Rating bias 4	.833					
Red-blue band		.710	-.339			
MJP•MIP (on MD)		.685				
MJP (on MD•MIP)	.425	-.608			.318	
F (on MD•MIP)			-.784			
MD (on MJP•MIP)			.704			
MD•MIP (on MJP)				.740		-.381
Brown band				-.673		
Rating bias 3				-.484		-.368
MD•MIP(on F)					.905	
Rating bias 1						-.838
Rating bias 5					-.346	-.526

1) Factors were extracted on the basis of eigenvalue in a principal-component analysis (2.52, 1.58, 1.43, 1.32, 1.11, and 1.04 respectively for Factors 1 to 6), and obliquely rotated. 19.4, 12.2, 11.0, 10.1, 8.5 and 8.0% of the total variance is explained respectively by Factors 1 to 6.
2) Loadings within ±.30 are omitted.
3) Rating bias indices derived from scales on: 1. warm - cold, 2. honest - dishonest, 3. friendly - unfriendly, 4. trustworthy - untrustworthy, and 5. generous - mean
4) Correlations between factor scores from Factor 1 and Factors 2 to 6: .07, -.01, .14, .06 and .21; between Factor 2 and Factors 3 to 6: -.04, -.02, .05, .04; between Factor 3 and Factors 4 to 6: .00, -.01 and -.09; between Factor 4 and Factors 5 and 6: .06 and -.01; between Factors 5 and 6: -.04.

Table A10.1.4 Factor loadings of the dependent measures (Experiment 5)

measures	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
Rating bias 1	.857			-.325	
Rating bias 2	.791			.348	
Rating bias 3	.747				
Rating bias 4	.739				
Rating bias 5	.505			-.355	
MD (on MJP•MIP)		.923			
MD•MIP (on MJP)		.894			
MD•MIP (on MJP, ver.2)		.825			
MD•MIP(on F)		.804			.416
Brown band			.889		
Red band			.815		
Blue band			.786		
MJP (on MD•MIP, ver.2)				.900	
MJP•MIP (on MD)				.571	.554
MJP (on MD•MIP)					-.856
F (on MD•MIP)					.376

1) Factors were extracted on the basis of eigenvalue in a principal-component analysis (4.57, 2.88, 1.94, 1.64, and 1.07 respectively for Factors 1 to 5), and obliquely rotated. 28.6, 18.0, 12.1, 10.2, and 6.7% of the total variance is explained respectively by Factors 1 to 5.

2) Loadings within ±.30 are omitted.

3) Rating bias indices derived from scales on: 1. warm - cold, 2. honest - dishonest, 3. friendly - unfriendly, 4. trustworthy - untrustworthy, and 5. generous - mean

4) Correlations between factor scores from Factor 1 and Factors 2 to 5: -.19, -.18, .03, and .16; between Factor 2 and Factors 3 to 5: -.03, -.02, and -.01; between Factor 3 and Factors 4 and 6: -.11 and .14; between Factors 4 and 5: -.14

Table A10.1.5 Factor loadings of the dependent measures (Experiment 6)

measures	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6
Rating bias 4	.849					
Rating bias 5	.811					
Rating bias 1	.787					
Rating bias 3	.777					
Rating bias 2	.774					
MD•MIP(on F)		.877		.315		
MD•MIP (on MJP)		.894				
MD (on MJP•MIP)		.616			-.381	
Brown band			-.948			
Red band			-.922			
Blue band			-.801			
MJP (on MD•MIP, ver.2)				.840		
MJP (on MD•MIP)				.787	-.380	
MD•MIP (on MJP, ver.2)		.344			.592	.319
F (on MD•MIP)					.562	
MJP•MIP (on MD)						.981

1) Factors were extracted on the basis of eigenvalue in a principal-component analysis (5.11, 1.86, 1.61, 1.55, 1.34 and 1.05 respectively for Factors 1 to 6), and obliquely rotated. 31.9, 11.6, 10.1, 9.7, 8.4 and 6.6% of the total variance is explained respectively by Factors 1 to 6.
2) Loadings within ±.30 are omitted.
3) Rating bias indices derived from scales on: 1. warm - cold, 2. honest - dishonest, 3. friendly - unfriendly, 4. trustworthy - untrustworthy, and 5. generous - mean
4) Correlations between factor scores from Factor 1 and Factors 2 to 6: -.07, .35 (p <.05 two-tailed), -.04, .06 and -.15; between Factor 2 and Factors 3 to 6: .18, .02, .05, -.13; between Factor 3 and Factors 4 to 6: .02, .00 and .02; between Factor 4 and Factors 5 and 6: -.03 and .08; between Factors 5 and 6: -.02.