Rational and emotional reactions to moral violations

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ABSTRACT

This thesis examines the relationship between the emotions of anger and disgust and morality, including moral judgement and moral reasoning. Previous research has been dominated by rationalist theories of morality, proposing that the correctness of an action can be established based on its positive or negative consequences. Although there is considerable evidence showing that moral violations elicit emotional reactions, the relationship between specific emotions and moral violations has not been established clearly. This thesis fills this gap by investigating the relationship between the emotions of anger and disgust and moral violations that elicit disgust. Experiment 1 examines the changes in evaluations of several moral violations after the consideration of its harmful consequences. Experiment 2 focuses on the emotions of anger and disgust as responses to transgressions of moral rules under different cognitive demands. Experiment 3 investigates the evaluation of and emotional reactions to moral violations that harm different targets. In Experiment 4 the evaluation of moral violations and the emotions of anger and disgust were explored further in conditions in which the described harm to others, the disgustingness of the described action and the cognitive resources of the participants were manipulated orthogonally. Experiment 5 was a partial replication of Experiment 4, concentrating on the conditions that do not describe harm to others. Experiment 6 examines the effect of a moral violation on the presumption of three different types of harm. Together, these results provide support for the proposal that specific emotions are elicited by different types of moral violations, and that anger and disgust are involved in the process of moral judgement. Limitations and implications for future research are discussed.

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MEMORANDUM

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INTRODUCTION

Successful interaction between individuals and groups within societies requires the regulation of behaviour through the creation of commonly acknowledged norms (Wright, 1971). Some of these norms are based on what is acceptable and correct behaviour, as well as on what is considered inappropriate behaviour. These norms are often referred as moral rules (Bennett, 1998; Foot, 2002; Haidt, 2003). What morality is and how actions should be judged as moral or immoral has been an important topic that can be traced back to Greek philosophy (Lyons, 1999; Strongman, 1996). Research has shown that those who violate a moral rule are often punished, derogated and even excluded from the group, and that the flexibility of these norms is limited, because people endorse them without questioning them (Grassian, 1981).

Although research of morality has focused mostly on considering the consequences of the actions as guidelines for their correctness, there is considerable evidence showing that emotional reactions can reliably predict whether an action is morally correct or not. Moreover, a direct relationship has been established between different moral violations and specific emotions (Rozin, Lowery, Imada, & Haidt, 1999). This research advances a specific emotional reaction in response to moral violations that harm different entities. There is also evidence suggesting that emotions—in the form of intuitions—can predict moral judgement more accurately than rational consideration of the consequences of an action (Haidt, 2001). However, empirical evidence showing that specific emotions can predict moral judgement is scarce. This thesis addresses this limitation investigating the roles of anger and disgust as predictors of moral judgement. In doing so, it raises some fundamental questions; namely, is an action considered wrong because it harms someone or

because it 'feels' bad? Moreover, how can a private and consensual action being wrong, if it does not harm anyone, even though it is repugnant? In examining such questions it is not only revealed that emotions have an important role in moral judgement, but that specific emotions such as anger and disgust have important functions in creating the standards to which actions are compared, the moral rules. These general questions have been addressed in a series of six experiments that are summarised in the following section.

OVERVIEW

Chapter 1 provides a review of previous research on morality and moral judgement. This chapter contains two main sections. The first one reviews theories about morality, with emphasis on rationalistic models of morality (e.g., Kohlberg, 1969; Piaget, 1932/1977). These theoretical models propose that a moral judgement, or the evaluation of an action as correct or not, can be established by careful analysis of the consequences of the action, so that actions that have positive consequences can be considered morally correct, whereas actions that provoke negative consequences are not. The second section outlines limitations of the rationalist approach, and alternative models of morality and moral judgement are reviewed (Haidt, 2001; Rozin et al., 1999). A common feature of these models is that they include, implicitly or explicitly, emotional reactions as responses to moral violations. For these theoretical models, emotions are not only closely related to morality, but they can inform whether an action is morally wrong based on negative emotional reactions. In this sense, an action can be morally wrong because it elicits an unpleasant feeling (Hume, 1734/1985).

Chapter 2 reviews theory and research on emotions and theories of emotions. Initially, the chapter briefly examines theories of emotions in general (Damasio, 1994; Davidson, 1998; Izard, 1977; James, 1884; Levenson, 1994; Russell & Feldman Barrett, 1999), before focusing on the emotions of anger and disgust. Next, this chapter outlines appraisal theories of emotions (e.g., Arnold, 1960; Lazarus, 1991; Ortony, Clore, & Collins, 1988; Roseman, 1984; Scherer, 1996, 1999), and more specifically the appraisals of anger and disgust. These theoretical models propose that an action or situation is cognitively evaluated in a series of appraisals, such as relevance and coping potential, resulting in the elicitation of an specific emotion. The following section is focused on the cognitive neoassociationistic model (Berkowitz, 1989, 1990; Berkowitz & Heimer, 1989), which proposes that potentially any negative stimuli can elicit anger, even without the need to cognitively appraise or evaluate the situation or action.

Chapter 3 includes two experiments (Experiments 1 and 2), in which participants were presented with different moral violations, half of them with and half without references to core disgust (Rozin, Haidt, & McCauley, 1999; Rozin, Haidt, & McCauley, 2000). Results of both studies reveal that scenarios based on core disgust were evaluated more negatively than scenarios that did not include core disgust. Experiment 1 also shows that those participants who perceived high levels of the harm product of the described actions consistently evaluated the scenarios as more wrong in a second evaluation. In Experiment 2, participants indicated more disgust than anger in core disgust scenarios, but more anger than disgust in scenarios without core disgust. This experiment also revealed that anger and disgust are increased under cognitive constraints.

Chapter 4 contains one experiment (Experiment 3) with three scenarios based on core disgust. These scenarios were manipulated to describe either no harm to

anyone, harm to the person performing the action, or harm to others apart from the person performing the action. This manipulation of the target of harm uncovered that in conditions where harm to others is described, the evaluations are the most negative, and that the overall levels of anger and disgust are highest. Results also confirm that participants reported high levels of harm to others, even in conditions that describe no such harm.

Chapter 5 includes one experiment (Experiment 4), that was built on the findings of the previous experiment, manipulating orthogonally the described harm to others and the presence of disgusting elements using only one scenario. A cognitive load task was also included to test the hypothesis that presumption of harm to others is a post-hoc justification for a fast, intuitive reaction based on disgust. This prediction is based on the social intuitionist model (Haidt, 2001). The results of this experiment show the presence of presumed harm to others based on the disgusting action, even in conditions in which no harm to others is described. Results also reveal that this presumption of harm is more easy to justify as symbolic rather than actual harm only without cognitive constraints, indicating the post-hoc nature of this presumption.

Chapter 6 incorporates two experiments (Experiments 5 and 6). Experiment 5 focuses on replicating the finding of the presumption of harm in Experiment 4, using only the conditions in which no harm to others is described and a similar manipulation of cognitive load. In this experiment, a correction of one of the measures was made, so that direct comparisons could be performed with identical bipolar measures. Results confirm the presumption of harm to others found in Experiment 4, also in the form of symbolic harm under cognitive load, only in conditions that describe a disgusting action based on core disgust and no harm to others. Experiment 6 investigates the relationship between an action based on core

disgust involving the body and inappropriate food, without describing harm to others, and the presumption of harm to different symbolic entities such as nature, the community and the rights of other people. This proposal is based on the existence of three moral codes, namely community, autonomy, and divinity (Shweder, Munch, Mahaptra, & Park, 1997), and their relationship with the emotions of contempt, anger and disgust as proposed by the CAD triad hypothesis (Rozin et al., 1999). In line with the predictions of these theoretical proposals, results substantiate the claim that the described disgusting action increases the presumed harm to the individual, and more strongly the presumed harm to nature, but it has no effect on the presumed harm to the community.

Chapter 7 summarises the findings of the research presented in the previous chapters, followed by a small meta-analytical integration combining the effects of some of the experiments in order to establish the general effect of the manipulation of the disgusting action that is described without harm to others on several dependent variables that are identical in the experiments involved. This integration shows reliable effects on the evaluation of the action, the emotions of anger and disgust, and the action tendencies of punishment and avoidance, with effect sizes that vary from small to large. The chapter concludes by outlining the implications of these findings and discussing the limitations of them for future research.

CHAPTER 1

MORAL JUDGEMENT

This chapter reviews theory and research on moral judgement. Specifically, the chapter analyses the processes people use to evaluate whether an action or a situation is morally correct or not. There are two main sections in this chapter, in the first, rationalistic models of morality are considered (e.g., Kohlberg, 1971). These models assume that morality is based on reasoned cognitive processes and that affect is involved only secondarily. Leaning on the limitations of rationalistic models, it can be proposed that morality has a close relationship with emotions and affect. This relationship and the theories investigating it form the main argument of the second section of this chapter. Considering the intrinsic limitations of rationalistic approaches to morality, and the evidence supporting the important role of emotions and affect on the decision about whether an action is morally correct or not, two theoretical approaches exploring the relationship between emotions and morality are described. Empirical evidence supports the perception that affective reactions are not only involved in moral evaluations, but that emotions can be more important for moral judgement than a rational evaluation of the action, as proposed by rationalist theories.

Introduction

Human morality is generally defined as the social ability to distinguish whether some action is right or wrong based on sets of rules, often referred to as moral rules. It has been suggested that the presence of morality and the negative

evaluation and condemnation of actions that affect the social order are necessary to maintain positive social relationships and to exercise social control (Wright, 1971).

The function of morality as a form of regulation of behaviour between individuals has long been recognised. In ancient philosophy, Aristotle (Aristotle, 4th Century B.C./1998) recognised that behaviour—including moral behaviour—involves the group or community the person belongs to, and he proposed that the rules and moral standards that the individual accepts as correct are shaped by the community. Based on this particular proposal, Turiel (1983) also argued that the moral domain is intrinsically interpersonal. The application of morality is usually achieved with the use of moral rules, these rules are abstract principles of conduct that apply to all individuals and in all concrete situations and that are difficult to question, as they resemble metaphysical absolutes, that is, "doctrines that are taught with the sanctity of tradition and that are necessary for the smooth running of society" (Maio & Olson, 1998). Further, these principles allow individuals to be judged based on what kind of behaviours are morally prohibited, required, discouraged, encouraged, and allowed (Gert, 2005). In this sense, moral rules can be seen not only as restrictions of actions that are considered incorrect, but also as the encouragement of actions that are in accordance with what the rules acknowledge as correct.

In the cases when individuals fail to act accordingly to a moral rule, the person is liable for blame and punishment in order to maintain the social order. Even though the responsibility for a correct or incorrect action is focused within the person, the individual is part of the society and not an isolated being, to the extent that any given action can be judged based on the consequences and the effect of the actions for someone else, whether they are positive or negative. Moral rules not only apply to actions, some of them are related to characteristics that a person should

posses or endorse in a certain group or society, such as honesty or fairness (Haidt, 2001). Moral rules resemble the notion of values in the sense that are central guidelines or principles in people's lives (Maio & Olson, 1998). However, an important difference between values and moral rules is that the former are personal guidelines that each individual endorses, whereas the latter are requirements that the society or group imposes on the individual. In this sense, a given society or group may require individuals do behave according to a specific moral norm, but it is not necessary for the individual to endorse a value that resembles the moral norm. Likewise, an individual may endorse some particular value, but the society or group may not require individuals to behave according to such value.

It has been suggested that morality is one of the ways in which societies compensate for asymmetrical relationships of physical advantage and social power (Wilson, 2004). The creation of rules that encourage the welfare of the group despite individual loss can increase the safety of each individual, and promote cooperation between the members of the group. Likewise, the violation of such rules implies punishment and rejection by the group and, in extreme cases, the withdrawal of the benefits of being a member of the group or society (Lal, 1998; Wright, 1971).

Sources of morality

There has been a long debate about the source of human morality and a conflict about whether it is based on reason or emotion (Haidt, Koller, & Dias, 1993). The conflict between reason and emotion can be traced back to ancient Greek philosophy, in which the debate was focused on the role of reason as ruler of emotions (Plato, 4th Century B.C./1984). In this sense, emotions or passions were a problematic component of the human personality and one of the functions of reason

was to control them. Under this perspective, reason and emotion are opposite processes, the former being related to high standards and order, while the latter is related to desire and irrationality. Under this perspective, morality was a virtue based on reason and not related to emotion. Because Plato saw a close relationship between morality and virtue, the former was a faculty of reason and contrary to emotions and passion. Although Aristotle (4th Century B.C./1998) had a less negative view of emotions than Plato had, and he recognised that reason and emotion (i.e. desires) contribute to the correct moral choice and determine human action, he also considered reason to be superior to emotion, and its impact on morality to be more important.

The distinction between passion and reason proposed by, among others, Plato and Aristotle was later reformulated and adopted (e.g. Augustine, 4th Century A.C./1961), almost invariably assigning reason to higher intellect, morals, divinity and well-order life; while emotion was seen as immoral, sinful, and problematic for the individual and the social order. This perception was also endorsed by most scholars and writers during the Middle Ages, equating some emotions such as rage and envy to sins, as in Dante Alighieri's "The divine comedy" (Alighieri, 1321/1931).

In later philosophy, Immanuel Kant also argued that human morality is based on rationality, suggesting that emotions are primitive, less intelligent expressions, which are controlled by reasoning (Kant, 1789/1965). This perspective is based on the agency of the individual and on the duty of the person to act in a morally correct way. Kant argues that actions can be perceived as correct or incorrect based on a 'categorical imperative', a rational principle that is unconditional and absolute for all individuals (Kant, 1785/2002). Opposing Kant's perspective, David Hume suggested that human morality is based on emotionality, arguing that moral judgements are

derived from sentiments and not reason (Hume, 1734/1985). Although Hume acknowledges the important role of reason, he argued that reason alone cannot be the source of morals because reason deals with objects and draws conclusions from them. However the sentiment associated with the object is not a characteristic of the object, but of the observer, so that a virtue is positive and a vice is negative not based on reason but on what sentiment they evoke.

Rationalistic approaches to morality argue that the foundation of morality is based on a limited set of rules, giving considerable importance to the way the understanding of the rules is reached. Rationalism is defined as "the theory that reason is the foundation of certainty in knowledge" (Thompson, 1995, p.1139). In line with this definition, rationalist theories propose that knowledge is based on reasoning and reflection. By extension, rationalist theories of morality propose that moral reasoning is at the base of moral judgement. Building on the definition proposed by Galotti (1989), moral reasoning can be defined as "a conscious mental activity that consists in transforming given information about people in order to reach a moral judgement" (Haidt, 2001, p. 818). According to rationalist models, by evaluating and reflecting upon the consequences of a given action, a person can decide if the action is morally correct or incorrect, or right or wrong (Kohlberg, 1971).

The proposal that actions can be categorised as correct or not based on its outcome is referred as consequentialism (Foot, 2002). This proposal is at the base of the concept of utilitarianism, which can be defined as "...consequentialism together with the identification of the best state of affairs, with the state of affairs in which there is most happiness, most pleasure, or the maximum satisfaction of desire" (Foot, 2002, p.60; Grassian, 1981). Utilitarianism proposes that the correctness of an action can be established based on the premise that the consequences of any action should

be positive and aimed to reach the greatest pleasure or happiness for the largest number of individuals (Bentham, 1789/1996). This notion has been extended to animals, proposing that pain is similar for animals and humans because animals suffer even if they have no reason. Although utilitarianism proposes that pleasure or happiness should be aimed to the largest number of individuals, it has been suggested that *individual* utilitarianism can lead to negative consequences to other members of the group or society, as in the 'prisoner's dilemma' or in the 'tragedy of the commons' situations (Hardin, 1968), so that the benefit of each individual could eventually lead to negative and undesired consequences.

The study of human morality has been based primarily on rationalist models (for a review, see Haidt, 2001). These models propose that moral reasoning is the basic process of moral judgement, so that the final evaluation about the correctness of an action is based on the consideration of its positive or negative consequences. According to Haidt (2001, p. 817), moral judgement can be defined as "...[an] evaluation (good vs. bad) of the actions or character of a person that are made with respect to a set of virtues held to be obligatory by a culture or subculture". Although in this definition the action and the individual are evaluated in a similar way, Bennett (1998) suggested a difference using first and second order morality, where first order morality issues judgment related to behaviour, while the second order morality judges issues related to a person, arguing that there are situations in which, although a moral norm is violated, the person cannot be held accountable for the action, such as with mentally impaired people or small children.

For models of morality based on rationalism, the input derived from affect may contribute to the reasoning process, but emotions are not the cause of the judgements, as they are always a reasoned process. Although the relationship between emotion and reason has been acknowledged at least since Aristotle (4th

Century B.C./1998), and Plato (4th Century B.C./1985), research in morality has mainly investigated the reasoned processing, usually in the form of developmental theories (Kohlberg, 1969; Piaget, 1932/1977). Research in the cognitive and developmental tradition suggests that there are issues that can be considered moral violations in all cultures (Turiel, 1983; Turiel, Killen, & Helwig, 1987). According to this line of research, questions related to harm, justice and rights are universal, and the violation of these norms is categorically negative in all cultures, resembling Kant's categorical imperatives.

Although these models have dominated the research on moral judgement, some difficulties have been identified regarding moral reasoning (Grassian, 1981). Among them are the vagueness of the concepts about morality (i.e. the lack of a clear definition about 'good' or 'just'), the over generalization of the moral rules (i.e. 'lying is always wrong'), and the confusion between what the person 'should do' and what the person 'is capable of doing', as it is exposed by the 'action principle', "Harm caused by action is morally worse than equivalent harm caused by omission" (Cushman, Young, & Hauser, In press). In disagreement with this perspective, some other research suggests that there are cultural variations of the moral domain (Shweder, Mahaptra, & Miller, 1987), implying that what is a violation in one culture does not necessarily imply a moral violation in another one (Haidt, 2001). Cultural psychologists argue that culture has an impact on the domain of morality, rejecting the existence of categorical moral violations. In this view, morality may be conceived as culture dependent (Miller, Bersoff, & Harwood, 1990).

Another important objection against rationalist models is that they disregard the role of affective and emotional reactions related to the event or action being evaluated. Evidence supporting the notion that emotions are related to violations can be seen in the reactions of not only humans, but also in some primates, that not only

react with disapproval against violations of the social order and hierarchy, but with emotional reactions as well (Rozin et al., 1999; Wright, 1971). Although the role of emotions as guidelines of moral judgement has been present since the proposals of Hume (1734/1985), the rationalist approach on the study of morality received more interest and study. However, the influence of emotions on moral judgement has been recognised, suggesting that emotions—and especially moral emotions—play an important part in the evaluation of what is right or wrong. Feelings such as indignation, anger, compassion, guilt, admiration, and sympathy can change the moral views of the person (Peacocke, 2003).

One central argument for rationalist theories regarding moral judgement is the presence of negative consequences produced from an action, the most common being the perceived harm associated with the action. Previous research has found that people who judged actions as moral violations also mentioned harmful consequences, whereas people who did not consider that the actions were moral violations did not mention harmful consequences (Turiel, Hildebrandt, & Wainryb, 1991). Rationalist theories of morality would propose that after reasoning on the harm product of the action, the negative moral judgement would follow. A challenge to the rationalist approach is a situation in which an action that is evaluated negatively does not have negative consequences for anyone. Based on moral reasoning, a person should evaluate the consequences of an action and reach a judgement, if there are no negative consequences, the action should, at least, not be considered immoral. Research has shown, however, that people condemn actions that violate moral norms even when the actions have no direct negative consequences for anyone.

The social intuitionist model

It has been suggested that an alternative to the use of moral reasoning to evaluate an action is the use of intuition. According to Haidt (2001, p. 818), moral intuition can be defined as "the sudden appearance in consciousness of a moral judgement, including an affective valence (good-bad, like-dislike), without any conscious awareness of having gone through steps of searching, weighing evidence or inferring a conclusion". Among the characteristics of intuitions mentioned by Haidt are the lack of awareness of the process, the quick response of it, the lack of intention to reach the judgement, and the lack of steps to do it. This definition of moral judgement has similarities to the proposal of Hume (1777/1998), giving precedence to sentiments over reasoning. It also highlights intrinsic differences between moral reasoning and moral intuitions regarding awareness, effort, speed, attention, intention, and accessibility.

Previous research has attempted to address the usefulness of intuition as a guideline of moral judgements using harmless but emotionally offensive behaviours (Haidt et al., 1993). In these stories, participants were presented with descriptions in which the characters violate moral norms, but no negative consequences are described. One important effect noted by Haidt (2001), is called *moral dumbfounding*. When faced with offensive stories that do not describe negative consequences, like having sexual intercourse with a dead chicken, participants evaluated the stories as wrong but they could not find rational arguments to support their judgment. Rational arguments given by participants about why an offensive yet harmless action is immoral were easily contradicted by the experimenter, so participants finally expressed their disapproval but were unable to give reasons for their judgment. This effect suggests that some moral reasoning may be plausibly

conceived as a post-hoc construction rather than a rational and logic evaluation that leads to a judgment. In this sense, the evaluation of the action precedes the rational judgment and subsequent justifications of the action. The moral dumbfounding effect also suggests that participants may have used their intuitions to evaluate the actions. The social intuitionist approach proposes that moral judgment is caused by quick moral intuitions, followed by slow, constructed moral reasoning.

The moral dumbfounding effect proposed by Haidt, along with some limitations in the definition of moral rules, such as vagueness (Grassian, 1981), suggest that the validity of moral rules is rarely questioned and the application of the rule is not based on argumentation. In this sense, moral rules can be described as cultural "truisms" (McGuire, 1964). Some research confirmed that values can be considered truisms (Maio & Olson, 1998), which resemble the characteristics of moral rules. The social intuitionist model proposes that moral judgement appears in consciousness based on moral intuition, in an automatic way, without effort and without pre-defined steps. Previous evidence showed that affective evaluations can be made quickly and without conscious processing (Zajonc, 1980), that negative stimuli attract more attention than positive stimuli (Pratto & John, 1991), and that some evaluations can operate automatically (Bargh, Chaiken, Raymond, & Hymes, 1996; Bargh, 1994). Under the social intuitionist perspective, the rational arguments and reasons why the action is wrong are a justification of the initial intuitive reaction, constructed after the judgement has been reached and therefore are not the source of the judgement, as rationalist model suggests.

An important feature of the social intuitionist model is that it recognises the importance of emotions as predictors of moral judgements. Although the relationship between emotions and moral violations is present in other theoretical models (e.g. the CAD triad hypothesis, which is discussed below), the social intuitionist explicitly

proposes that emotions can be the source of moral judgements in the form of intuitions. Empirical research has showed that moral judgments were best predicted by the emotional or affective reactions of the participants, rather than by the analyses of its consequences (Haidt, Bjorklund, & Murphy, 2004; Haidt & Hersh, 2001; Haidt et al., 1993). As previously mentioned, it has been suggested that some emotions are closely related to morality (Haidt, 2003; Hume, 1734/1985; Rozin et al., 1999), and it has also been proposed that they can guide our moral judgements, as in the "wisdom of repugnance" belief (Kass, 2002), and are also related to the exercise of law (Nussbaum, 2004).

It has been proposed that not all emotions are related to moral judgement to the same strength or in the same way, so that there are groups of emotions or 'families' of emotions (Ekman, 1992), that are particularly related to morality. One of the clusters of moral emotions is centred on the self; the so-called self-conscious moral emotions (Lewis, 1993). This cluster includes shame, embarrassment and guilt. These three emotions motivate the individual to behave in a culturally acceptable way and to promote the social order. The second cluster of moral emotions is related to interpersonal relationships and not focused on the self. This cluster includes anger, disgust and contempt. These three emotions are focused towards someone else and respond to moral violations from and to others (Rozin et al., 1999). Following Turiel (1983) proposing that the moral domain is basically interpersonal, the second cluster of emotions should be especially important when offensive violations occur. A very similar division has been proposed by Haidt (2003), grouping contempt, anger, and disgust into the "other-condemning" family, while the "self-conscious" family is formed by shame, embarrassment and guilt.

The CAD triad hypothesis

The CAD triad model, an acronym of the emotions of contempt, anger and disgust, related to the moral violations of the realms of community, autonomy and divinity, suggests a close relationship between moral violations and emotional reactions. The CAD triad hypothesis proposes a direct relationship between the clusters of ethics related to autonomy, community and divinity and suggested that the violation of each one of the codes would typically elicit one specific emotion.

According to Shweder and colleagues (Shweder et al., 1997), there are three clusters of moral discourse, each of them orientated towards regulating the behaviour of the person in different contexts. The cluster related to the ethics of autonomy relies on the concepts of individual rights, justice, and harm, and it is focused on the individual and the pursuit of personal preferences and desires; the obligations for the individual are based on the person as a free agent. The cluster related to the ethics of community is related to the concepts such as duty, hierarchy and interdependence between individuals. This code aims to protect the moral integrity of the relationship between individuals within a society or a community. Finally, the cluster related to the ethics of divinity relies on concepts like natural order, tradition, sacred order and the sanctity of the body. This code of ethics protects the individual against sin and degradation of values and the natural order, and it encourages the person to protect the spirit, honour and dignity (Shweder et al., 1997). Based on the findings of Shweder regarding the ethics of autonomy, community and divinity—the "big three"—, Rozin and colleagues (Rozin et al., 1999) proposed that each different violation of the moral codes would typically elicit one emotion across cultures, so that violations of the code of autonomy would elicit anger, violations of the code of

community would elicit contempt, and violations of the code of divinity would elicit disgust.

Results based on the CAD triad hypothesis revealed that the emotions of contempt, anger and disgust were more strongly elicited by the violations of community, autonomy and divinity respectively. The relationship between the moral violations and the emotions was found in two different cultures (Japan and The United States of America), suggesting the universality of the relationship predicted by the CAD hypothesis. This theory proposes the existence of three universal codes of morality and that the use and preference of each one of these codes is thought to vary depending on each culture, such that all cultures endorse the three codes more or less, creating different cultural variations and different levels of tolerance when they are violated.

An important feature of this theoretical perspective is the explicit recognition that the individual does not have to be involved in an action, or be the direct target of harm in order to elicit a negative reaction. Some violations of the code of divinity are not directed towards a person, and some of them do not even involved other people—such as eating with the fingers instead of using a fork—but they are considered moral violations by some people. Another important feature of this research is the use of facial expressions as measures of emotions; results revealed that the facial expressions endorsed by participants in the United States of America were similar to those in Japan, and that in both countries participants recognised and differentiated facial expressions of emotions like anger and disgust to a similar extent, suggesting that facial expressions are a reliable method to investigate emotional reactions (Ekman & Friesen, 1971, 1978).

Although these results are considerable and focused on the differentiation of the emotional reactions, one methodological limitation is that participants in these

experiments were requested to select one of several facial expressions that represented emotions. This forced choice between the given expressions did not allow for the investigation of the influence of the different moral violations on all the emotions, so that the effect of the violations of community and divinity on anger, or the effect of violations of community and autonomy on disgust could not be studied. Although the social intuitionist model and the CAD triad hypothesis are theories related to morality, the former is focused on the processes that lead to moral judgement, whereas the latter is focused on the relationship between moral violations and emotions.

The processes of moral reasoning and moral intuition mentioned by the social intuitionist model reflect important differences in their characteristics. Haidt (2001), proposes that moral intuition is a fast, effortless and automatic process, while moral reasoning is slow, effortful, and conscious. The description of these processes resembles the proposal of the existence of two different and parallel processes, occurring at the same time when a judgement is made or a problem is solved. The hypothetical models that associate both processes are known as dual-processes models (Chaiken & Trope, 1999). Dual process models are often used to explain the apparent relationship between one thoughtless, easy and almost automatic process and a thoughtful, difficult and cognitively demanding process. At the same time, since Plato in The Republic (4th Century B.C./1985), who suggested that emotion was like a wild horse that has to be restrained by reason— a charioteer, there has been a tendency to describe emotions as fast, effortless, and uncontrollable processes, while reason was described as slow, controlled and effortful. This description can also be found in several other descriptions, from Kant to Freud (Freud, 1923/2001). Based on the similarities between the processes described for moral intuition and emotional reactions, it is possible to assume that moral

judgement can be studied as a dual-process model, in which cognitive evaluations and emotional reactions contribute to the judgement in a separate but related way (Haidt, 2001). The social intuitionist approach proposes that decisions about a moral action are fast, effortless and automatic, driven by emotions and intuitions. Rational decisions whether an action is morally correct or not are derived later, and are based on the acceptance of the moral codes associated with the culture. These decisions are typically the outcome of relatively slow, deliberative, and effortful processes (Haidt, 2001).

Moral violations and harm

Although it seems plausible to think that any action that does not have negative consequences for anyone can be considered moral—or at least there are no basis to consider such action immoral, empirical evidence has shown that some actions and expressions are condemned and punished even when they do not have any negative effect on other people. The condemnation and humiliation of homosexuality and people with HIV/AIDS are examples of ostracism and exclusion that have some basis on moral arguments, such as those expressed by political conservatives about the harm to the society, God or nature. (Haidt, 2003; Haidt & Hersh, 2001). These arguments usually associate HIV with a promiscuous life style, which is harmful for the society (Pryor, Reeder, Yeadon & Hesson-McInnis, 2004).

Moral violations can be extrapolated as offences that include not only the physical well-being of the person, but also to the values and ideas endorsed by the group a person belongs to (Haidt & Hersh, 2001). It has been proposed that values are central conceptions in the life of people, they play an important role in the guidelines of behaviour and people are ready to defend them (Schwartz & Bilsky,

1990; Maio & Olson, 1998). Some values, such as liberty and equality, refer to the physical integrity of the person, and the violation of this value has a direct negative effect on the individual. However, there are values related to symbolic entities such as tradition and faith, that when violated, only have an effect on the individual at a psychological and emotional level and do not harm the individual physically, as they are more closely related to violation of group norms or regulations endorsed by the society. Despite the difference in the harm caused by the violation of different values it is plausible that transgressions of values that are central for individuals or groups can elicit the same reactions as those that affect the person physically. Perceived offences towards traditions and customs are among those studied by Shweder (1997) and Rozin (1999), supporting the notion that perceived harm towards symbolic entities elicit specific emotional reactions, just as when the individual is involved. Empirical evidence has shown that individuals moralise and even criminalise some actions that have no direct effect on anyone apart from the people involved in the actions, but violate moral norms held by the group (Haidt & Hersh, 2001), or deviate from the judgement and actions of what is supposed to be correct, usually based on the standards of "the average man", that is, any given individual that is considered by most people as normal (Nussbaum, 2004).

An intrinsic limitation of the use of morality based on harm to symbolic entities is that individual desire or consent is overruled. Even in cases in which the only possible consequences—positive or negative—involve only the person performing an action, it can be argued that the action harms other people by harming their beliefs. Voluntary euthanasia, and same-sex marriage have been challenged and condemned on the basis of attacking the values, religious beliefs and traditions of a group or society (Feinberg, 1989; Haidt & Hersh, 2001).

Conclusions

This chapter has reviewed theory and research on morality and moral judgements. Although most research has focused on rationalistic approaches of morality, it was argued that these theories provide incomplete explanations of the phenomena. Rationalist models maintain that morality is based on reasoned processes and that the examination of the consequences of an action can lead to moral judgement. In the more extreme forms—consequentialism and utilitarianism—the consideration of the outcomes are the most important guidelines of the moral nature of an action. One of the main limitations of the rationalistic study of morality is that it disregards the role of emotions and feelings in moral judgement, and morality in general. A similar criticism was advanced by Berkowitz (2003), who criticised the view of many sociological and criminological theories because they consider that behaviour is based on a rational controlled choice, and affect is not involved. Building on this limitation, alternative theoretical approaches to the study of morality revealed that emotions have an important role on moral judgement (Nichols, 2004). Results based on the CAD triad hypothesis not only revealed that the relationship between emotions and moral violations exists, but that violations of different types can elicit specific emotions (Rozin et al., 1999). These findings are also relevant for two reasons. First, they show that emotions are a reliable response towards moral violations; second, they provide support for the use of facial expressions as measures, so that some of the intrinsic limitations of research based purely on words can be resolved (e.g., Nabi, 2002).

Going beyond purely establishing the relationship between emotions and moral judgements, the social intuitionist model proposes that moral intuitions—including moral emotions—directly cause moral judgement (Haidt, 2001). This

model suggests that the function of moral reasoning is to justify an initial, intuitive reaction once the judgement was already reached. Haidt proposes the moral dumbfounding effect as evidence that people can make moral judgements without rational arguments, but based on intuitive reactions. Evidence from the CAD triad hypothesis and the social intuitionist model suggests that some of the general limitations of moral rules (e.g. vagueness), can be investigated with the use of emotional reactions. It is possible that actions that elicit negative emotions such as anger and disgust can be categorised as moral violations by some people, based on the idea that the action harms symbolic values or traditions. This proposal is compatible with the social intuitionist model, the CAD triad hypothesis and the moral dumbfounding effect.

CHAPTER 2

EMOTIONS

The focus of this chapter is on the examination of theory and research on emotions and affect, with particular detail given to the emotions of anger and disgust. The first part of this chapter is devoted to reviewing some definitions of emotions in general, and the different theoretical approaches that categorise anger and disgust as primordial, basic or fundamental emotions, analysing also some of the characteristics of these two 'negative' emotions. In the second section, different theoretical approaches are considered. First, appraisal theories are reviewed (Arnold, 1960; Frijda, 1986; Lazarus, 1991). Research based on these theories suggests that there are specific patterns of emotional responses based on the way people appraise a situation or event (Scherer, 1999). Although the usefulness of appraisal models is acknowledged, intrinsic limitations of these theories are also considered, leading to the review of the cognitive neoassociationistic model in the last part of this chapter (Berkowitz, 1989). This model attempts to address some limitations present in appraisal models, and proposes an elicitation of negative affect before the cognitive processing of information of an event or situation. In addition, the cognitive neoassociationistic model predicts some of the correlations found between several emotions, which cannot be predicted using appraisal models. The analysis of anger and disgust as moral emotions will be treated with more detail in the next chapter.

Introduction

The suggestion that several different emotions exist can be traced in history to Ancient Greece, in works such as Aristotle's Rhetoric (Aristotle, 4th Century B.C./1984; Lyons, 1999). It has been proposed that each emotion responds to specific stimuli, and that these distinct reactions originally helped individuals to survive. Emotions are central features that play an important role in the significant events of human experience (Lazarus, 1991; Ortony et al., 1988; Panksepp, 1994; Parrott & Harré, 1996; Roseman, 2001); they also supply information to others in the form of vocal and facial expressions, and to oneself in the form of feelings and thoughts (Clore, 1994). Emotions are intrinsically related to reasoning and decision making (Damasio, 1994) and it has also been suggested that humans are the most emotional of all animals (Hebb & Thompson, 1968; Lazarus & Lazarus, 1994). Despite the large amount of research related to emotions (Russell & Feldman Barrett, 1999), there is no clear agreed definition of them, since the phenomena associated with the word 'emotion' are too broad to be classified into one single category, and there are as many definitions of emotions as theoretical approaches trying to investigate them (Kleinginna & Kleinginna, 1981).

Most theories recognise the role of evolution in emotion so it is assumed that they have functions that contributed to the survival of the individuals. Emotions have been described as evolved mechanisms that increase the flexibility between stimuli and the response given by the organism (Scherer, 2001). It is also agreed that emotions are collections of responses with varied and complex characteristics (Damasio, 2000), which prepare the body for actions (Frijda, 1986), help to allocate cognitive resources to specific tasks and goals and communicate imminent actions, such as impulse to fight based on anger (Darwin, 1872). Emotions provoke a global

change in the state of the organism (Damasio, 1994, 2000); and focus and synchronise the available psychological and physiological resources (Scherer, 1996).

Keltner and Gross (1999, p.468) defined emotions as "...episodic, relatively short-term, biologically based patterns of perception, experience, physiology, action, and communication that occur in response to specific physical and social challenges and opportunities". This definition suggests that emotions are reactions based on stimuli, and that these reactions are adaptations to problems in the human environment. Damasio (2000) recognises that 'classes of stimuli' and 'ranges of emotion' exists, so that there are variations in the type of stimuli that can elicit the same emotion, individually and across cultures; at the same time, there are variations in the type of emotional responses, since they are shaped by cultural variations in the form of stimuli that induce the emotion and also in appropriate responses and expression to the stimuli. In this sense, the range of stimuli that can produce emotions is infinite.

There have been several attempts to categorise emotions throughout the history of philosophy (Strongman, 1996), and in psychology since its foundation as an independent discipline (James, 1884). The organisation of the field of emotions has included categories, dimensions, prototypes and other forms of classification that intended to orderly organise emotions (Russell & Feldman Barrett, 1999).

Basic emotions

A large amount of research supports Darwin's proposal that emotions are mainly the result of evolution and adapting processes with a number of biological functions (Darwin, 1872). This evolutionary perspective suggests that emotions have useful functions for the organism in terms of survival, adapting the behaviour of the

organism to specific situations and also regulating the interaction between individuals (Ekman, 1992; Scherer, 1996). It has been proposed that there are emotions that have similar characteristics in humans and mammals, similar action tendencies associated with those emotions, and even parallel facial expressions. These emotions are also similar across cultures, even in those that have not yet been affected by mass media communications (Ekman & Friesen, 1971). These emotions are usually referred as basic, primordial or fundamental (Arnold, 1960; Ekman & Friesen, 1971; Gross, 1992). However, the criteria of classification of emotions as basic has been a matter of disagreement between theories; some approaches base the differentiation of emotion in mutually exclusive primordial categories, so each emotion belongs to one category only (e.g. rage, and annoyance belong to the category of anger). Russell and Feldman Barrett (1999) identified seven criteria of categorisation based on previous research, so that this classification could be based on facial expressions, patterns of autonomic nervous system activities, cognitive appraisals related to each emotion, cognitive structures involved in the elicitation and expression of the emotion, behavioural response or action tendency, the person's own classification of the emotional episode in the form of self reports, and brain structures and systems involved on each emotion.

Some research has identified at least three different uses of the term basic (Ekman, 1999), first, that some emotions are different in degree and more important than other emotions; second, that basic emotions are systems that have special adaptive value and help the survival of the individual; and third, that basic emotions are elements that can be combined to form other more complex emotions. An important distinction is the one detailed by Ortony and Turner (1990), suggesting the notion that basic emotions can be seen either as biologically primitive or psychologically primitive. In the *biologically primitive* perspective, emotions had an

evolutionary significance and function that helped individuals to survive (Darwin, 1872; Plutchik, 1980). In this approach it is important to clarify the biological basis of emotions and their specific functions, so that those with more probabilities of being basic will be present in all or most individuals and across cultures. Evidence supporting this approach showed that some emotions are universally associated to a distinctive facial expression (Darwin, 1872; Ekman & Friesen, 1971), and that there are specific autonomic nervous responses associated to some emotions (Ekman, 1999). In the *psychologically primitive* approach of basic emotions, it is assumed that these emotions are psychologically irreducible based on two conditions: first that they do not have other emotions as constituents; and second, they are present once the elementary conditions for their elicitation are fulfilled. This approach can be traced back to Wundt (1897), who proposed that emotional experience can be described in terms of the combinations of three dimensions: pleasantness vs. unpleasantness, calm vs. excitement, and relaxation vs. tension. More recently, there have been several attempts to classify emotions, from a simple distinction between pleasure and pain as the basic distinction between emotional states (Morwer, 1960), to a complicated high order classification based on different hierarchies, structures, dimensions, action tendencies, facial expressions and other criteria (Russell & Feldman Barrett, 1999).

Research on the characteristics of basic emotions has lead to some criteria that differentiate one emotion from another. Ekman (1999) proposed four characteristics that differentiate basic emotions. The first criterion is *distinctive universal signals*, as one of the fundamental functions of emotions is to communicate to others the inner state of the organism and the probable action that is going to be taken. In order to be effective and contribute to the survival of the individual, the communication should be clear and unambiguous. Among the signals identified by

some researchers, the facial and vocal expressions and the action tendencies related to specific emotions are the clearest indicator of a specific emotional state. Some authors even suggested that one intrinsic characteristic of basic emotions is that they have a specific and universal facial expression (Ekman, 1992; Ekman & Friesen, 1971), although this proposal has been challenged by other research (Ortony & Turner, 1990). The second criterion, *specific physiology*, proposes that emotions are adaptations that facilitate the survival of the organism; likewise, one of the functions of emotions is to prepare the organism to deal with events that are relevant for the survival of the individual in different situations (Darwin, 1872). Previous research has suggested that there are no specific differences in Autonomic Nervous System (ANS) activity based on different emotions, or that the differences have little impact on the emotional experience (Lazarus, Averill, & Opton, 1970; Schachter & Singer, 1962). However, more recent investigation suggests that some specific emotions produce particular and distinctive patterns of ANS activity, related to changes in the heart rate, temperature in the tip of the fingers, muscle tension, and changes in the skin conductance (Levenson, 1992).

The third criterion, *automatic appraisal mechanisms,* is based on the assumption that some evaluation and appraisal of the stimuli is necessary in order to elicit specific basic emotions. Ekman (1977; 1999) proposed the automatic mechanism as a process related to the selection of the stimuli and its evaluation that requires little time to be activated, and sometimes without the awareness of the individual, so that the emotional response can be faster. The fourth criterion, *universal antecedent events*, is based on the assumption that emotions evolved to help individuals to deal with life tasks, it is also expected to find specific emotions once the common elements that elicit the emotional reaction are present. Although the important influence of evolution is recognised, some research suggests that

differences between individuals and between cultures are present due to social learning (Ekman, 1999; Öhman, 1986).

A simple classification of emotions that is often used is related to the general effect of emotions on the individual, so that emotions that have positive or pleasant consequences are often referred as 'positive' or 'positive affect', such as joy; whereas those emotions that have unpleasant feelings for the individual are referred as 'negative affect', such as disgust. However, this form of classification does not take into consideration the evolutionary function of the emotion, so that although disgust is thought to protect the individual from contamination (which is a positive feature), the emotion is unpleasant and, therefore, negative. Another limitation of this classification is that the categories positive and negative are usually formed by collections of several different emotions, so that 'negative affect' may include anger, disgust, shame and other emotions that are theoretically different. Despite these limitations, this approach has proved useful to confirm structures of self reported emotions (Johnson-Laird & Oatley, 1989; Roseman, 1984; Russell & Feldman Barrett, 1999).

One useful distinction was proposed by Damasio (2000), suggesting a difference between basic emotions, background emotions and secondary emotions. Basic emotions are those dependent on the limbic system and the amygdala, they are the result of fine evolution tuning that helped the organism to survive. Secondary emotions are the experience of emotions based on "a systematic connection between categories of objects and situations, on the one hand, and primary emotions, on the other" (Damasio, 1994, p. 134). Background emotions are the internal state of the organism that maintains homeostatic regulation with the environment; this state is relatively independent of external stimuli and lasts for long periods of time.

Anger and disgust

Although there are differences between theories regarding which emotions belong to the category of basic, most theoretical accounts suggests that anger and disgust are basic emotions (Ekman, 1977; Johnson-Laird & Oatley, 1989; Plutchik, 1980). Anger and disgust fulfil the requirements proposed by Ekman, so that they have specific and distinguishable facial expressions (Ekman & Friesen, 1971), are present in several mammals (Darwin, 1872), there are action tendencies and body postures associated to them (Darwin, 1872; Frijda, Kuipers, & ter Schure, 1989), and they display specific physiology and activation of the autonomic nervous system (Davidson, 1998; Levenson, 1992, 2003). Some research also confirms the activation of the insula in the presence of disgusting elements or faces (Phillips et al., 1997), while it has been found that anger activates the amygdala, the right temporal pole and the thalamus (Kimbrell et al., 1999). Anger and disgust can also be considered basic emotions based on the requirements suggested by Ortony and Turner (1990). As biologically primitive emotions, anger and disgust can be found in all cultures and their display is similar in all individuals. As psychologically primitive, anger and disgust do not have other emotions as constituents and the elicitation of them is relatively stable.

Anger is an emotion that has the function of energising the body and preparing it for action, usually to engage in defensive strategies or as a response towards goal blockage or frustration (Darwin, 1872; Izard, 1977). The experience of anger is usually linked to aggressive behaviour and to the tendency to harm or injure some target (Berkowitz & Harmon-Jones, 2004). Although references about the analysis of anger can be traced back to Aristotle's Rhetoric (4th Century B.C./1984), there is no clear agreement regarding the definition of the emotional state considered

as anger (Russell & Fehr, 1994). Some definitions of anger are based on the conditions necessary to elicit the emotion (Lazarus, 1991; Ortony et al., 1988; Weiner, 1982), some other definitions are based on the categorisation of terms referred to anger (Alvarado, 1998), some others are based on the relationship between anger and some behavioural measure like facial expressions (Ekman, 1977), or aggressive behaviour (Berkowitz, 1989), and definitions based on the analysis of physiological states of the organism have also been proposed (Levenson, 1992).

Anger is associated to an imminent threat or to a situation that creates a negative or undesirable situation for the individual. Anger is closely related to aggression (Berkowitz, 1999; Strongman, 1996), and to the tendency of correcting a wrong action of someone else. Although anger has been described as a long term emotional state, in line with the definition of mood proposed by Damasio (2000); most accounts of anger are referred to 'emotional episodes' with a short duration (Russell & Feldman Barrett, 1999). There is no clear agreement about the necessary or sufficient requirements for anger to be elicited (Kuppens, Van Mechelen, Smits, & De Boeck, 2003). Because the experience of anger seems to be relatively common among people (Averill, as cited in Berkowitz, 1990), most theoretical accounts suggests that anything or anyone, real or symbolic, can potentially be a cause of anger. One of the most recognised components of the elicitation of anger is that the perceived outcome should be negative and unfair or undeserved; however, these components have also been challenged (Berkowitz, 1990).

Previous research has suggested that disgust is a protective emotion that evolved in order to protect the organism from contaminated foods and items (Rozin & Fallon, 1987; Rozin et al., 1999). The reaction associated with disgust is to avoid the contaminated item and to increase the distance between the organism and the source of contamination. Disgust has also stable responses in the form of facial

expressions (Darwin, 1872; Ekman & Friesen, 1971), and also has specific physiological and behavioural responses. It has also been demonstrated that reactions provoked by disgust are hard to overcome or change, even by rational arguments about the source of disgust (Rozin, Millman, & Nemeroff, 1986). Therefore, it is plausible that the activation of disgust requires only a minimum of requisites to be elicited and maintained, not depending largely on cognitive processing. These responses have similarities in several cultures and across species (Rozin et al., 1999).

However, some actions that are not directly related to contamination are labelled as disgusting, including hypocrisy, racism, unusual forms of sexuality and masturbation, and actions that are socially considered as "lacking of dignity", like stealing from a blind beggar (for a review, see Rozin et al., 1999). In order to investigate the several forms of the term disgust, a classification has been proposed (Rozin & Fallon, 1987; Rozin, Haidt, & McCauley, 1993; Rozin et al., 1999; Rozin et al., 2000), which has been supported by empirical evidence (see also Marzillier & Davey, 2004). Disgust is related to a sense of contamination and contagion, which has been labelled *core* disgust (Rozin et al., 1993). Core disgust may be conceived as a guardian against potential contaminants and sources of contagion, mainly those sources that are eaten. The elicitors of core disgust are usually of animal origin and food related items, as well as insects, all of them are also related to the contaminating properties of these items and to food rejection (Rozin et al., 2000).

A second form of disgust is called *animal-nature* disgust. This form of disgust is related to the aversion of humans about being reminded of their animal origin. In this sense, actions or items that are associated with poor hygiene of the body, body fluids or organs, death, and unusual sexual activities, provoke a disgusting reaction, even if this is only psychologically based on the perceived 'animality' of the action or person (Rozin & Fallon, 1987; Strongman, 1996). A third

form of disgust, *interpersonal disgust*, is an evolved form of disgust that is applied to the social domain. Interpersonal disgust is a form of protection against people as partners for social interaction or intimate social contact. This form of disgust makes humans selective and critical about sharing items with strangers. Examples of these reactions are related with the reluctance of people to wear a sweater that belonged to someone else, avoiding casual contact with strangers, and the perception that some groups are contaminated, such as convicted murderers or the low caste in the caste system in Hindu India. The fourth form of disgust, *socio-moral disgust*, is a complex category related to actions that violate established moral norms. It has been proposed that this type of disgust functions as a form of rejection for actions that violate important values of the group or in situations in which people behave without dignity or strip others of their dignity. Examples of this type of disgust are betrayal, corruption, racism and disloyalty (for a review, see Marzillier & Davey, 2004; Rozin et al., 1993; Rozin et al., 2000)

One basic characteristic of emotions is that they are reactions towards stimuli (Damasio, 1999; Damasio, 1994). It has been suggested that anger and disgust are responses that occur when the elicitors of these emotions are present. Based on this premise, some research has focused on the analysis of the elicitors of these emotions, and on the relationship between the elicitors and the emotional reactions.

Appraisal theories

The relationship between cognitive and emotional processes is the focus of some theories of emotion (Frijda, 1986; Izard, 1977; Lazarus, 1991). Appraisal theories of emotions propose that emotions are elicited and differentiated based on the subjective evaluation or appraisal about an action or situation by the individual

(Scherer, 1999). One of the most important assumptions of these theories is that these evaluations elicit different emotions (Schorr, 2001). Appraisals theories of emotions can help to explain the different reactions that the same event can elicit in diverse individuals, and can also explain the processes that lead to the distinct patterns of responses that an event can produce (Scherer, 1997).

Although the basis of appraisal theories can be traced back to the ancient Greek philosophers like Aristotle (Lyons, 1999), appraisals were introduced in psychology, and more specifically in emotion research, by the seminal work of Magda Arnold (Arnold, 1960), who first proposed that the significance of an emotional event is closely related to the way the perceiver appraises the event. In a simple way, appraisal theories claim that emotions are elicited by evaluations of situations and events (Roseman & Smith, 2001). Arnold (1960) suggested that the process leading to the differentiation of emotions starts with an appraisal of the event, which in turn arouses the appropriate emotional experience and course of action. In this view, emotions are the product of different patterns of appraisals.

Past research on emotions has given special attention to the cognitive components of the emotional experience. One influential theory is the two-factor theory (Schachter & Singer, 1962). This theory highlights the importance of the cognitive evaluation of a situation based on the previous experience of the perceiver. Schachter and Singer suggested that the first factor, activation, occurs as a non-specific arousal, producing the effects of the sensation associated with an emotion. The second factor, a cognitive analysis of the situation or event, is then activated based on the evaluation of the situation and the experience, creating the specific emotion. Although most research supports the presence of these two factors in most emotions, the specific features of emotions that have similar features are difficult to

distinguish, so that there may be several emotions that have similar levels of activation and valence.

One assumption of appraisal theories is that any event is cognitively evaluated in order to generate the adequate emotional response (Schorr, 2001). Most research in emotions agrees that an adequate response is the one that maximizes the survival and or well-being of the person; therefore, according to appraisal theories appraisals precede and elicit emotions and initiate the physiological, expressive and behavioural changes that compromise the emotional state (Roseman & Evdokas, 2004).

One basic feature of appraisals was suggested by Richard Lazarus (1966; 2001), who proposed that there are two stages of appraisal: primary and secondary. The primary appraisal is the process that evaluates how relevant an event is. If any given event occurs, the primary appraisal distinguishes whether the event is relevant to the person's goals, commitments or values. At this stage, the person evaluates the valence of the event: If the event is negative the person may experience stress. If the event is positive, a pleasant affect will more likely occur. If the result of the evaluation is that the event is not relevant, the appraisal process is interrupted. The secondary appraisal determines the abilities, methods and ways a person can deal with the event. During this stage of the appraisal process, the person assesses the conditions of the event, the coping options to deal with the event and the possible outcomes of the event. The result of this evaluation is what determines the nature of the emotion. Another key feature of the argument of Lazarus is the possibility of repeating the process of appraisal when new information is available for the person. The dynamic nature of the evaluations of the event or object allows the person to include new information and re-appraise the situation based on the same and new information. Lazarus proposed that—since the environment is always changing and

generating feedback about the psychological situation—primary and secondary appraisals also change continuously, which is why emotions are flexible and can change. Not only is the environment changing, but also the reactions of the person to the environment. These changes provide information that can be evaluated and used.

Although the assumption of cognitive elements present in the appraisal process is agreed by most appraisal theories, the number, relevance and primacy of those cognitive elements is not clear. On one hand, some appraisal models claim that appraisal is a continuous checking process with a predefined sequence in the form of several evaluations of the stimuli, called Stimulus Evaluation Checks (SEC) (Scherer, 2001). These include four types of information (1) *Relevance*. The organism must evaluate all information and decide whether the stimulus is important for its well being and whether it is worth considering more processing. (2) *Novelty check*. If the stimulus is new, it will require some attention and the organism would try to match the stimulus with a familiar schema, with the final goal of predicting the occurrence of the stimulus. (3) *Intrinsic pleasantness*. This is the fundamental reaction or response of the organism; liking would encourage approach and disliking would encourage avoidance. (4) *Goal relevance*. This is the process that evaluates the importance of the stimuli in a given situation or time, depending on the importance of the stimuli for the survival or well-being of the organism. Some other appraisal models, on the other hand, do not propose a sequence of events (Frijda, 1986; Roseman, Antoniou, & Jose, 1996), and favour a flexible sequence in the process of appraisal. However, some appraisals are believed to have primacy in the sequence, such as novelty and relevance.

There is some variation regarding the number and type of dimensions necessary to appraise a situation or event. Scherer (1997; 1999) reported three different approaches regarding these principles. The *reductionist* approach suggests

that a minimal number of clear non-redundant dimensions should be necessary to discriminate a situation or event. The *eclectic* approach suggests that in order to achieve an appropriate appraisal a maximum number of dimensions is required, so the differentiation of emotions would be more refined. The *principled* approach suggested a restricted number of necessary and sufficient abstract dimensions are enough to differentiate the major categories of emotional states. The number of dimensions necessary to differentiate each emotional state is closely related to the number of emotions to be classified. According to Arnold's perspective (1960), the process of appraisal is based on three basic dimensions: if the event or action is beneficial or harmful, the presence or absence of some object that elicits the emotion, and the extent to which one can approach or avoid the object.

More differences exist regarding the relevance given to different cognitive elements by the distinct appraisal theories. Scherer (1999) classified appraisal theories based on the different dimensions each theory focuses on. The dimensions are (1) Criteria: focused on the set of criteria used to evaluate an event (or situation). Examples of these are the intrinsic characteristics of the event, such as the perceived novelty or agreeableness, the significance of the event, the individual's ability to cope with the consequences of the situation or event, and the compatibility of the event with social and cultural standards (Frijda, 1986; Roseman, 1984; Roseman et al., 1996). (2) Attributions: This dimension relates to the perceived causes of the event—e.g., the controllability of the event and who is perceived to be responsible for it (Weiner, 1982, 1986). (3) Themes: This dimension attempts to link the elicitation of a specific emotion to a specific pattern of components of the event, one of them being a *core relational theme*. Using sadness as an example, its appraisal components could be motivational relevance, congruence, low coping potential, etc. The core relational theme would be an irrevocable loss of something (Lazarus,

1991). (4). Meanings: This dimension relates to the analysis of the propositional nature of the semantic fields that underlie specific emotional terms. One goal of this dimension is to analyze the logical operations that lead to giving a name to a specific emotion (Ortony et al., 1988).

Although there is some disparity regarding the number and primacy of the processes necessary to appraise a situation or event, all appraisal models support the basic principle that once the appraisal is complete, the result is an emotional reaction that prepares the body to engage in action with the situation (Schorr, 2001). Based on these premises, some proposals about the appraisals that elicit anger and disgust have been advanced.

Appraisal of anger

There has been some debate about the number of cognitive elements necessary to elicit anger. Some research has identified five appraisals: novelty / expectancy, intrinsic pleasantness, goal conduciveness, coping potential and compatibility with standards (Scherer, 1997), while other research identified four appraisals that can be elementary in eliciting anger: goal obstacle, other accountability, unfairness and control. However, these results also claim that none of these suggested appraisals was necessary to elicit anger, but that any of them was sufficient to elicit it (Kuppens et al., 2003). In its most basic form, it has been suggested that anger can be elicited by the perception that any negative occurrence is personally significant, a process called *ego-involvement* (Lazarus, 2001). Further additions to this basic form included the need for an external agent that must be perceived as the source of the negative event. Moreover, it has been suggested that the agent must behave in a blameworthy manner and that the outcome should be

unfair or illegitimate. Finally, the person must appraise to have enough resources to cope with the negative event (Scherer, 2001). Despite the differences, one synthesis of the appraisal of anger suggests that there must be an agent (cause) of an undesirable event, behaving in a blameworthy manner (Ortony et al., 1988). These authors suggest that both the blameworthiness of the action and the incident's undesirable effects must be appraised together to elicit anger.

Appraisals of disgust

As a negative emotion, disgust shares with anger some of the components of its appraisal, such as the negativity of the outcome. One main difference, however, is the level of intrinsic unpleasantness in disgust, which must be negative and very high (Scherer, 1997). Disgust is one of the least studied emotions despite being considered a basic one (Marzillier & Davey, 2004). Appraisal theories do not offer a clear prediction about the processes involved in the elicitation of the emotion. Lazarus describes disgust "as a very simple emotion in appraisal terms and no other appraisals are needed to distinguish it from all other emotions" (Lazarus, 1991, p.261). Likewise, Ortony and colleagues only refer to the 'appealingness' of the object, so that disgust is related—along with hate, dislike and loathing—to the dislike of an unappealing object (Ortony et al., 1988). Scherer and Wallbott (1994, p. 313), included disgust in their measures because "...it is often considered to be a basic "biological" emotion that seems to be present in many species."

This evidence suggests that disgust is an emotion that presents a problem for appraisal theories. Although some other research offered a large amount of evidence showing that disgust is a complex emotion (Rozin & Fallon, 1987; Rozin et al., 1993; Rozin et al., 2000), some appraisal investigations often include measures of disgust

as belonging to the measurement of anger (Alvarado, 1998; Ellsworth & Smith, 1988), or disgust is not considered in the emotions studied (Nabi, 2002; Roseman & Evdokas, 2004).

It has been suggested by appraisal theorists (e.g. Scherer, 1997), that the processes underlying emotion elicitation and differentiation are likely to occur in a fast, largely unconscious, and automatic manner. However, the appraisal of anger seems to be more cognitively demanding than the appraisal of disgust. Using some of the arguments of the social intuitionist approach (Haidt, 2001), and the dual-processes models (Chaiken & Trope, 1999), it seems plausible to argue that disgust has faster, more automatic, and less cognitively demanding reactions than anger. Research on disgust has showed that it has stable responses across situations and cultures (Rozin et al., 1999). The expression of disgust is related to a very specific physiological reaction—the experience of nausea. Some other research has revealed that disgust is not easy to control. For example, in several experiments Rozin, Millman and Nemeroff (1986), showed that the experience of disgust can overcome rational arguments. In contrast to disgust, anger responds to rational arguments (Berkowitz, 1989; Tedeschi, 1983).

One important assumption of appraisal theories is that once the elicitors of any emotion—the appraisals—are present, one emotion will be activated and displayed. However, these theoretical models do not offer clear predictions about the presence of two or more emotions simultaneously. Although Lazarus advanced the process of *re-appraisal* (Lazarus, 1966, 1991), suggesting that the process evaluation of actions and situations can be repeated, and Scherer (1999) advanced that the appraisal processes is constantly operative; there is no clear prediction when the appraisal of an action can elicit two or more emotions.

Some other research, however, has shown that appraisal models have some limitations. According to appraisal theories, there must be an agent or cause in order to experience anger. Empirical evidence has revealed that anger can be elicited by different agents, and some of them do not fulfil the requirements that appraisal theories postulate as agents that elicit anger (Berkowitz & Heimer, 1989). One challenge for appraisal theories is to explain why anger can be elicited without the necessity of the appraisals associated with it. Laboratory experiments have provided some support for the argument that aversive conditions can produce anger. Exposure to cigarette smoke, foul odours, high room temperatures, unpleasant cold water and, central to this research, disgusting scenes can elicit anger, even when none of the appraisals such as goal obstacle or unfairness is involved and no agent responsible for the negative outcome can be proposed. It has been argued that any experience of aversive stimuli can prompt anger and aggressive behaviour (Berkowitz, 1999; Berkowitz & Heimer, 1989). It has also been proposed that there is more than one system of emotion activation, the cognitive system being just one of them (Izard, 1993).

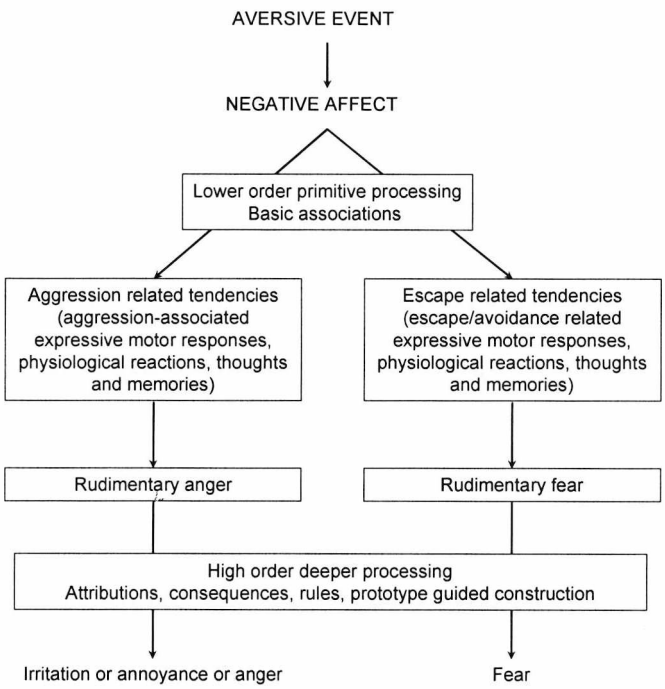
The Cognitive Neoassociationistic Model

A possible answer to this inconsistency has been provided by the cognitive-neoassociationistic model (Berkowitz, 1989). This model proposes that an unpleasant event or situation like physical pain, high temperature, frustration or stress can trigger anger through a multi-stage process (Figure 1). According to this approach, the initial reaction to an aversive event is a general negative affect. The result of negative affect produces, at least, two different expressive motor and physiological reactions, feelings and memories: the inclination to fight and the inclination to

escape. It is only after this stage that cognitive processes are involved, so that cognitive evaluations of the situation or event can be appraised; guiding and shaping the emotional experience.

An important feature of this theoretical model is that it can predict a close relationship between two emotions. Some reports indicate that sadness frequently elicits anger (see Termine and Izard; Rosenblatt, Jackson and Walsh; in Berkowitz, 1990), while empirical evidence has shown that disgust is also a cause for anger to increase (Marzillier & Davey, 2005).

Figure 1. Graphical representation of the cognitive neoassociationistic model



This theoretical model can account for the speed of the emotional response. In the presence of aversive stimuli, undifferentiated negative affect is activated without the need of cognitive processing, so the processes related to avoidance and aggression occur automatically and simultaneously. This undifferentiated negative affect can then be changed, increased, or transformed based on high order cognitive

processing of the situation or action. This model proposes that the differentiation of emotions happens at later stages, only after a cognitive processing of the action or situation that elicited the negative affect.

Although this model predicts the relationship between emotions and the elicitation of one based on another, research focused on other emotions than anger and fear is not available. Although fear and disgust share some basic features such as the tendency to avoid the elicitor, the fast response of the emotion, and the difficulty to control it, no empirical evidence using disgust and anger has been advanced. However, based on the similarities of the emotions of disgust and fear, and the empirical evidence suggesting that disgust can elicit anger, similar results can be expected using the emotions of anger and disgust. Although this theoretical perspective advances predictions regarding the relationship between anger and other emotions, it remains to be explored if this model is useful with emotions other than anger, and whether its predictions about the presence of affect before the cognitive processing of information can be maintained.

The model proposed by Berkowitz highlights one important component of the conception of emotions in general: the behavioural tendency to act based on different emotions. Action tendencies are central in other models of appraisal theories, and it has been argued that they may be a central component in the study of emotions (Frijda, 1986; Frijda et al., 1989; Kuppens et al., 2003).

As it has been established by the CAD triad hypothesis, moral violations have a close relationship with emotional reactions (Haidt, 2003; Rozin et al., 1999). Based on this relationship, some similarities can be outlined between rationalistic models of morality and appraisal models of emotions, and between the social intuitionist theory and the cognitive-neoassociationistic model. Rationalistic models of morality and appraisal theories of emotions are based on the consideration and evaluation of

analysis of the action or situation, so that cognitive analysis of the consequences is needed. In the case of the social intuitionist model and the cognitive neoassociationistic model, the responses are fast and without cognitive analysis of the consequences.

Responses towards offensive harmless stories

The stories used by Haidt describing moral violations that did not include harmful consequences for anyone (Haidt, 2001; Haidt et al., 2004; Rozin et al., 1999), are useful to establish some differences in the predictions of appraisal models of emotions and the cognitive neoassociationistic model. If an action is a moral violation that has no negative consequences—or even positive ones for the ones involved—rationalistic theories of morality would not evaluate this action as a moral violation in the first place. Appraisal theories would predict a reaction that would include a response similar to disgust or contempt, mostly based on the *intrinsic pleasantness* and the *compatibility with standards* appraisals (Scherer, 1997), and the most likely action tendency associated to any of these emotions would be avoidance.

The cognitive neoassociationistic model would predict a fast negative reaction based on the nature of the violation, this negative reaction, in turn, would simultaneously activate the tendencies to attack and to avoid. Importantly, the activation of anger and another negative emotion such as disgust can be predicted based on this model.

The difference between these predictions has theoretical support based on dual-process models of information processing (for a review see Chaiken & Trope, 1999). Based on these models, two different reactions towards an offensive or immoral action can be expected. The first one would be a slow and cognitively

demanding evaluation of the action based on a deliberative and reasoned process. The second one would be a fast, automatic and effortless reaction based on the perception of the action and the emotions associated to it.

One of the models that investigates the impact of affective information on evaluation is the affect infusion model (AIM) proposed by Forgas (1995). The AIM proposes that affect can have a direct effect on evaluation in several ways. Importantly, two of those modes focus on the relationship between cognitive processing and affect. First, the "heuristic processing" proposes that affect can be a short-cut to infer an evaluation. The "substantive processing" proposes that affect influences evaluations by having an effect on attention, retrieval, encoding and associative processes. In addition, Forgas (1995) suggests that these two processes require cognitive capacity and elaboration.

The proposal of two parallel ways of information processing, one fast and automatic, and a second slow and deliberative, can be related to the moral dumbfounding effect mentioned above (Haidt & Hersh, 2001). Based on the some of the features suggested by Forgas, it is plausible to propose that a harmless disgusting action can be judged negatively in a quick and effortless manner using the emotion of disgust as a short-cut to the evaluation. Likewise, it is also plausible to propose that individuals would analyse the information presented in terms of consequences. This analysis is cognitively demanding and requires attention and effort.

Conclusions

This chapter reviewed theory and research on emotions and affect, with special emphasis on the emotions of anger and disgust. It is argued that these two are considered basic emotions, and that they are the result of evolutionary adaptation,

with defined functions that contributed to the survival of individuals. Important differences between anger and disgust have been found in the action tendencies associated to each one (Frijda et al., 1989), in their facial expressions (Ekman, 1992), and in the physiology and activation of the autonomous nervous system (Levenson, 2003). Despite these differences, research on emotions usually place anger and disgust closely together, belonging to the category of "negative emotions" (Lazarus, 1991; Ortony et al., 1988). Furthermore, disgust is often considered to be an expression of intense anger (Nabi, 2002, Rozin et al., 1999). It has also been proposed that anger and disgust have social functions, that they communicate intentions to others and contribute to the social organisation of groups and the maintenance of the social order.

The complexity of the study of the phenomena of emotions has lead to several forms of categorisation and classification, so that the investigation of specific features of different emotions is viable. There are several intrinsic differences between emotions, one of the most important being the elicitation of them. Appraisal theories of emotion focus a large amount of attention on investigating the characteristics of the elicitors of different emotions, suggesting that cognitive evaluations or appraisals of an action or situation—in terms of the well-being of the individual—cause an emotional response. Considerable amount of research and evidence has shown the usefulness of this approach, investigating not only the elicitation of the emotions (appraisals), but also the likely response of the person to the appraised situation. Due to their intrinsic characteristics, appraisal theories rely on the cognitive processing of information regarding the action or event to a considerable extent.

Although appraisal processes are undoubtedly useful and several theoretical predictions of these models have received substantial empirical support, these models

offer no clear prediction of when the action or event can be appraised to elicit more than one emotion. Rather they often combine two or more emotions into one, or use one emotion as a measure of another, as in the case of disgust being used to measure anger. One more limitation, which is closely related to the previous one, is that only one emotion is expected as the result of the appraisal process, so that predictions are unclear regarding the correlation between two emotions. Some evidence shows that different emotions tend to co-occur and that one emotion can influence another one (Berkowitz, 1989; Marzillier & Davey, 2005). Empirical results in the following chapters also support this proposal. An alternative approach, the cognitive neoassociationistic model, can predict the correlation between emotions and even predicts that one emotion can be the cause of another. However, this model has only been employed using the emotions of anger and fear. Despite this limitation, similar outcomes may be expected with the emotions of anger and disgust.

Several empirical studies suggest that the elicitors of anger are more complex and variable than those of disgust, which are simple and related to a limited set of characteristics (Lazarus, 1991; Marzillier & Davey, 2004; Rozin & Fallon, 1987). Once more, appraisal processes are unclear about the apparent contradiction between an emotional response, which is thought to be fast; and the cognitive processing of the appraisals, which is proposed to be cognitively demanding and sequential. The cognitive neoassociationistic model advances some plausible answers, claiming that negative affect occurs before the cognitive analysis of the event.

CHAPTER 3

HARM AND EMOTIONS IN MORAL VIOLATIONS

This chapter focuses mainly on the examination of the relationship between the evaluation of an action, the perceived harm of that action and the emotional reactions produced by the action, when violations of different moral norms occur. As reviewed in Chapter 1, moral rules are said to be necessary to establish social relationships and to maintain order between groups (Wright, 1971). Although the nature of the moral norms may vary from context to context, their violations are likely to engage negative reactions ranging from the very mild to the extreme. Although it is accepted that most violations of this kind of norms would elicit a negative reaction it is sensible to investigate what are the origins of such negativity and to what extent it is based on cognitive reasoning or emotional reactions, since it is also accepted that responses towards moral violations can be expressed to a considerable extent in emotional reactions. (Peacocke, 2003; Rozin, 2003).

This chapter contains two studies that included short stories describing different moral violations, some of which were based on core or animal-nature disgust (Rozin et al., 1999; Rozin et al., 2000). Experiment 1 focused on how evaluations of actions that violate a moral norm change after taking the possible consequences of those actions into consideration. More specifically, Experiment 1 investigated the role of the perceived harm of the action or the benefit product of it, and its impact on subsequent evaluations. Experiment 2 investigated the elicitation of the specific negative emotions of anger and disgust as the result of different moral violations. In addition, this experiment included a manipulation of cognitive load, in order to test its effect on those emotions.

Based on the results of previous research (Haidt, 2001; Haidt et al., 2004), it was expected that the evaluation of the described action would be negative, but differences based on the extremity of the violation of the described scenarios were expected, so that the extreme scenarios—the ones that included references to core or animal-nature disgust— would be evaluated worse. The difference between scenarios including different types of disgust would allow to investigate whether the change in evaluations and emotions is similar in two distinct types of disgust-based scenarios.

A second hypothesis is related to the relative effect of the emotions of anger and disgust ion the evaluation of the action. It was expected that disgust would be more influential on the evaluation of a moral violation with limited cognitive resources, because disgust would be a more automatic process than anger and, therefore, less affected by cognitive load.

Introduction

Research on morality and the evaluation of actions related to it has mainly concentrated on the consideration of the consequences of those actions. In this tradition, an action may be considered morally incorrect if it has negative consequences for someone (Haidt, 2001). Building on criticisms of rationalist models, it has been proposed that emotions can also be a good guide for the evaluation of actions, at least in the field of morality. In addition, rationalistic models also assume some degree of independence between emotions and rational judgement; conversely, empirical research has shown that when participants were requested to indicated things that made them feel disgust, the described actions often referred to socio moral violations like racism and child abuse (Rozin et al., 1999).

It has been suggested that moral rules change from group to group and are context dependent (Shweder et al., 1987; Shweder et al., 1997). Although some actions related to harm, injustice and rights seem to be moral violations in most cultures, there is also evidence showing that different groups use different sources of moral standards to establish what is acceptable and unacceptable in a culture or group (Haidt et al., 1993). Another limitation of rationalist models is that they do not account for the negative emotional reactions related to violations of some domains, like sexuality and personal hygiene, even when there are no negative consequences for anyone (Haidt et al., 2004).

Some research shows that anger and disgust are related to violations of specific codes of morality (Rozin et al., 1999, see also Chapter 1); however, these findings suggest that anger is more likely to be related to violations of codes related to autonomy, such as harm and limitations of individual desires; while disgust is more likely to be related to violations of codes of divinity, such as the sanctity of the body and accepted sexual and food related practices. Although results confirm these relationships, the nature of the relationship between the referred codes and other emotions apart from the ones predicted, like the effect of a violation of autonomy on the emotion of disgust, are not clear or no results have been produced.

Anger and disgust as moral emotions

Anger and disgust have been studied mostly as basic emotions, related to evolutionary processes and the role they have played in the adaptation of humans to their environment. However, another important feature of anger and disgust is that they can be considered moral emotions, a type of emotions that can be defined as "those emotions that are linked to the interest or welfare either of society as a whole

or at least of persons other than the judge or agent" (Haidt, 2003, p.853). Moral emotions are emotional reactions that do not directly affect the person evaluating the action or situation, but have an effect on the social order. It has been suggested that humans and other primates react emotionally to violations of rules and norms, and that these reactions can have long term effects on the relationships between individuals (Rozin et al., 1999). It has also been stated that moral regulation is basic for social activity between individuals (Wright, 1971). Although some of the characteristics of emotions as reactions towards violations of the social order can be traced back to Aristotle (4th Century B.C./1984), research on moral judgement has been based mostly on rational models (Haidt, 2001).

Previous research highlighted the different elicitors of anger and disgust as moral emotions (Haidt, 2003; Rozin et al., 1999). Although both emotions are reactions towards negative events or situations, it has been proposed that anger and disgust would respond to different types of violations. Even though anger has been analysed mostly as an individual emotion (Plutchik, 1980), there is evidence suggesting that anger is also an important regulator of social interactions (Lazarus & Lazarus, 1994). In this sense anger is elicited as a reaction towards unjustified actions to others, insults, rights violations, limitations to individual preferences, and, broadly speaking, to harm based actions.

Disgust as a moral emotion has been related to violations that are not based on harm, but that it is a response that arises because of the violation of the natural order or to cultural rules, like those regarding the appropriate use of the body and activities related to it, such as adequate hygiene and the exercise of sexuality (Haidt, 2003; Rozin et al., 1999; Shweder et al., 1997). In addition, it has been found that disgust is a reaction related to transgressions of the social order that are not only related to the body, but to actions that show cruelty, betrayal, lack of dignity, and

hypocrisy (Rozin et al., 2000). While anger is a response towards an individual who caused some harm to someone else, disgust is a reaction used when the individual fails to behave according to the cultural standards of the group regarding respect for the norms and rules of the group.

Research based on the relationship between the specific moral codes of autonomy, community and divinity, and the emotional reactions of anger, contempt and disgust shows that people distinguish between violations towards the person as a free agent causing harm to someone (autonomy), and violations of the social and natural order (divinity) (Rozin et al., 1999).

Automaticity of anger and disgust

The vast majority of theories about emotions accept that they are reactions to stimuli, and that they are basic to the evolution and adaptation of humans to their environment (Darwin, 1872; Levenson, 1994). It is also accepted that, despite the disagreement regarding the primacy and importance of cognition and emotion, and which of these processes elicits the other (Lazarus, 1982; Zajonc, 1980), most research recognises the important relationship between cognitive and emotional processes (Damasio, 1994; Izard, 1993).

Investigations of emotions offer a large amount of research related to the emotion of anger. The emotion of disgust, on the other hand, has not received the same amount of interest, despite being considered a basic one (Marzillier & Davey, 2004; Rozin & Fallon, 1987). Previous findings indicate that anger and disgust are present in humans and some animals, suggesting that these emotions have different evolutionary functions, and that different behaviours are linked to each emotion.

Two important differences between anger and disgust are, first, the varying degree of difficulty in eliciting them; and second, to the extent to which they can be controlled. Research on automatic processes highlights differences in the degree of controllability (in opposition to automaticity) of different cognitive processes, with some processes occurring without intention, effort, awareness or control (Bargh, 1994). This theoretical prediction has been extended to the investigation of affect (Giner-Sorolla, 1999; Öhman, 1999), suggesting differences in the degree of automaticity of emotions.

Based on their different evolutionary functions of anger and disgust, it is possible to propose differences in their degree of automaticity. It has been suggested that the main function of disgust is to protect the organism against elements that may cause disease and contamination (Darwin, 1872; Rozin & Fallon, 1987; Rozin et al., 2000). Some of the features that support this prediction are the fact that disgust can be elicited by the recognition of stimuli via several senses like visual perception, taste, touch, and smell, and the elicitation of disgust responds to simple stimuli that may contain a contaminating characteristic; the association of disgust with the experience of nausea and the behaviour of rejection of oral incorporation in the form of vomiting; and the behavioural tendency related to avoid the stimuli.

Research on anger has suggested that its main function is to prepare the organism to engage in action with threatening or negative stimuli. Because of this characteristic, anger is often associated to action tendencies related to aggression (Berkowitz, 1989; Frijda et al., 1989; Lazarus, 1991). Previous research that focuses on the cognitive determinants of anger has revealed that it requires an external agent behaving in such a manner that can be accounted for a negative outcome to the person (Lazarus, 1991; Ortony et al., 1988). The difference in the amount and type of information that must be processed in order to elicit anger or disgust suggests that the

activation of disgust requires less cognitive resources than anger does, and the stimuli that elicits anger does not only depends on its characteristics, but on the perceived consequences that the stimuli may cause.

In the field of social cognition, Bargh (1994) proposed that cognitive processes vary in their degree of automaticity, and identified four characteristics associated to how automatic a process can be. The combination of different degrees of awareness, efficiency, controllability and intentionality would result in the level of automaticity of a mental process.

Awareness. Bargh (1994) identifies three ways in which a person can be unaware of the stimuli. The person can be unaware of the stimulus itself, be unaware of the interpretation of the stimulus, or be unaware of the influence of the stimulus on the person. In the cases of anger and disgust, it is difficult not to experience awareness, because their elicitation prepares the body for a reaction. However, there may be changes in the responses of a person without that person being aware of the stimulus, as the investigation on the relationship between high temperatures and aggression has shown (Berkowitz, 2003). In addition, the distinction highlighted by Damasio (1999; 1994), between "emotion" and "feeling of the emotion" suggests that people are conscious of their emotions most of the time, but that there are cases or "states of emotion", which can be executed non consciously. In addition, it has been shown that the influence of emotions on evaluations does not require awareness of the emotional state, as Wheatley and Haidt has shown (2005). In this research, participants under hypnotic suggestion were more severe on their judgements based on the emotion of disgust, but they were not aware of such effect.

Efficiency. This characteristic is related to the extent to which a cognitive process demands attentional resources or when a process is performed without effort. It has been argued that emotions are efficient processes per se, because they have an

effect on the whole organism without any necessary effort (Damasio, 1994), prepare the body for a response, and focus and synchronise available cognitive resources without attention of the person (Scherer, 1996).

Some differences between anger and disgust can be outlined based on this dimension. In the case of disgust, the reaction can be considered efficient if the objective to avoid or withdraw from the stimuli is achieved leaving cognitive resources available for other tasks; this action is usually fast and has a brief duration (Scherer & Wallbott, 1994), it does not require long time to activate, and the response is usually based on the intrinsic characteristics of the object or stimuli (Rozin et al., 1986), so that the processing of information is minimum to avoid exposure to the stimuli and probable contamination. For anger, the efficiency of the reaction is related to focusing the available cognitive resources for the engagement with the aversive stimuli, before and during the engagement. Anger also generally has a longer duration than disgust and the emotional episode of anger is influenced by constant processing of information about the object or stimuli, like in different strategies animals use to defend themselves.

Controllability and intentionality. According to Bargh (1994), intentionality is related to how much control a person has over initiating the process, while controllability is related to whether the person can change, stop or override the process once it has started. These processes have similarities with the process of emotion regulation, which refers to the "broad constellation of processes that either amplify, attenuate or maintain the strength of the emotional reaction." (Davidson, 1998, p. 308). Differences between anger and disgust can also be proposed on the basis of these two dimensions. Previous research suggests that disgust is difficult to control and is related to beliefs of contamination and contagion (Rozin & Fallon, 1987). Further, it is difficult to start feeling disgust willingly. The behaviours

associated with disgust (e.g., nausea and vomiting), are also difficult to control, as is the tendency to avoid the disgusting stimuli. Anger is thought to have a higher controllability than disgust (Scherer & Wallbott, 1994); it can be suppressed or displaced to another target if the conditions for anger expression are not adequate (Berkowitz, 2003). Additionally, anger responds to social regulation, and can be changed if the components of the appraisal of the situation change (Izard, 1993; Lazarus, 1991).

Importantly, Bargh (1994) suggested that a process is usually not only automatic or only controlled, but that there are combinations of the features described above so that different mental processes have different requirements and, therefore, different degrees of controllability or automaticity.

Based on these considerations, it could be predicted that anger and disgust will have different cognitive requirements, so it can be hypothesised that disgust will be easier to elicit and it will require less attention than anger, so higher levels of disgust compared to anger there were expected. In addition, disgust was expected to be more difficult to control than anger. Based on their characteristics, it is also hypothesised that disgust should be more influential than anger on the evaluation of the action with limited cognitive resources.

Experiment 1

Introduction

Experiment 1 focused, on the one hand, on change in the evaluation of violations of moral norms after the possible consequences associated to those actions have been considered; on the other hand, this experiment was also used to test the

reactions towards different types of stories in the form of evaluations and of expressions of feelings and emotions. The stories used described different moral violations, and half of the stories used contained elements related to the domain of core disgust or animal - nature disgust (Rozin et al., 2000). They were expected to elicit more negative reactions than stories that do not contain elements of core disgust due to their content. In order to assess the effect of the consequences of the actions of the characters in the stories, a measure related to the perceived harm or benefit of the action was included. At the same time, the relationship between the perceived harm or benefit of the described actions and the emotions associated to them could be investigated. It was also expected that the judgment of the action would be more negative after the consideration of the consequences. To investigate the change between the two evaluations more in depth, the first evaluation was requested promptly and without time to consider the consequences of the action, while the second one was requested asking participants to think about such consequences. It was also expected that there would be differences between the stories based on how extreme the violation of the moral norm was. Those stories containing elements related to violations of core or animal - nature disgust were expected to be evaluated worse than those that were not related to these types of disgust. Because all the scenarios presented violations of moral norms it was predicted that the perceived harm would influence the evaluation of the action, so that those participants reporting high levels of harm would judge the action worse than those who reported less perceived harm.

An important characteristic of the stories, including those considered extreme violations is that they were described without negative consequences for the main character of the story. Although it was expected that extreme moral violations would be evaluated worse than those without references to these types of disgust, describing

the stories without consequences was important to control for the possible effect of negative consequences described. In this way, the effect of the perceived harm will not be confounded with the effect of the described negative outcomes. A rationalist evaluation based only on the consequences of the actions described should not lead to a more negative evaluation after the consideration of the consequences, because there were none described in the stories. Whereas an evaluation based on the perceived harm or negative emotions would increase the negative evaluation after the consideration of the consequences. In this case, the post consequences evaluation should be more severe for those participants who perceived high harm as a product of the action.

Method

Participants

Thirty nine undergraduate psychology students (26 females and 13 males) participated in the study on a voluntary basis and received a partial course credit in return. Participants were tested individually and after completing the questionnaire they were thanked and debriefed.

Materials and Procedure

The experiment was divided into two sections and was introduced as being about emotional evaluations of different stories. After receiving informed consent, the scenarios and dependent measures were given to the participant in two different booklets, one for each section of the experiment. The questionnaire consisted in 6 different stories, two stories in which the main character of each story took revenge

against someone else ("farmer" and "wife"), two stories in which the main character violated a mild moral norm ("burglar", "prostitute"), and two stories in which the main character violated an extreme moral norm ("necrophilia", "siblings"), one of them adapted from (Haidt, 2001). The stories used in the experiment were: *Farmer*: "A man and a woman live on a farm in a small country. One day, the military dictator of the country arrives in the town. He sees the woman and for no reason kidnaps her, tortures her, and kills her. Then he warns the farmer that if he takes revenge the whole town will be massacred. The farmer ignores the warning, sneaks into the presidential mansion and finds the dictator asleep, then kills him". *Necrophilia*: "A man belongs to a necrophilia club that has devised a way to satisfy the desire to have sex with dead people. Each member donates his or her body to the club after death so that the other members of the club can have sex with the corpse. The man has sex with a dead woman who gave her body to the club. He and all the other members of the club use adequate protection so there is no risk of disease being spread". *Burglar*: "A man in Canada is convicted as a professional burglar. He has never hurt anyone in his crimes but he has robbed millions of dollars worth of jewellery from homes and shops. While serving a long prison term he trains himself in mathematics education. Upon leaving prison he becomes certified as a maths instructor and tests well above the average in teaching. A primary school wishes to hire him but in applying for the position he discloses his prior criminal record. The school accept the man as a teacher". *Wife*: "A woman who has been married for 20 years finds that her husband is having an affair with another woman. She hires a detective to find where the two lovers meet. The detective catches the two lovers having sex and films them. The husband is an important politician, and asks his wife not to reveal the fact of the affair for the sake of his career; in return, he promises to stop seeing the other woman. She releases the video to the press". *Prostitute*: "A

female prostitute in another country finds out she has HIV (AIDS). The treatment for the disease is very expensive and not publicly funded. She can only afford it by continuing to prostitute herself. But she always uses a condom and tries to protect her clients". *Siblings*: "Julie and Mark are brother and sister. They are travelling together in France on summer vacation from college. One night they are staying alone in a cabin near the beach. They decide that it would be interesting and fun if they tried making love. At very least it would be a new experience for each of them. Julie was already taking birth control pills, but Mark uses a condom too, just to be safe. They both enjoy making love, but they decide not to do it again. They keep that night as a special secret between them, which makes them feel even closer to each other".

Pre- consequences evaluation. In the first section, participants were asked to read each scenario and answer a question evaluating the action of the main character, indicating to what extent they thought that the action of the main character was right or wrong on a scale from 1 (completely wrong) to 9 (completely right). Participants were asked to respond to this question as quickly as possible and without taking too much time to think, simply answering whether the action was right or wrong.

Feelings and emotions. Following the pre-consequences measure, participants were asked to write up to four feelings or emotions they had felt immediately after reading each story in spaces provided.

Perceived degree of harm or benefit. In the second section of the study, participants were requested to read each scenario again, then they were asked to take some time to think and write down all the consequences they could think about the main character's action, trying to write ten consequences for each scenario. After this, participants were requested to evaluate the overall consequences of the character's action, considering the total harm or benefit of all the people involved in

each story, on a scale from 1 (much more harm than benefit) to 9 (much more benefit than harm).

Post- consequences evaluation. Participants were requested to think about all the consequences of the main characters' actions and indicate again to what extent they thought the action was right or wrong, on the same scale as in the pre-consequences evaluation. Finally, participants were asked to write what feelings and emotions they had about the story, indicating they could use the same ones they had listed in the feelings and emotions section.

Results

Scores of the pre-consequences evaluations, post -consequences evaluations and the item regarding the perceived degree of harm were reversed, so higher numbers indicated the action was perceived as more wrong and there was more perceived harm. The pre and post evaluation ratings of the 6 scenarios were averaged to create two indexes, one for the pre- consequences and one for the post consequences items. These evaluation scores were analysed using repeated measures analysis of variance with a 2 (Time: Pre vs. Post), within participants factor. Results showed a significant main effect of Time, F (1, 38) = 8.39, MSE = .34, $p < .01$, pre-consequences scores (M = 5.33, SD = 0.89) were evaluated less wrong than post-consequences scores (M = 5.72, SD = 0.91).

It was expected that the perceived harm product of the action would moderate the post- consequences evaluation, making it more negative. In order to investigate this prediction a median split was performed on the index related to the perceived harm or benefit, creating a group of relatively low perceived harm (M = 5.27, SD = 0.48) and a group of relatively high perceived harm (M = 6.48, SD = 0.51). These

were significantly different, t (37) = 7.57, $p < .001$. The scores of both groups were also significantly different from the midpoint of the scale, (t (20) = 13.15, $p < .001$ for the high harm group and, t (17) = 2.40, $p < .05$ for the low harm group).

A mixed model analysis of variance using a 2 (Time: Pre vs. Post), within participants factor x 2 (Harm: High vs. low) between participants factor revealed a significant main effect of Time F (1, 37) = 8.19, MSE = .31, $p < .01$, showing a worse evaluation in the post- consequences evaluation than in the pre- consequences one. An expected significant main effect of Harm was present F (1, 37) = 8.70, MSE = 1.07, $p < .01$, confirming that high harm perceivers reported more harm than low harm perceivers. A significant Time x Harm interaction was also found, F (1, 37) = 4.87, MSE = .31, $p < .05$, suggesting that only those participants who perceived high harm evaluated the actions more wrong in the post- consequences scores, t (20) = 3.60, $p < .01$, while the difference between the pre and post- consequences scores for those participants who perceived low harm was not significant, t (17) = 0.47, p = 0.65 (Table 1).

Table 1. Pre and post consequences evaluations scores by perceived harm

	Pre-consequences	Post-consequences
High harm perceivers	5.52 (0.66)	6.17 (0.82)
Low harm perceivers	5.11 (1.08)	5.19 (0.71)

Note: Standard deviations are in parenthesis

In order to investigate the differences between the scenarios these were classified as 2 categories, Scenarios containing elements of core or animal nature were classified as 'core disgust', while the three scenarios that did not include such elements were classified as 'mild disgust'. A similar mixed model analysis of

variance including a 2 (Extremity: core disgust vs. mild disgust), within participants factor revealed a significant main effect of Time, F (1, 230) = 12.71, MSE = 1.42, p < .001, the evaluation of the action was worse on the post- consequences (M = 5.72, SD = 2.61) than in the pre- consequences (M = 5.33, SD = 2.88). A significant main effect of Harm was present, F (1, 230) = 67.96, MSE = 6.30, p < .001, participants in the high harm group reported worse evaluations (M = 6.95, SD = 2.14), than participants in the low harm group (M = 4.00, SD = 2.15). The effect of Extremity was also significant, F (1, 230) = 108.27, MSE = 6.30, p < .001, indicating that core disgust scenarios were evaluated worse (M = 7.17, SD = 2.03) than mild disgust scenarios (M = 3.88, SD = 2.00). These effects were qualified by a significant Time x Extremity interaction, F (1, 230) = 17.49, MSE = 1.42, p < .001, and by a significant Time x Harm interaction, F (1, 230) = 17.45, MSE = 1.42, p < .001. The Extremity x Harm interaction was non-significant, F (1, 230) = 0.02, MSE = 6.30, p = .89, as well as the Time x Extremity x Harm interaction, F (1, 230) = 1.57, MSE = 1.42, p = .21.

Analysis of the Time x Extremity interaction revealed a significantly worse evaluation on the post- consequenc es (M = 4.23, SD = 2.27), than on the pre-consequences score (M = 3.52, SD = 2.15) in the mild disgust scenarios, F (1, 116) = 16.34, MSE = 1.80, p < .001, while the difference between the pre- consequences (M = 7.15, SD = 2.34) and post- consequences scores (M = 7.20, SD = 2.00) in the core disgust scenarios was not significant, F (1, 116) = 0.17, MSE = 1.24, p = .68. Analysis of the Time x Harm interaction showed that for the high harm group the post- consequences score (M = 7.30, SD = 2.03) was significantly worse than pre-consequences scores (M = 6.60, SD = 2.60), F (1, 112) = 16.52, MSE = 1.77, p < .001; while post- consequences score of the low harm group (M = 4.03, SD = 2.03), was not significantly different than the pre- consequences score (M = 3.97, SD = 2.53), F (1, 112) = 0.13, MSE = 1.27, p = .72.

Separate analyses for high and low harm perceivers using a Time x Extremity mixed model design showed, for high harm perceivers, significant main effects of Time F (1, 119) = 27.83, MSE = 1.60, $p < .001$, and Extremity F (1, 119) = 59.67, MSE = 6.14, $p < .001$, that were qualified by a significant Time x Extremity interaction F (1, 119) = 13.71, MSE = 1.60, $p < .001$. Further analyses showed a significant difference between the pre- and post- consequences evaluations for the mild disgust scenarios t (39) = 4.29, $p < .001$, but not for the core disgust ones t (80) = 1.65, $p = .10$.

In the case of low harm perceivers, analyses showed a non significant main effect of Time F (1, 111) = .21, MSE = 1.23, $p = .65$, and a significant main effect of Extremity F (1, 111) = 49.13, MSE = 6.48, $p < .001$, as well as a significant Time x Extremity interaction F (1, 111) = .21, MSE = 1.23, $p = .65$. Analysis of this interaction showed that in mild disgust scenarios the post- consequences evaluation was worse than the pre- consequences one, but the difference was not significant t (76) = 1.59, $p = .12$; for core disgust scenarios the post- consequences evaluation was better than the pre- consequences evaluation, but not significantly t (35) = 1.47, $p = .15$. Means and standard deviations of the above are in Table 2.

Relationship between perceived harm and evaluations

Regression analysis was used to investigate the relationship between pre-consequences evaluations and harm on post- consequences evaluations, for low and high harm perceivers. Results showed that for low harm perceivers ($R^2 = .54$, $p < .01$), the previous evaluation was a significant predictor of the post- consequences evaluation ($\beta = .78$, $p < .001$), but harm was not ($\beta = .18$, $p = .35$); for high harm

perceivers (R^2 = .44, p < .01), both the individual contribution of the previous evaluation (β = .52, p < .01), and harm (β = .43, p < .05), were significant predictors.

Table 2. Means and standard deviations of pre and post consequences evaluations by extremity of the scenario and by perceived harm

	High harm perceivers		Low harm perceivers	
	Pre	Post	Pre	Post
Mild disgust	4.43 (2.53)	5.98 (2.48)	3.05 (1.76)	3.32 (1.52)
Core disgust	7.68 (1.87)	7.95 (1.38)	5.94 (2.82)	5.53 (2.18)

Note: Standard deviations are in parenthesis.

Reported feelings and emotions

The words related to feelings and emotions of the participants were classified into dimensions related to emotions. In order to maximize differences between the reported emotions, they were hierarchically categorized based on their prototypicality, following the categorization of Shaver, Schwartz, Kirson, & O'Connor (1987). This approach has been useful in the past, although with some limitations (Russell & Feldman Barrett, 1999). The final dimensions were anger, disgust, pity, sadness, regret, surprise, shame, confusion, fear, pride and happiness and were also based on the categorisation proposed by Alvarado (1998). The words or comments that could not be coded were not included in any of the categories. In addition, when one word fitted into one of the categories, the rest of the words of the same participant in each scenario were not included, so that several references to the same emotional dimension were coded as only one. Analysis revealed that, on

average, participants responded almost with the same number of words in extreme and mild scenarios (Table 3). Results also revealed that in core disgust scenarios there were more mentions of disgust than anger, χ^2 (1) = 40.61, $p < .001$, while the pattern was reversed in the mild disgust scenarios, χ^2 (1) = 6.82, $p < .01$. It is also relevant to notice that no mentions of positive affect (pride and happiness), were present in the core disgust scenarios.

Table 3. Frequency of word related to each dimension separately for mild and core disgust scenarios

	Mild disgust	Core disgust
Anger	24 (22)	9 (8)
Disgust	5 (5)	54 (48)
Pity	20 (18)	12 (11)
Sadness	11 (10)	10 (9)
Regret	1 (1)	5 (4)
Surprise	5 (5)	4 (4)
Shame	1 (1)	0 (0)
Confusion	6 (5)	15 (13)
Fear	4 (4)	3 (3)
Pride	6 (5)	0 (0)
Happiness	27 (25)	0 (0)
Total	110	112

Note: Numbers in parenthesis represent percentages

Discussion

It was expected that the evaluation of the actions would be negative as a result of the violation of moral norms, and also to be affected by the extremity of the violation. According to the social intuitionist model (Haidt, 2001), the evaluation of a moral norm can be performed without the need of a rationalization process, especially if the evaluation is fast and without thinking of the consequences of the violation. It was also expected that the post- consequences evaluations would be more negative than the pre- consequences evaluations, as a results of the considerations of the possible harm associated to those actions. Importantly, this overall effect was found only in the high harm perceivers, as low harm perceivers' scores between pre- and post- consequences evaluations did not differ significantly.

Analyses of the perceived harm on the post-consequences evaluations showed that it had some influence only for those participants who indicated that the action was wrong in the pre- consequences evaluation (high harm perceivers); low harm perceivers did not associate their post- consequences evaluation with harm, indicated by the non-significant and negative correlation. Although both groups reported that the perceived level of harm was significantly above the midpoint of the scale (indicating more harm than benefit), the individual contribution of harm for the post-consequences evaluation was relevant only in the mild disgust scenarios for low harm perceivers and in the core disgust scenarios for high harm perceivers. The fact that in mild disgust scenarios low harm perceivers showed a less negative evaluation in the post- consequences evaluation, and that it was negatively correlated with harm, suggest that the role of harm can be independent of the evaluation if participants consider that its contribution does not make an important change after the initial evaluation.

The difference between mild and core disgust scenarios indicated that the extremity of the violation had an important role in the consideration of the post-consequences evaluation. 45Although the evaluation of core scenarios was worse after the consideration of the consequences this change was not significant, suggesting that this evaluation was based strongly on the initial score, which may include the possible consideration of harm, a large amount for the high harm perceivers and a small amount for the low harm perceivers. In the case of mild disgust scenarios the change between the two evaluations included a significant effect of harm, which was correlated more strongly with the post- consequences evaluation. Low harm perceivers associated harm with the post- consequences evaluation only in mild scenarios, while high harm perceivers did so for the core scenarios. This finding also supports the suggestion that the perception of harm and the evaluation of an action can be independent processes.

The moral violations that were categorized as core disgust (necrophilia, disease and incest), form part of the classification of animal - nature disgust (Rozin et al., 1999). The overall evaluation of these scenarios did not change significantly in the post- consequences judgement regardless of the perceived level of harm, although in all cases the evaluation was worse after considering the consequences. For the mild scenarios the change between the pre and post- consequences evaluations supports the social intuitionist approach, in the sense that a fast and effortless evaluation (pre- consequences) was modified by reasoning of the possible consequences (including the possible harm associated with the action) to increase the negativity of the second evaluation (Haidt, 2001). This finding suggests that extreme moral violations are difficult to reappraise and show no change; while mild moral violations can respond and change based on the perceived harm. Even when harm was recognised by low harm perceivers, its influence did not have an impact on the

post- consequences evaluation. Only those participants who evaluated the actions as high in harm evaluated the actions more negatively in the post- consequences evaluation.

This experiment showed that although moral violations were evaluated in a negative way, these violations had variations; evaluations of core disgust scenarios did not change after the consideration of the consequences, while evaluations of mild scenarios did. This finding suggests that responses to evaluations of extreme violations are difficult to change. Also, these results suggests that the perceived level of harm is relevant in addition to the extremity of the violation; if participants perceive high levels of harm, even mild violations change as a result of the consideration of the consequences. If participants perceived low harm, the evaluation of the action did not change after the consideration of the consequences, even in core disgust scenarios.

Experiment 2

Introduction

Experiment 2 investigated the arousal of the specific emotions of anger and disgust as a result of the extremity of moral violations. Previous research identified them as part of a cluster of emotions that are elicited because of violations of moral rules (Rozin et al., 1999; Shweder et al., 1997). Results of Experiment 1 were not clear about the role of specific negative emotions in relationship to the moral violation, so bipolar scales measuring specific emotions instead of open questions related to emotions and feelings were included in this experiment.

This experiment also investigated the effect of cognitive load on the elicitation of anger and disgust, as well as on the evaluation of the action. It has been claimed that cognitive load can impair the deliberative processing of information (Gilbert, Tafarodi, & Malone, 1993), so that processes that require more cognitive resources should be less efficient. The use of cognitive load in this experiment intended to test the relative automaticity of the evaluations and the emotions. Based on the suggestion that emotions vary in their degree of automaticity (Giner-Sorolla, 1999), it was predicted that cognitive constraint would reduce the levels of anger and the negativity of the evaluation, but would have no such effect on disgust. Another change is the presence of a control condition in which participants did not have to consider explicit consequences, as well as a condition with cognitive load and the consideration of the consequences simultaneously.

Based on the results of Experiment 1, it was expected that core disgust scenarios would be evaluated more negatively than mild disgust scenarios due to the content described. Also based on the results of the previous experiment, it was expected that the consideration of the consequences would increase the levels of anger relative to disgust compared to the control condition, because the consideration of harm and negative consequences are theoretically associated more to anger than to disgust (Lazarus, 1991; Ortony et al., 1988). In the case of the condition including cognitive load and consequences, it was predicted that anger and the judgement of the action would be similar to those in the control condition because the cognitive constraint should impair the processes that require more resources to be used—anger and the evaluation of the action. It was also predicted an increase in the reported levels disgust compared to the control condition, due to the more simple and categorical nature of the elicitors of disgust which do not depend on the negative

consequences of the action, but on its intrinsic contaminating properties (Rozin et al., 1986).

Method

Participants

A total of 86 undergraduate psychology students, 73 females and 13 males, took part in the experiment on a voluntary basis and received a partial course credit in return. Participants were tested in groups from 2 to 8 and they did not interact during the task. After completing the questionnaire, participants were thanked and debriefed.

Design

The basic design of this experiment had a 2 (Consequences: consideration vs. no consideration) x 2 (Cognitive load: load vs. no load) between participants design.

Materials and Procedure

The questionnaire consisted on the same six scenarios used in Experiment 1. Participants were assigned randomly to one of the four conditions: In the no consideration conditions, participants were asked to read each story and answer to what extent they thought the action of the main character of each scenario was right or wrong, using a scale from 1 (completely wrong) to 7 (completely right). After this participants were asked to indicate how much each story made them feel anger, compassion, depression, disgust, happiness, infuriation, outrage, pity, pleasure,

repulsion, sadness, satisfaction, sickness, sorrow, sympathy and grossed-out. These measures were indicated on a scale from 1 (not at all) to 8 (very). In the consideration condition, participants read each story, then they were asked to take some time to think about all the consequences of the main character's action, and to write them down, trying to write ten consequences in the spaces provided for them. Next, participants were requested to indicate whether the action of the main character was right or wrong on the same scale as described above. Finally, participants were asked to indicate to what extent they felt the emotions described previously. In the cognitive load conditions, participants were asked to perform one of the previous tasks, but while performing a tone tracking test. In this test, participants counted the number of times a flute tone was repeated before it changed to a different one. One of seven different flute tones was played for .25 seconds, a random number of times between 1 and 8, 5 seconds apart, before the tone changed to another one. The participants were instructed to remember the number of times the tone was played before it changed to another one. This test is similar to the one used by Skitka and colleagues (Skitka, Mullen, Griffin, Hutchinson, & Chamberlin, 2002). Participants were also reminded of the importance of tracking the number of repetitions mentally and were asked not to use writing as an aid to the task.

Results

The scores regarding the evaluation of the action were reversed so higher numbers indicated that the action was evaluated as more wrong. The scenarios were classified into 'mild disgust' and 'core disgust' as in Experiment 1.

Evaluations

The responses regarding the evaluation of the action of the 6 scenarios were averaged to create one single score. Analysis of variance of this score adding a 2 (Extremity: core disgust vs. mild disgust) between participants factor to the basic design revealed only a significant main effect of Extremity, F (1, 508) = 263.93, MSE = 1.98, $p < .001$, suggesting that core disgust scenarios ($M = 5.84$, $SD = 1.27$) were evaluated as more wrong than mild disgust scenarios ($M = 3.82$, $SD = 1.53$); the remaining main effects and interactions were not significant (all $p > .12$, Table 4).

Anger and disgust

Two indexes were created in order to analyse the emotions reported by the participants, one for the emotion of anger and one for the emotion of disgust. The remaining emotions were included to mask the purpose of the study and were not analysed. The average of the items regarding anger (anger, infuriation and outrage, Cronbach's Alpha = .92), and the average of the items regarding disgust (Disgust, repulsion, sickness, grossed-out, Cronbach's Alpha = .96) had a correlation of r (515) = .80, $p < .001$. These indexes were analysed using a mixed model analysis of variance with a 2 (Emotion: anger vs. disgust, within participants factor) x 2 (Extremity: core disgust vs. mild disgust, within participants factor) x 2 (Consequences) x 2 (Cognitive load). Results showed a non-significant main effect of Emotion, F (1, 507) = 1.97, MSE = .84, $p = .16$, participants indicated similar levels of anger and disgust; a significant main effect of Extremity was also present, F (1, 507) = 309.25, MSE = 5.18, $p < .001$, so that core disgust scenarios aroused more overall anger and disgust than mild disgust scenarios; a significant main effect of

Cognitive load was also revealed, F (1, 507) = 5.92, MSE = 5.18, $p < .05$ showing higher levels of anger and disgust in the under load; a marginal main effect of Consequences was present, F (1, 507) = 3.38, MSE = 5.18, $p = .07$, suggesting that when participants considered consequences they reported less anger and disgust.

This analysis also revealed a significant Emotion x Extremity interaction F (1, 507) = 71.72, MSE = .84, $p < .001$, indicating that mild disgust scenarios elicited more anger than disgust, while core disgust scenarios elicited more disgust than anger. A significant Cognitive load x Consequences interaction was also present, F (1, 507) = 11.89, MSE = 5.184, $p < .001$ showing that Cognitive load increased both, anger and disgust, only when participants did not consider the consequences of the actions. The remaining interactions were not significant (all $F < 1$) Means and standard deviations are shown in Table 4.

Table 4. Means and standard deviations of evaluations, anger and disgust by Consequences by Extremity by Cognitive Load

	No consequences				Consequences			
	No load		Load		No load		Load	
	Mild	Core	Mild	Core	Mild	Core	Mild	Core
Evaluation	3.71 (1.58)	5.64 (1.43)	3.71 (1.59)	6.00 (1.05)	3.91 (1.42)	6.03 (1.15)	3.95 (1.56)	5.67 (1.39)
Anger	2.16 (1.40)	4.08 (2.06)	3.01 (1.53)	5.02 (2.16)	2.28 (1.15)	4.32 (1.86)	2.17 (1.12)	4.24 (2.04)
Disgust	1.89 (1.32)	4.53 (2.20)	2.49 (1.37)	5.47 (2.14)	1.82 (0.91)	5.14 (2.31)	1.79 (0.91)	4.79 (2.15)

Note: Standard deviations are in parenthesis

Relationship between evaluations and emotions

Regression analysis was used to test the individual contribution of anger and disgust to the evaluation of the action for mild and core disgust scenarios, comparing the control and load conditions based on the results of the analyses of variance. Results showed that for the control condition anger was a better predictor of the evaluation of the action than disgust for mild and core disgust scenarios, while in the load conditions anger was a better predictor of evaluation in the mild disgust scenarios, while disgust was a better predictor in core disgust ones (Table 5).

Table 5. Standard regression coefficients of anger and disgust predicting the evaluation of the action by extremity

	Control		Load	
	Anger	Disgust	Anger	Disgust
Mild disgust	.50**	.00	.52**	-.19
Core disgust	.66***	-.15	.09	.50**

Note: ** = $p < .01$, *** = $p < .001$

General discussion

The results of Experiment 2 suggest that the evaluation of an action is closely related to the negative emotions associated to a moral violation. They also suggest that the effects of different emotions on the evaluation of an action are related to how extreme the violation is perceived. The indexes of anger and disgust in Experiment 2 did not differ significantly, although this difference was expected. Moreover, the

correlation between these emotions was not only significant, but very high; this high correlation made difficult the differentiation of anger and disgust. In this experiment the levels of both emotions were increased under cognitive load, but there were no significant differences between the mean values of them, one possible explanation for this is that all the stories used included mixed elements of harm as well as elements related to disgusting actions or situations, and the indexes of anger and disgust were created averaging the scores of all the stories. Experiments regarding the effects of manipulations of harmfulness and disgustingness separately for anger and disgust are presented in the next chapter.

It was expected that the manipulation of cognitive load would have an effect on the evaluation of the action and on anger; however results showed that anger and disgust were affected to a similar extent by the cognitive constraint, and that it showed no effect on the evaluations. Although there were no differences between anger and disgust in the different conditions, the effect of disgust on the evaluation of the action was present only under cognitive load for the core disgust scenarios, suggesting that when a moral violation is extreme and cognitive resources are limited, disgust is more accessible than anger. These findings combined with those from Experiment 1 indicate that the extremity of the violation and the cognitive resources available, and not only the perceived negative consequences have important roles on the evaluation of an action. Results confirm the pattern of more negative responses when the violation of the norm is extreme than when the violation is mild. Although these responses were expected, the influence of perceived harm in Experiment 1 suggests that the evaluation of an action is not completely based on the consideration of its consequences, but that it can be moderated by the type of disgust—core disgust, animal – nature disgust, the action elicits.

The expected reduction of the severity of the evaluation under cognitive load compared to the control condition in Experiment 2 was not present. Also, it was expected that the consideration of the consequences of the action would increase the severity of the evaluation compared to the control condition. Results revealed, however, that the evaluation of the action was not significantly different between the conditions. One possibility is that the evaluation was not performed based on the consequences of the actions, but using the emotions of anger and disgust as guidelines of the judgement, as the social intuitionist model would predict (Haidt, 2001).

The changes related to specific questions about negative emotions in Experiment 2, compared to open questions related to feelings present in Experiment 1 allowed the differentiation of specific negative emotions and their effect on the evaluation. Experiment 2 more explicitly investigated the negative emotions of anger and disgust related to moral violations, highlighting the difference in cognitive resources needed for the two emotions to be involved on the evaluation of the action. Experiment 2 shows that disgust is associated with extreme violations under cognitive load, while anger is better in predicting the evaluation of mild violations and of extreme violations when enough cognitive resources are available. It is especially important to notice that although the overall levels of anger and disgust were not significantly different in any of the conditions, they did impact differently on the evaluation. The impact of cognitive load on both anger and disgust suggests that emotions can be influenced by the cognitive resources available. In Experiment 2 the presence of cognitive load increased the level of the emotions reported; suggesting that emotions are more accessible when cognitive constrain is present. At the same time, results showed that the influence of each emotion on the evaluation of

the action can be affected by the cognitive resources available, so that disgust is more influential than anger with limited cognitive resources.

Results from Experiment 1 indicate that the initial evaluation of the action is relevant over and above the negative consequences associated to the action in the form of high and low perceived harm. Although low harm perceivers acknowledged the presence of harm above the midpoint of the scale, its influence was not significant for the evaluation of the action. These results suggest that perceived harm and the evaluation of the action are two different but related processes, so that the presence of harm does not always predict a negative evaluation. Combined results of the two experiments highlight the proposal that extreme moral violations do not change over time, probably because extreme moral violations are based more on disgust than on anger. Previous research highlights the idea that disgust is an automatic response that is difficult to change. The role of cognitive load on Experiment 2 supports this proposal, since under cognitive load the effect of disgust was stronger than the effect of anger on extreme scenarios.

An important difference between these experiments is related to the requirements of the evaluation. In Experiment 1 participants were instructed to evaluate the action quickly and without considering its consequences, while in Experiment 2 no instructions were given regarding how fast the evaluation should be made, so that participants answered taking as much time as they wanted. This distinction may have had an impact on the evaluations, since in Experiment 1 all scenarios were significantly different from the midpoint of the scale, while in Experiment 2 some scenarios were not, so that evaluations in Experiment 1 were more extreme than those in the second experiment.

Limitations of the experiments

Although these experiments investigated the relationship between the perceived harm of an action, the judgement of that action and on the emotions of anger and disgust, results are not clear regarding the effect of the target of the harm. Because all the scenarios contained a mixture of negative consequences for the main character and other people, differences between harm to other people involved and self-inflicted harm could not be investigated. This mixture of negative consequences for the person and others in the scenarios could explain the high correlation between anger and disgust in Experiment 2. The results of Experiment 1 regarding words of feelings and emotions in the form of open questions were addressed in Experiment 2. However, in both experiments perceived harm was measured and not manipulated, so that although the stories were described without negative consequences for the main character, the nature of the experiment did not allow investigating the possible intrinsic negative consequences associated to the different types of violations used in the experiment. One more limitation of Experiment 2 is that the there was no measure of the relationship between the cognitive load task and the negative emotions. According to the Cognitive neoassociationistic model, (Berkowitz, 1990; Berkowitz & Heimer, 1989), negative stimuli of different types can elicit feelings of anger, so it is plausible that the cognitive load manipulation created some negative affect or increased the existing one product of the stories.

CHAPTER 4

FROM PERCEIVED HARM TO PRESUMED HARM

This chapter includes one study that investigated the relationship between the evaluation of an action, the perceived harm product of the action, the emotions of anger and disgust and the action tendencies of punishment and avoidance. One of the limitations of Experiments 1 and 2 was that the perceived harm produced by the action was only measured and not manipulated. In addition, although Experiment 2 was more clear in measuring the emotions of anger and disgust more specifically, it did not distinguish between different targets of the perceived harm, or the negative consequences associated to the violation, so that only general negative consequences or unspecified harm were involved.

Building on the findings of the previous experiments, and to investigate whether different targets of harm would have an effect on the reported emotions and evaluations, Experiment 3 used three different stories that were manipulated to create different targets of described harm, so that each story had a variation including psychological harm to the person performing the action, psychological harm to others, and a condition without described harm to anyone that was used as a control condition. Measures of action tendencies related to punishment and avoidance were incorporated, so that the effect of anger and disgust on the action tendencies could be investigated.

Introduction

The experiments included in the previous chapter investigated the relationship between the evaluation of the moral violation and the perceived consequences, more specifically, the perceived harm of the actions. In both experiments, the distinction between extreme and mild stories indicated that actions that violate an extreme moral norm are difficult to change. Although Experiment 2 more clearly than Experiment 1 measured the emotions of anger and disgust, the expected differences between these two emotions were not found. One possible explanation is that all the scenarios used in experiments 1 and 2 included elements of harm, as well as elements that potentially could elicit disgust, so that even if anger and disgust responded to different patterns of elicitation, both of them would be present because the mixture of stories. In addition, another one of the limitations of these experiments was their correlational nature, since the stories were not manipulated.

Despite these limitations, there were three main findings. First, results highlighted the important role of perceived harm in the evaluation of an action. Second, Experiment 2 showed that moral violations have an effect on the specific emotions of anger and disgust. Third, the mean levels of these emotions responded in a similar way to the demands of the task of cognitive load, but had different effects on the evaluation of the action in the load and no load conditions, and also responded differently to the extremity of the action. Although results showed a consistent relationship between evaluations and the perceived harm product of the action, in both experiments some of the stories included harm to other people as well as stories that described harm to the person performing the action. This mixture of targets of harm did not allow investigating specific differences in evaluations and emotions

based on the negative consequences for either the person performing the action, or someone else. These differences in the target of the described harm are relevant for some theoretical approaches. Cognitive appraisal theories would predict differences in emotional reactions based in the different descriptions of situations or events (Arnold, 1960; Lazarus, 1991; Lazarus et al., 1970; Ortony et al., 1988; Roseman, 1984; Scherer, 1999). The predictions of these theories in the case of the emotion of anger usually include an agent causing an undesired and undeserved event to someone (Lazarus, 1991; Ortony et al., 1988). Along with the elicitation of emotions, related action tendencies can be expected. Because emotions are usually accompanied by behavioural reactions, facial expressions and global changes in the organism (Damasio, 2000), it seems likely that the emotions investigated will be accompanied by behavioural tendencies.

Action tendencies related to anger and disgust

The majority of theories of emotions indicate that one of the main functions of emotions is to focus available resources and prepare the body for action (Damasio, 1994; Darwin, 1872; Ekman, 1999; Frijda, 1986; Frijda et al., 1989; Lazarus, 1991). Moreover, it has been suggested that action tendencies are an intrinsic part of the emotion experience (Frijda, 1986; Frijda et al., 1989), and they can be seen in humans as well as in other animals. Action tendencies are related to the readiness to engage or disengage in action with the stimuli in the form of behaviour, at the most basic level 'moving away' or 'moving towards' the stimuli, with some research considering facial expressions as a form of action tendency (Frijda et al., 1989). Anger and disgust appear to respond in opposite action tendencies; it has been suggested that the action tendency of anger is related to approaching the stimuli in

order to confront it (Frijda et al., 1989; Lazarus, 1991; Strongman, 1996); disgust has been linked to the tendency of withdrawal and avoidance of the negative stimuli (Rozin et al., 1993).

Alternative theoretical perspectives suggest that there are two different neurological systems, approach and withdrawal, that mediate the different forms of motivation and emotion (Davidson, 1998). Unlike cognitive appraisal theories, these theories propose that emotions are not the result of appraisals of situations or events, but that each system facilitates the generation of emotions and behaviour. The approach system eases appetitive behaviour and affect, which are related to approaching the stimuli. The withdrawal system generates forms of negative affect and behaviour that facilitates the withdrawal from the stimuli. Although disgust has been recognized to match the criteria of the withdrawal system, both, as an emotional reaction and as behaviour consistent with the emotion, the relationship between the emotion of anger and the proposed systems is not clear. It has been argued that the approach system is related to positive affect. However, findings suggest that anger is related to negative affect and to the action tendency of approaching (e.g. Berkowitz, 2003).

One possible explanation of the relationship of approaching action tendencies and anger is that, in most analysis and previous research, anger is usually accompanied by aggression, hostility and even the urge to hurt (Berkowitz, 1999). The close relationship between anger and aggressive behaviour has been used to propose that anger activates a motor program orientated to injure or destroy the available target. Most theoretical approaches maintain that anger and aggression are intrinsically related, either suggesting that anger is the predictor of the behaviour (Frijda et al., 1989; Lazarus, 1991), or that anger can be the result of the activation of aggression related tendencies (Berkowitz, 1989, 1999). Most of the research related

to the relationship between disgust and its related action tendency of avoidance or withdrawal recognises that this action tendency is elicited by the emotion (Lazarus, 1991; Rozin et al., 1999).

Experiment 3

Introduction

The correlational nature of Experiments 1 and 2 did not allow the investigation of the independent effects of perceived harm and of the disgustingness of the action separately. This experiment manipulated the target of harm product of the action, leaving the nature of the disgusting action constant, with the main objective to investigate these independent effects. The main focus of this experiment was on the effect of perceived harm on the evaluations, emotions and action tendencies. The independent effect of the disgustingness of the action will be treated in more detail in the next chapter.

In order to investigate the role of perceived harm in more depth, this experiment manipulated the extent of harm by describing individual stories with three different targets of harm. In the harm to others stories, the moral violation harmed other people apart from the person performing the action psychologically; in the harm to the self, stories the person performing the action was harmed psychologically, but no one else was; finally, in the no consequences stories no harm to anyone was described.

Results of Experiment 2 showed a high correlation between the mean indexes of anger and disgust across all conditions. Also, the cognitive load manipulation affected both emotions in a similar way. It was predicted that the manipulation of the

target of harm in this experiment would produce differences in the levels of anger and disgust, such that overall disgust was expected to be higher than anger, this is because all the actions described were moral violations with references to core disgust (Marzillier & Davey, 2004; Rozin et al., 1999), and it is proposed that the elicitation of disgust is more automatic than the elicitation of anger. In addition, the levels of anger were expected to change based on the target of harm.

According to the predictions of cognitive appraisal models, in the cases with no negative consequences for anyone, the evaluation should be based almost exclusively on whether the described action is disgusting or not, and not on the degree of harm product of the action. In line with these predictions, differences between the levels of anger and disgust were expected, in that disgust would be high and anger would not have any influential effect. In the cases where harm to others was described, high levels of anger and disgust were expected, the former based on the described harm to others, and the latter based on the disgustingness of the action. It was expected that in the conditions in which the main character of the stories harmed his or herself, the levels of disgust would be higher than those of anger as a result of the disgustingness of the action, although high levels of anger were not expected.

Because the evaluation of the action was expected to change on the basis of the perceived harm, such judgement was expected to correlate more with the emotion of anger than with the emotion of disgust. Another hypothesis was that the judgement of the action would be negative in general as a result of the moral violation, but it was expected to be affected by the manipulation so that the worst evaluation would be expected in the harm to others conditions, and the least negative evaluation would occur in the no consequences conditions. Although the main differences were expected between the no consequences and the harm to others

conditions, the harm to the self condition was included to exclude the alternative explanation that differences in the reported emotions and evaluations are due to the general harmfulness of the action, and not to specific targets of harm. The inclusion of questions related to action tendencies allowed the clarification of whether these are different behavioural functions associated to each emotion, despite the fact that they were significantly correlated in Experiment 2. It was expected that each emotion would be associated to the action tendency predicted by appraisal models, punishment of the agent relating to anger and avoidance of the agent relating to disgust.

Method

Participants

Ninety-four undergraduate psychology students at the University of Kent participated in the experiment in one of three sessions of a lecture. Seventy-two participants were female and 22 male. After completing the questionnaire all participants were thanked and debriefed.

Materials and procedure

The questionnaire presented three fictitious stories in which the main character or characters violated a moral norm. The described consequences of these actions were manipulated to create three different conditions. In the "no consequences", condition there were no described negative consequences for anyone. In the "harm to self", condition, the main character of each story was psychologically harmed, but no one else was harmed. In the "harm to others", condition the main

character of each story was not harmed, but someone else was harmed psychologically. The scenarios used were: a) "Julie and Mark are brother and sister. They are travelling together in France on a summer vacation from college. One night they are saying alone in a cabin near the beach. They decide that it would be interesting and fun if they tried making love. At very least it would be a new experience for each of them. Julie was already taking birth control pills. But Mark uses a condom too, just to be safe. They both enjoy making love, but they decide not to do it again". *No consequences*: "Julie and Mark have no regrets about that night and keep it as a special secret between them, which makes them feel even closer to each other. Eventually, they move on and are able to form successful long-term committed relationships with other people. Nobody ever finds out about what they did on their holiday". *Harm to self*: "Julie and Mark develop deep regrets about that night and keep it as a dark secret, which complicates the relationship between them. Eventually, they are unable to form successful long-term committed relationships with other people. Nobody ever finds out about what they did on their holiday". *Harm to others*: "Julie and Mark have no regrets about that night and try to keep it as a special secret between them, which makes them feel even closer to each other. Eventually, they move on and are able to form successful long-term committed relationships with other people. However, their family eventually finds out and are very hurt by what Julie and Mark have done". b) "A man belongs to a necrophilia club that has devised a way to satisfy the desire to have sex with dead people. Each member donates his or her body to the club after death so that the other members of the club can have sex with the corpse. The man has sex with a dead woman who gave her body to the club. (*No consequences and harm self:* She had no surviving family members.) The man and all other members of the club use adequate protection so there is no risk of disease being spread. After they are done, they

cremate the woman's body, following her final instructions to them". *No consequences*: "The man and his fellow club members have no regrets or mental anguish about what they are doing. They understand that it's important to keep their club a secret and they are very successful in making sure nobody in the "outside world" finds out about it. Also, they know the limits of the club, and they are never tempted to harm living people or engage in sex with corpses whose owners did not consent beforehand". *Harm to self*: "The man and his fellow club members are tormented by regret and mental anguish about what they are doing. They understand that it's important to keep their club a secret and they are very successful in making sure nobody in the "outside world" finds out about it. Also, they know the limits of the club, and they are never tempted to harm living people or engage in sex with corpses whose owners did not consent beforehand". *Harm to others*: "The man and his fellow club members have no regrets or mental anguish about what they are doing. They try to keep their club a secret, but the family of the dead woman eventually finds out and is deeply hurt. Also, some of the members of the club are tempted to break the rules and engage in sex with corpses whose owners did not consent beforehand". c) "A scientist studying recent advances in cell cloning technology takes a group of muscle cells from her arm and clones them in a vat. The cells grow into a strip of human muscle tissue about the size of a steak. When the process is finished, she is curious about the meat's taste, so she takes the strip of tissue, grills it on a barbecue, (*No consequences and harm self:* and eats it alone for dinner). She knows she is free of any communicable diseases". *No consequences*: "The scientist does not develop a taste for human flesh, and she is never tempted to harm people. Her curiosity is satisfied and she goes on with her research. She has no regrets or worries about what she has done, as it was all in the name of science". *Harm to self*: "The scientist does not develop a taste for human flesh, and she is

never tempted to harm people. Her curiosity is satisfied and she goes on with her research. However, she develops deep regrets about what she has done, and worries about whether it was worth doing in the name of science". *Harm to others*: "Gives the meat to her friends without their knowledge. The scientist never tempted to harm people. Her curiosity is satisfied and she goes on with her research. She has no regrets or worries about what she has done, as it was all in the name of science. Her friends all enjoyed the dinner, but when they find out afterwards what it was, they become quite upset and the scientist has to apologise to them".

The questionnaires were counterbalanced so that each participant received one variation (no consequences, harm to self and harm to others) of each of the three different stories. Thus, each participant had one questionnaire consisting of one story with no consequences, another different story with the harm to self variation, and a third different story with the harm to others variation. No participants received repeated scenarios or repeated variations of any of the conditions. The assignment of story to consequences was fully counterbalanced resulting in six different questionnaire conditions; each questionnaire condition was presented with the three stories in one of three different orders, resulting in 18 different versions of the questionnaire overall.

Participants were asked to read each story, and immediately afterwards to evaluate the action of the main character of the story, indicating if the action was right or wrong on a scale from 1 (completely wrong) to 9 (completely right). After this, participants were asked to indicate if the action of the main character was beneficial or harmful to himself or herself (harm self manipulation check), and to people other than the main character (harm other manipulation check); these judgments were made on bipolar scales from 1 (much more benefit than harm) to 9 (much more harm than benefit). Participants also indicated how much they would

like to punish, and how much they would like to avoid the main character of each story, on bipolar scales from 1 (not at all) to 9 (very). After this, participants were asked to indicate to what extent each story made them feel the following emotions: anger, compassion, depression, disgust, happiness, infuriation, outrageness, pity, pleasure, repulsion, sadness, satisfaction, sickness, sorrow, sympathy, grossed-out, and contempt. These measures used a scale from 1 (not at all) to 8 (very).

Results

Responses to the evaluation of the action, harm to self and harm to others manipulation checks were reversed, so higher numbers indicated that the action was evaluated more wrong and that there was more perceived harm to self and harm to others.

Manipulation Checks of Perceived Harm

Responses to the harm to others manipulation check were analyzed using a mixed model analysis of variance, with the harmfulness manipulation as a three-level within participants factor. This analysis revealed a significant main effect of Harmfulness, F (2,186) = 57.24, MSE = 121.53, $p < .001$; indicating that harm to others stories were judged as more harmful to others than no consequences or harm to self stories were. A similar analysis on perception of harm to self also revealed a significant main effect of Harmfulness, F (2, 186) = 12.71, MSE = 39.94, $p < .001$; so that the main characters of the harm to self stories were perceived as more harmed than those of the no consequences and harm to other stories (means and standard

deviations are in Table 6). These results suggest that the manipulation of harmfulness was successful.

Evaluation of the action

The evaluation of the action was analysed using analysis of variance with the same mixed-model design used for the analyses of perceived harm. Results showed a significant main effect of Harmfulness, F (2,186) = 19.14, MSE = 46.03, $p < .001$. Each level differed significantly from each other so that the harm others stories were evaluated as the most wrong, harm self as second most wrong, and no consequences as least wrong. (Means for all analyses in this section appear in Table 6). Further analysis also revealed that the evaluation was significantly higher than the midpoint of the scale in all conditions; t (93) = 8.50, $p < .001$, for the no consequences; t (93) = 12.78, $p < .001$, for the harm to self; and t (93) = 24.35, $p < .001$, for the harm to others conditions.

Table 6. Means and standard deviations of evaluation, perceived harm, emotions, and action tendencies

	No harm	Harm self	Harm others
Harm to others	6.07 (1.64)$_a$	5.99 (1.54)$_a$	8.00 (1.55)$_b$
Harm to self	5.95 (2.33)$_a$	7.24 (1.94)$_b$	6.49 (2.11)$_c$
Evaluation of the action	6.92 (2.19)$_a$	7.51 (1.90)$_b$	8.31 (1.32)$_c$
Anger	3.77 (2.08)$_a$	3.62 (1.87)$_a$	4.97 (2.06)$_b$
Disgust	5.32 (2.36)$_a$	5.08 (2.22)$_a$	5.92 (2.13)$_b$
Disgust minus Anger	1.55 (1.53)$_a$	1.46 (1.41)$_a$	.95 (1.28)$_b$
Punishment	3.55 (2.40)$_a$	3.19 (2.23)$_a$	4.96 (2.66)$_b$
Avoidance	5.76 (2.95)$_{ab}$	5.53 (2.70)$_a$	6.38 (2.72)$_b$
Avoidance minus Punishment	2.20 (2.26)$_a$	2.34 (2.34)$_a$	1.42 (2.15)$_b$

Note: Standard deviations are in parentheses; means with different subscripts are different from each other by Tukey LSD, $p < .05$.

Anger and Disgust

The three items measuring anger (angry, outraged and infuriated, Cronbach's alpha = .91), and the four items regarding disgust (disgusted, sickened, repulsed and grossed-out, Cronbach's alpha = .95) were averaged to create one index for each emotion. Correlations between these indexes were computed for each of the harmfulness conditions; results showed high correlations between anger and disgust in all three conditions; no consequences, r (92) = .77, $p < .001$; harm self, r (92) =

.78, $p < .001$; harm others r (92) = .82, $p < .001$, and were not significantly different from each other by Fisher's z - test. Despite these high correlations a principal components analysis of the items related to anger and disgust, using varimax rotation and constraining the model to two factors, revealed a factor in which the items related to anger loaded strongly, and a second one with strong loading factors for the items related to disgust. These two factors explained 86.57 % of the variance (Table 7).

Table 7. Factor loadings of words related to anger and disgust

	Factor loadings	
	Disgust	Anger
Anger	.31	.87
Infuriation	.40	.84
Outrage	.56	.71
Disgust	.81	.41
Repulsion	.87	.34
Sickness	.84	.42
Grossness	.88	.38

In order to investigate the effect of the harmfulness manipulation differently on anger and disgust, a 2 (Emotions: anger vs. disgust, within participants factor) x 3 (Harmfulness: no consequences vs. harm to self vs. harm to others, within participants factor) mixed-model analysis of variance was conducted. This analysis

revealed that the main effect of Emotions was significant, F (1, 186) = 139.52, MSE = 1.76, $p < .001$, indicating higher overall levels of disgust than anger; the main effect of Harmfulness was also significant, F (2, 186) = 13.22, MSE = 4.87, $p < .001$, indicating more negative affect of both, anger and disgust, in harm other versus the other two conditions.

Analysis also showed a significant Emotions x Harmfulness interaction, F (2, 186) = 8.10, MSE = 0.61, $p < .001$, further analyses revealed that the harm to others stories elicited significantly more anger and more disgust, but the effect was stronger on anger, F (2, 279) = 12.74, MSE = 4.05, $p < .001$, than on disgust F (2, 279) = 3.49, MSE = 5.05, $p < .05$, (Table 6). In order to investigate the overall effect of the manipulation of harm on both emotions simultaneously, the difference between the scores of disgust and anger was calculated and analysed using analysis of variance with a single factor (Harmfulness), with 3 between participants levels (no consequences vs. harm to self vs. harm to others). Results showed a significant main effect of Harmfulness F (2, 279) = 4.96, MSE = 1.99, $p < .01$, suggesting that the manipulation of harm to others had a stronger effect on anger relative to disgust, since the difference between the emotions was reduced significantly more in the harm to others condition than in the no consequences and harm to self stories.

Action tendencies

The items related to punishment and avoidance were correlated at r (280) = .64, $p < .001$. To investigate the effect of the harmfulness manipulation, a similar analysis to the one used for the analyses of the emotions was used, substituting the Emotions factor for a 2 (Action: punishment vs. avoidance) within-participants factor. Results showed that the main effect of Action was significant, F (1, 186) =

152.26, MSE = 558.01, $p < .001$, indicating higher overall levels of avoidance than punishment; Harmfulness also had a significant main effect, F (2, 186) = 9.20, MSE = 88.67, $p < .001$, indicating more general willingness to take any of the two action tendencies in the harm to others than in the harm self and no consequences stories. The interaction of Action x Harmfulness was also significant, F (2, 186) = 5.73, MSE = 11.43, $p < .01$. Again, separate analyses for each of the action tendencies showed a significant difference between the harm to others and the other stories for punishment, indicating a higher willingness to punish in the harm to others stories than in the other two. Similarly, analysis also revealed higher levels of avoidance in the harm others stories, but this difference was significant only compared to the harm self stories as the no consequences stories were not significantly different from the other two (Table 6).

In order to investigate the effect of the manipulation in both action tendencies simultaneously, the reported punishment was subtracted from the reported avoidance to create one single index. Analysis of such index revealed a significant main effect of Harmfulness, F (2, 279) = 4.48, MSE = 5.10, $p < .05$, showing that the harm to others manipulation had a stronger effect on punishment relative to avoidance, so that the difference between the willingness to punish and the willingness to avoid was reduced significantly in the harm others stories compared to the harm self and no consequences ones. This result indicated that punishment was affected more relative to disgust by the Harmfulness manipulation.

Relationship between emotions and action tendencies

A strong relationship between anger and punishment, and disgust and avoidance was hypothesised. To test this prediction, anger and disgust were used as

predictors of each action tendency in regression analyses. In order to remove the shared variance between the three stories and both action tendencies a multilevel data analysis was performed (Kenny, Kashy & Bolger, 1998). The mean level of the action tendency analysed was included as a predictor in the first step of the model; followed by the action tendency that was not analysed in a second step, and both emotions in the third step. Results showed that anger was a significant predictor of punishment ($\beta = .39, p < .001$), but disgust was not ($\beta = -.12, p < .05$); for avoidance, disgust was a significant predictor ($\beta = .31, p < .001$), while anger was not ($\beta = .07, p = .30$).

Levels of harm to others and their relationship with anger and disgust

The harm to others item was analysed in the conditions where there was no harm to others. For the no consequences condition, the mean of harm to others was significantly higher than the midpoint of the scale, using a one-sample *t* test, $t\ (93) = 6.32, p < .001$. Likewise, in the harm to self condition, the mean of harm to others was significantly higher than the midpoint of the scale, $t\ (93) = 6.20, p < .001$. For the perceived harm to self item, similar analyses were performed using the no consequences and harm to others conditions. Results revealed that the mean of harm to self in both conditions was significantly higher than the midpoint of the scale, $t\ (93) = 3.93, p < .001$, for the no consequences condition; and $t\ (93) = 6.81, p < .001$, for the harm others condition.

In order to test for the prediction that anger would be associated more strongly with the perceived harm than disgust; the indexes of both emotions were used as simultaneous predictors of perceived harm to others within each level of the harmfulness manipulation factor. Among the no consequences stories, anger

predicted perceived harm to others significantly, $\beta = .36$, $p < .05$, but disgust did not, $\beta = .04$, $p = .78$; the model had an $R^2 = .16$, $F(2, 91) = 8.45$, $p < .001$. Likewise, among the harm self stories, anger predicted perceived harm to others, $\beta = .38$, $p < .05$, but the effect of disgust was not significant and in a negative direction, $\beta = -.12$, $p = .44$; the model had an $R^2 = .08$, $F(2, 91) = 4.15$, $p < .05$. In the case of the harm others stories neither anger, $\beta = .21$, $p = .22$, nor disgust, $\beta = .08$, $p = .65$ significantly predicted the perceived harm to others, $F(2, 91) = 3.94$, $p < .05$. The perceived harm to others in the harm others stories ($M = 8.00$, $SD = 1.55$) was too high to allow differentiation of any of the effects of anger and disgust.

Discussion

In this experiment, the target of harm was manipulated in order to investigate the differences in the evaluation, emotions and action tendencies when the consequences of a moral violation affected the person performing the action or someone else. In the previous experiments, there was either no mention of the target of harm or a mixture of targets related to the self or other people apart of the perpetrator of the action. The differences found in the results of the measures of harm to others and harm to the self support the notion that the evaluation of the actions is not based on the mere presence of undifferentiated harm of the action. In addition, the differences in both measures of harm combined with the results of the evaluation of the action suggest differences in the perception of the action in the three conditions, with harm to others being evaluated worst.

Although negative evaluations were expected based on the negativity of the actions in all conditions, it was also expected that when the target of harm is someone else other than the person performing the action, the evaluation would be

worse than in the other conditions. The results of this experiment confirm this prediction. The inclusion of different measures for harm to the self and harm to others instead of the single item measuring general harm and benefit in Experiment 1 allowed a clear distinction between the differences in the specific harm related to the target of it. The results regarding the perceived harm to others and to the self showed that the manipulation was successful for both targets of harm.

Emotions and action tendencies

This manipulation of the target of harm proved useful to elicit and differentiate the emotions of anger and disgust. Results from Experiment 2 did not allow a clear distinction between these emotions due to the mixture of scenarios, with different negative consequences for more people apart from the perpetrators of the actions. In this experiment, the manipulation of the target of harm had different effects on anger and disgust, so that despite the higher levels of disgust than anger in the three conditions, anger was affected more than disgust by the manipulation of the target of harm. Results also showed not only higher levels of both emotions in the harm to others condition, but also significantly less difference between them.

Although in all conditions there was a higher level of disgust than anger, this difference was reduced in the harm to others conditions indicating that anger, relatively to disgust, was affected more by the manipulation of harm. Despite these differences, in all the three conditions the correlation between the emotions was very high and significant. Previous research suggests some degree of differentiation between anger and disgust, that can be seen in the different facial expressions associated to each emotion (Ekman & Friesen, 1971; Rozin et al., 1999), different elicitors (Lazarus, 1991),and action tendencies (Frijda et al., 1989). Results of this

experiment indicate differences regarding the elicitors of anger and disgust, as well as differences in the action tendencies.

Based on the predictions of cognitive appraisal theories, a strong correlation between the tendencies of punishing and avoidance was not expected (Frijda, 1986; Frijda et al., 1989; Lazarus, 1991). Most research suggests some degree of independence in the action tendencies of punishment and avoidance since they appear to be opposite outcomes, the first one related to approaching and engaging in action with the stimuli, and the second one related to escape and withdrawal from it. However, in all conditions the correlation of action tendencies was not only significant, but also high. Despite these correlations, the action tendencies were predicted by anger and disgust differently and in the direction suggested by the above appraisal models, once the shared variance between the tendencies was controlled.

The tendency to punish was predicted only by anger and the tendency to avoid was predicted only by disgust. Results also showed that the manipulation of the target of harm had similar effects on the action tendencies as those reported for anger and disgust. In the three conditions there was a higher tendency to avoid than to punish, but similarly to the relationship between anger and disgust, the difference between the action tendencies was reduced in the harm to others condition, also suggesting that the manipulation had a stronger effect on punishment than on avoidance. These findings further support the notion that the processes of evaluating an action, the emotional responses and the expressed action tendencies are not the result of the mere negativity of the action. These results are similar to the predictions of cognitive appraisal models in the sense that the manipulation of harm affects anger more than disgust. Likewise, the action tendencies are related to the specific emotions predicted by those models, and the emotions and action tendencies are stronger in the conditions where harm to others was described.

Despite the expected differences between anger and disgust, the correlations between words related to each emotion are high and significant in the three conditions. Appraisal theories (Lazarus, 1991; Ortony et al., 1988; Roseman, Spindel, & Jose, 1990; Scherer, 1999), would predict different outcomes in the three conditions. Although high levels of anger and disgust could be expected in the condition where harm to others was described, it was expected that only disgust would be elicited in the conditions in which no negative consequences for others were described. However, results showed that these predictions were only partially supported, as there were high levels of anger and punishment present, even in conditions in which appraisal theories would not predict such presence.

Presumption of harm

Although the results of this experiment support some of the predictions of appraisal models, they are not clear in the case of the conditions in which no harm was described. It was expected that in these conditions there would be a high degree of disgust and avoidance based on the disgustingness of the action, but anger and punishment were not expected to be high since no harm was described. Some versions of appraisal models (Lazarus, 1991), even predict that in cases where the stimulus is not important for the well-being of the person, the process of appraisal is interrupted. Contrary to these predictions, results showed that the levels of anger and punishment were higher than those in the harm to the self conditions, although not significantly. In addition, the evaluation of the action and the perceived harm to others and to the self in the no consequences conditions were significantly higher than the midpoint of the scale, suggesting that the disgusting actions described in the no consequences conditions were evaluated equally wrong as the ones described in

the harm to the self conditions, and elicited anger and disgust to similar levels. Analysis of the relationship between the different emotions and perceived harm suggested that anger is the only emotion related to harm, despite the fact that anger and disgust are significantly correlated and that the reported levels of disgust are higher than those of anger. Although several theoretical approaches predict this relationship, cognitive appraisal theories include intentional harm in the form of blameworthiness of the agent (Ortony et al., 1988), or the accountability and blame of an undesired event to someone else as one of the necessary components to elicit anger (Lazarus, 1991). The findings of this experiment revealed that anger was present even in conditions where no negative consequences were described.

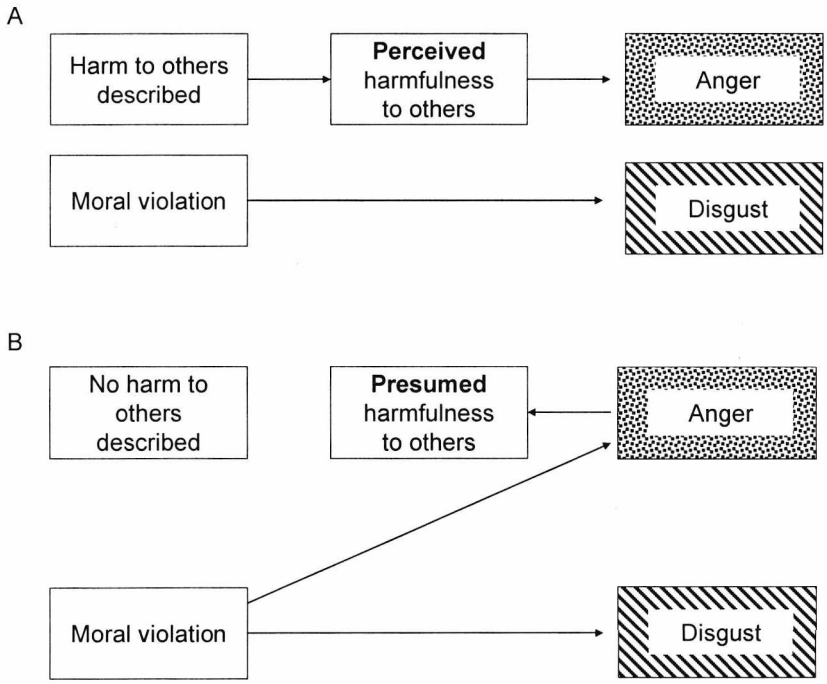
Despite confirming some predictions of appraisal theories, these theories do not predict anger as the product of actions that harm no one or that harm the agent producing the action, if the person is acting willingly. In the two conditions in which no harm was described, the perception of harm to others was significantly higher than the midpoint of the scale. Although appraisal models involve harm as an important predictor of anger and the results support this relationship, the harm to others product of actions that do not harm someone else was presumed, and cognitive appraisal models cannot explain presumed harm instead of perceived harm clearly, since harm has to be perceived in order to elicit anger.

One possible explanation for this finding is that participants inferred a high degree of harm to others even in conditions where no harm to others was described. Unlike *perceived* harm, that is, negative consequences clearly described to the participants, *presumed* harm is related to the participant's suppositions and assumptions that a moral violation has negative consequences. An important difference between perceived and presumed harm has already described by Haidt in the moral dumbfounding effect (e.g., Haidt & Hersh, 2001), the effort of many

participants to include harmful consequences in the scenarios presented to them, even when such consequences contradict details in the scenarios. In the case of perceived harm, participants do not engage is such effort since negative consequences are already available, while presumed harm is based on the participant's supposition that a disgusting moral violation will result in harmful consequences.

Results of this experiment suggest that an action that violates a moral norm could produce a presumption of harm to others, even when no such harm to others is described. There were some levels of anger along with the presumption of harm to others, based on the relationship between harm and anger. The presence of presumed harm to others could explain the high levels of such harm reported by participants, since such harm cannot be predicted based on appraisal theories. In cases in which a moral violation is described but where no harm is present, a negative reaction such as anger product of the moral violation can be justified presuming harm (Figure 2). The moral dumbfounding effect found by Haidt (e.g., Haidt & Hersh, 2001) provides empirical evidence that participants do not accept a moral violation without looking for explanation to justify a negative intuitive reaction.

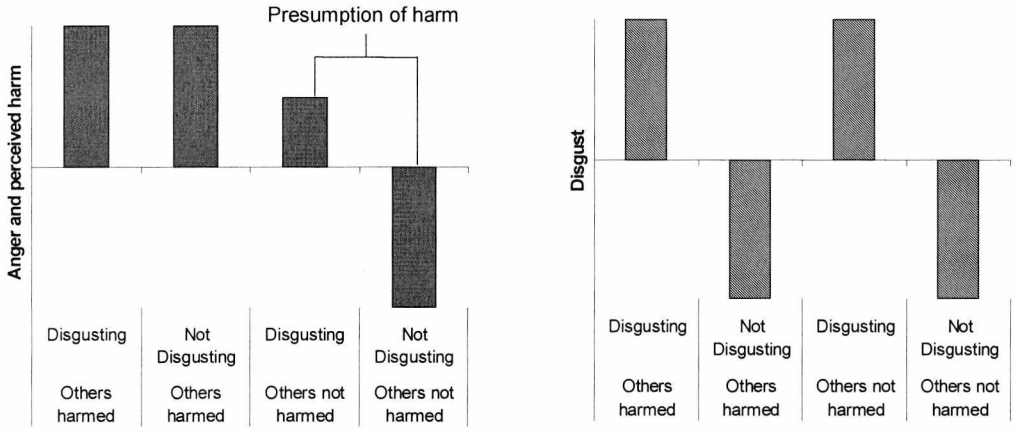
Figure 2. Theoretical model predicting (A) independent contribution of harm to others and a disgusting moral violation to anger and disgust reactions, (B) presumption of harm from a disgusting action when no harm to others is described



This presumption of harm can also be predicted by the social intuitionist model (Haidt, 2001); in line with this model, the harm reported by participants is a way to justify the negative evaluation and the negative affect produced by the action. Empirical evidence can be found in the work of Haidt and Hersh (2001), who showed that some of their participants reacted to descriptions of unconventional sexual practices with a presumption of harm. Moreover, these results showed that moral judgment was not predicted by harm-based reasons independently of affective reactions. They concluded that arguments about harm were a post-hoc attempt to justify initial emotion-based negative moral judgments. Results of Experiment 3 also indicate that participants perceived some degree of harm to others in all the three conditions, even in those where no harm to others was described. Because it is

plausible to think that most instances of cannibalism or necrophilia—even if they are described as free of harm to others—would be perceived harmful and would elicit anger, this model would predict a fast, intuitive, and negative reaction as a result of the disgusting action, that can be rationally justified making a presumption of harm to others. This presumption of harm is closely associated to anger and the tendency to punish the action, but it would occur only when the action violated a moral norm but harm others (Figure 3).

Figure 3. Graphical representation of predictions for anger and perceived harm, and for disgust



Limitations of the experiment

Although the results of this experiment indicate that anger and the associated action tendency of punishment were more affected by the manipulation, all the stories in this experiment included some element of disgust. Even though the three stories form part of the core classification of disgust (Rozin et al., 2000), the elicitor of the disgusting experience may be different within the core-disgust domain of the emotion. The results also indicate that the levels of disgust – and the action tendency

of avoidance associated to it –, were higher than the levels of anger. Another possible limitation is the use of several stories as a within-participants factor.

CHAPTER 5

INDEPENDENT MANIPULATIONS OF HARM AND DISGUST

This chapter includes one study that manipulated independently the described harm to others and the disgustingness of the action, so that their independent effects on the evaluation harm and emotions could be investigated. The experiments in the previous chapters included a mixture of different stories, which proved useful to investigate the conditions that affect the evaluation of the actions and the emotions associated with them. However, because of the mixed nature of the stories, it was not possible to make direct comparisons with a control condition. This experiment builds on the findings of Experiments 2 and 3, regarding the use of cognitive load and a manipulation of the target of harm. Although the results of Experiment 2 showed that cognitive load affects the emotions of anger and disgust in a similar way, it was also found that the independent effect of each emotion on the evaluation of the action is different under cognitive constraint. Based on the results of Experiment 3, a manipulation of harm to others was included in this experiment, so that its effects on the evaluations and the elicitation of emotions could be investigated.

Another addition was the use of pictures of facial expressions representing anger and disgust. It was expected that the inclusion of facial expressions would differentiate these emotions more clearly and allow the investigation of the relationship between words and faces that express the emotions of anger and disgust. Based on the predictions of cognitive appraisal theories (Lazarus, 1991; Ortony et al., 1988; Roseman & Smith, 2001; Scherer, 1999), it was expected that the manipulation of harm would affect anger and that the manipulation of disgust would affect the

emotion of disgust. However, results of Experiment 3 showed that moral violations could lead to a presumption of harm that is not predicted by such theoretical models. It was expected that the separate manipulations would allow a clearer investigation of the effects of the presence of elements of harm and disgust on the dependent variables. At the same time, the intention of this experiment was to examine whether there are differences in the primacy of the emotions involved regarding their automaticity.

Introduction

Results from Experiment 3 indicate that anger was more influenced by the manipulation of the target of harm than was disgust. At the same time, participants reported some degree of harm to others even when there was no such harm described, probably because of the description of violations of moral norms associated with the domain of core or animal-nature disgust (Rozin et al., 1999; Rozin et al., 2000). This presumption of harm was associated uniquely with anger and the action tendency of punishment. However, because all the stories in the previous experiment contained elements related to the domain of core disgust, results did not allow investigating the independent effect of the disgustingness of the action on the evaluations and the emotions.

Relationship between anger and disgust

Some research has focused its attention on the relationship between two or more emotions. According to cognitive appraisal theories (Roseman & Smith, 2001;

Schorr, 2001), emotions are elicited by evaluations of actions and situations, so that different sets of appraisals should elicit distinct emotional reactions.

Based on the predictions of these theories, it was expected that only anger would be affected by the manipulation of the target of harm in Experiment 3. However, results indicate that the presence of elements that potentially could elicit disgust also elicited some degree of a presumption of harm—and the emotion of anger associated with it— in conditions in which no harm to others was described. In addition, results of Experiment 2 reveal that anger and disgust respond similarly to the manipulation of cognitive load. Although it was predicted that disgust would not be affected by cognitive load, but that anger would be reduced under cognitive constraint, the simultaneous presence of elicitors of anger and disgust in the scenarios could explain the similar effects of cognitive constrain on the expressions of these emotions.

Most theories of emotions suggest that there are differences between emotions, although they are related to each other to different degrees, and that these emotions have specific functions (for a review, see Russell & Feldman Barrett, 1999). Anger and disgust are usually considered to be basic emotions, nevertheless, research sometimes considers disgust as a 'less prototypical form of anger' (Shaver, Schwartz, Kirson, & O'Connor, 1987), sometimes it is thought to be on the same level as anger and hostility (Alvarado, 1998), or it is kept as a basic emotion (Johnson-Laird & Oatley, 1989). All these similarities and differences suggest that anger and disgust share several features, which complicate their distinction.

One possibility for the presence of anger based on an action that contains disgusting properties is the use of words related to disgust in order to express anger. Nabi (2002) raised the concern that the theoretical meaning of the word disgust does

not resemble the way lay people use words related to these emotions, in that lay people often use words related to disgust to express anger.

Another possibility is that the elicitation of one emotion may elicit other emotions. The cognitive neoasociationistic model explains the relationship between anger and other emotions based on the premise that anger can be elicited by various negative stimuli, including other emotions.

Facial expressions of anger and disgust

The high correlation between anger and disgust expressed only in words in the previous experiments may be the result of the use of terminology related to disgust to express anger. Other research has shown that the elicitation of each emotion activates distinct response patterns that are different for each basic emotion. Facial expressions are part of the behavioural responses associated to emotions; among these varying reactions of an emotional episode, facial expressions have been useful to distinguish between different emotions and to test the universality of basic emotions (Darwin, 1872; Ekman & Friesen, 1971). Since Darwin (1872), it has been proposed that one of the most important functions of facial expressions is to signal a particular state—like been angry or happy—and even an action tendency in order to enable communication with other organisms (Tomkins, 1962, 1963). Such communication is important to maintain interactions between individuals and to indicate the subsequent interaction processes.

Because one of the main features of emotions is to increase the adaptation of the individual to the environment (Damasio, 1994; Scherer, 1996), differences related to the functions of the facial expression can be expected. Previous research has shown that the facial expression of anger is mostly related to communicating

aggression and a readiness to attack, and that it is the result of the preparation of the body for vigorous activity; anger expressions can also show dominance within the group. This signal of imminent confrontation may have served humans to scare other individuals and to avoid direct aggression and the danger related to a direct physical confrontation. Although the expression of anger in humans has several manifestations, the one that includes a fierce glance and contracted eyebrows, with or without the exposure of teeth is recognised as the most characteristic (Frijda, 1986). The expression of disgust is focused on the mouth and the nose and it is associated to the rejection of tastes. This movement reduces sensory contact with substances in the mouth and facilitates their expulsion (Frijda, 1986). In addition, the nose is wrinkled in order to avoid the incorporation of smells. The facial expression of emotion requires the use of several muscles in the neck and face arranged in complex patterns.

In order to analyse the groups of muscles involved in the expression of different emotions, Ekman and Friesen created the Facial Action Coding System (FACS) method (Ekman & Friesen, 1978). This method analyses the anatomical movement of the muscles in the face in terms of Action Units (AU), which indicate that the muscle has been contracted to produce the expression, so that distinguishable individual muscles can be analysed. The FACS method allows the identification of the muscles used during the expressions of different emotions. This methodology has proved useful in comparing the facial expressions associated to emotions across cultures (Rozin et al., 1999), as well as in preliterate cultures that were still not affected by mass media communications (Ekman & Friesen, 1971), in blind people, and infants that have not yet learnt these responses (Charlesworth & Kreutzer, 1973). For a review see Keltner, Ekman, Gonzaga, & Beer, 2003).

Symbolic harm

Results regarding the presumption of harm found in Experiment 3 are not clear about the nature of the harm. Although the actions described as disgusting elicited presumption of harm to others, the results did not allow investigating if the referred harm was based on perceived actual harm, or if it was based on the violation of a symbolic entity regarding social rules. This distinction is important since previous research has indicated that moral violations of different domains are strongly associated with distinct specific emotions (Rozin et al., 1999). In this way the presence of disgust is strongly associated with a violation of the realm of divinity; however, in Experiment 3 anger was found and it was highly correlated with harm although high levels of disgust were present.

According to the CAD triad hypothesis, there is a strong relationship between harm to the code of autonomy and the emotion of anger. Building on this relationship it is plausible to suggest that the presumption of harm is also associated to violations of the code of autonomy, since results showed that it is uniquely related to anger. One limitation of the work of Rozin and colleagues is that participants were presented with a forced choice between the emotions of contempt, anger and disgust. So it was not possible to asses to what extent violations of autonomy elicited disgust or violations of divinity elicited anger. A systematic variation of the same story manipulating the presence of elements related to disgust and anger could explore these relationships more accurately. In order to investigate the possible differences between actual and symbolic harm, a measure related to the violations of rights of other people was included in the experiment.

Experiment 4

Experiment 4 was focused on the investigation of conditions that affect the evaluation of an action, as well as the relationship between the emotions of anger and disgust and violations of moral norms. Although there was a condition in which no harm to others was described in Experiment 3, all conditions described violation of a moral norm associated with the domain of core or animal - nature disgust (Rozin et al., 1993, 1999; Rozin et al., 2000), so there were elements that elicited disgust as a product of the action in all stories. Experiment 4 used only one of the stories from Experiment 3; this story was manipulated to create 4 different conditions, based on the manipulation of the factors of harmfulness to others and the disgustingness of an action. Therefore this specific manipulation allowed the inclusion of a control condition that had no presence of harm to others and a disgusting action, as well as a condition in which harm to others and an element of disgust were present in order to investigate the combined effects of both factors.

The results of the previous experiment suggest that anger is more affected by the manipulation of harm than disgust. So, this experiment looked to replicate that finding, as well as to investigate whether a manipulation of the disgustingness of the action would have a stronger effect on the emotion of disgust that on the emotion of anger. It was also hypothesised that the manipulation of harm to others would affect anger more than disgust. Similarly, it was expected that the manipulation of disgustingness would have a stronger effect on disgust than on anger.

Another modification was the inclusion of faces expressing the emotions of anger and disgust. The inclusion of faces allows investigation of a concern raised by Nabi (2002), who highlighted the differences between the use of the term disgust by the academic community and the lay public. This research points out that for the lay

public, the use of the term disgust refers to repulsion as frequently as it refers to anger, suggesting that the word disgust often refers to a combination of disgust and anger. Nabi's research also suggests that the use of the word "grossed-out" is associated more strongly to the theoretical meaning of disgust than the words "disgust" or "disgusted". These latter 2 words seem to be associated to the theoretical meanings of both, anger and disgust, to a similar extent. It was expected in this experiment that the face representing disgust would be associated to words related to disgust but not to words related to anger when the action was described as disgusting but not harming other people apart from the perpetrator of the action. Likewise, it was expected that the face representing anger would be associated only to words related to anger, but not to words related to disgust, when the action was described without any disgusting element but harming other people. Results from Experiments 1 and 3 suggest that the perceived harm product of the action has important effects on the evaluation of an action. An additional item measuring symbolic harm in the form of violations of rights of other people was included in this experiment, so that the presumption of harm found in Experiment 3 could be investigated using two different, but related, types of harm.

Further, this experiment also included a manipulation of cognitive load. In Experiment 2, the cognitive constraint increased levels of anger and disgust in a similar manner. Although the levels of both emotions were higher under cognitive load, it is possible that the reported levels of emotions were affected by the mixed nature of the stories, since the measures of anger and disgust in Experiment 2 were combinations of the reported levels of each emotion across stories. These stories included elements of both harm and disgust, making it difficult to differentiate between them. The independent manipulation of both factors, the harm to others and the disgustingness of the action, allowed to a clearer investigation of the relationship

between the amount of cognitive resources available and the reported levels of anger and disgust. It was expected that disgust would be a more accessible emotion than anger. Thus, disgust would be affected less by the cognitive load manipulation relative to anger.

The cognitive load manipulation can also clarify the post-hoc nature of moral reasoning proposed by the social intuitionist model (Haidt, 2001). It is plausible to assume that the use of presumption of harm is an effortful process that requires cognitive resources. If the presumption of harm is used as a means to justify a negative reaction when no harm to others is described, it should be impaired under cognitive constraint, and the form of harm more easy to justify should be employed to validate the negative evaluation. It is proposed that when no harm to others is described, participants should employ symbolic harm in the form of violations of rights to justify their negative reactions, and that this form of harm should be reduced with limited cognitive resources. When harm to others is described, actual harm is the more accessible way to justify a negative reaction and it should not be affected by cognitive constraint.

It was expected that these four improvements (the inclusion of facial expressions representing anger and disgust, the separate manipulations of harm and disgust, the separation between actual and symbolic harm, and the inclusion of the cognitive load manipulation), would clarify the relationship between anger and harm and the different levels of automaticity of anger and disgust and how they influence the evaluation of the action.

Method

Participants

One-hundred and ninety-four undergraduate psychology students from the University of Kent participated on voluntary basis and received one partial course credit in return; of these 165 were females and 29 were males.

Design

This experiment had a 2 (Harm: harmless to others vs. harmful to others) x 2 (Action: disgusting action vs. non-disgusting action) x 2 (Cognitive Load: load vs. no load) between participants design.

Materials

The questionnaire presented a fictitious story that was manipulated to create four different variations based on two criteria: Whether someone else apart from the main character was harmed or not, and whether the action performed by the main character was disgusting or not. These stories were based on the no consequences and the harm to others versions of the scientist story used in Experiment 3. The stories used were: *Disgusting action:* "A scientist studying recent advances in cell cloning technology takes a group of muscle cells from her arm and clones them in a vat. The cells grow into a strip of human muscle tissue about the size of a steak. When the process is finished, she is curious about the meat's taste, so she takes the strip of tissue, grills it, (*Harm others*: and serves it to her friends for dinner without their knowledge. She has no worries, as she knows the steak is free of any

communicable diseases. *No harm to others:* and eats it alone for dinner. She knows she is free of any communicable diseases). The scientist did not do that again. Her curiosity is satisfied and she goes on with her research". For the *non disgusting action* the scenarios used were: "A scientist studying recent advances in human memory is investigating a new drug that may increase the capabilities of human memory. When she finally completes the process, she is curious about the effects of the drug, so she mixes the drug with water (*Harm to others:* and gives it to her friends at a dinner without their knowledge, in order to test it on them. *No harm to others:* and drinks it with her dinner, in order to test it on herself). She has no reason to believe that the drug has negative effects on humans. The scientist does not test the drug again and she was careful with the use of the drug. Her curiosity is satisfied and she goes on with her research".

All responses were given on bipolar semantic differential scales. The order in which the questions were presented was partially counterbalanced in three different forms, so that evaluation of the action, perceived harm and the emotions each came first for approximately a third of the sample, with the other questions following in a cyclical order (e.g., emotions first, then evaluation of the action and perceived harm). Action tendencies and cognitive load manipulation checks always were presented at the end of the questionnaire.

Evaluation of the action. The questionnaire contained four evaluation items from 1 (completely right / good / correct / positive) to 9 (Completely wrong / bad / incorrect / negative).

Perceived harm. Two questions regarding the perceived level of harm were included: "Do you think the action of the scientist was harmful or beneficial for any other people apart from her" from 1 (completely harmful) to 9 (completely

beneficial); and "Do you think the action of the scientist violated the rights of any other people apart from her", the scale was from 1 (not at all) to 9 (extremely).

Emotion items. In the word measures, participants were asked to indicated to what extent each story made them feel anger, compassion, depression, disgust, happiness, infuriation, outraged, pity, pleasure, repulsion, sadness, satisfaction, sickness, sorrow, sympathy, grossed-out and contempt. These measures were answered on scales from 1 (not at all) to 8 (very). In the facial measures, two photographs of female faces were shown, one showing disgust in the full form and the other showing anger in the open mouth form. Participants were instructed to "select the face that best describes your feelings towards the scientist now". The photos were 70 mm x 55 mm in black and white and were taken from Rozin et.al. (1999). Participants were then asked to indicate separately how much of each of the feelings represented by each face (anger or disgust) they had towards the scientist from 1 (not at all) to 9 (extremely) This photos are shown in Appendix 1.

Action tendencies. Participants then were asked to indicate two action tendencies: punishment and avoidance, each one measured using two items. For punishment the items were "How much would you like to punish the scientist?" and "How much would you like to publicly condemn the scientist?"; for avoidance, they were "How much would you like to avoid the scientist?" and "How much would you like to move away from the scientist?". These questions were indicated on a scale from 1 (not at all) to 9 (extremely).

Load manipulation checks. At the end of the questionnaire, participants were requested to write down the number they were asked to memorise, and to answer four items that measured if being asked to remember the number was irritating, annoying, difficult and distracting from 1 (not at all) to 9 (extremely).

Procedure

Participants were tested in groups of between 10 and 25. Each group was randomly assigned to one of two Cognitive load conditions. The experiment was introduced as an experiment to measure how well people could judge the actions of someone while they had to remember a number. At the beginning of the session, the experimenter gave instructions and distributed the questionnaires instructing participants not to start until the number was given and not to write the number down to remember it. The experimenter presented a large sheet of paper showing a number to the participants for 90 seconds, and asked them to remember it for the duration of the whole experiment and instructed not to write it except in the space provided for it in the questionnaire. A seven digit number with no digits repeated was presented in the cognitive load condition, while the number 1 was presented in the no load condition. After they read the scenario, they were presented with the response measures. Finally, participants were thanked and debriefed.

Results

Of the 194 participants, 12 (6.2 %) reported the load number incorrectly. These participants were excluded from the analyses, leaving a total of 182.

Manipulation check of the Cognitive load conditions

The two items related to the difficulty of the task (measuring whether the task was difficult and distracting) were correlated at r (180) = .77, $p < .001$, and therefore averaged to create a single score. A 2 (Harm) x 2 (Action) x 2 (Cognitive load) between participants analysis of variance revealed a significant main effect of

Cognitive load, F (1, 174) = 144.50, MSE = 3.15, $p < .001$, with no other significant effects, showing that the load manipulation increased the subjective difficulty of the task. The items related to how irritating the task was ("irritating" and "annoying"), were correlated at r (180) = .88, $p < .001$, and were also averaged and subjected to the same analysis. Only Cognitive load affected this score significantly, F (1, 174) = 54.30, MSE = 3.92, $p < .001$, so that participants under load reported the number task to be more irritating (M = 3.99, SD = 2.39) than participants under no load (M = 1.82, SD = 1.46). However, the irritation caused by the cognitive load task was not significantly related to anger, r (180) = -.08, p = .32, to disgust, r (180) = .00, p = .97, or to any of the other dependent variables studied.

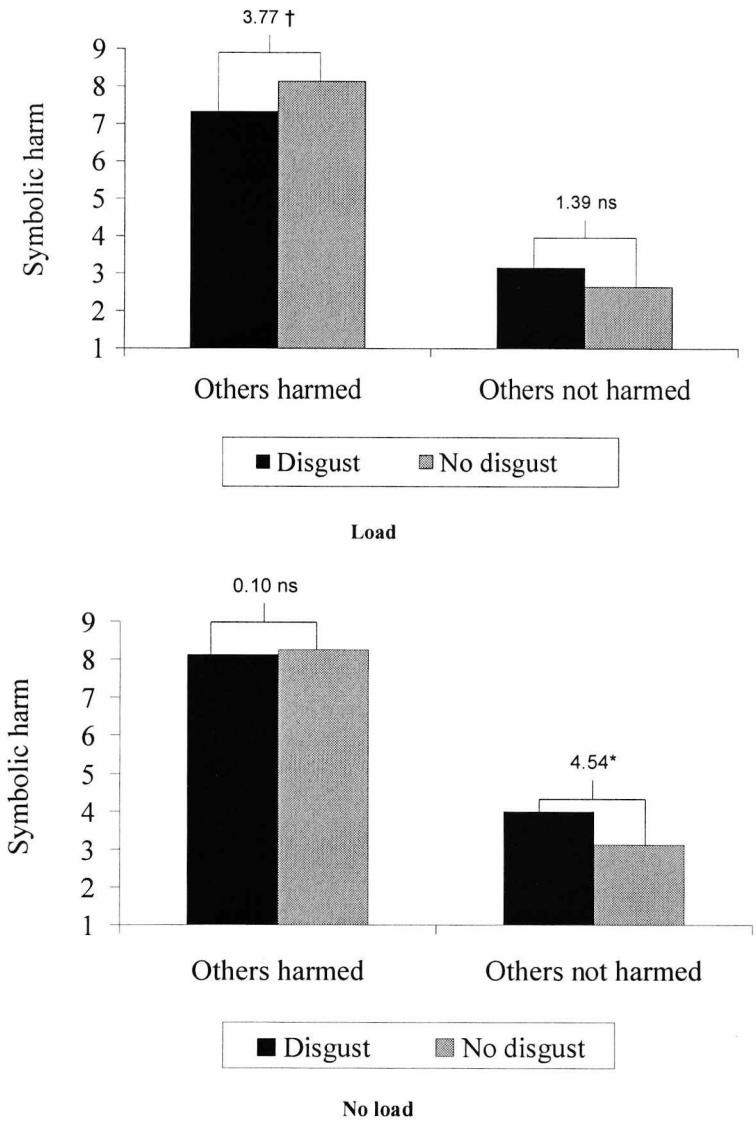
Manipulation Check of perceived harm

Harmfulness to others. The item related to the perceived level of harm to others was reversed so higher numbers indicated higher perceived harm to others. This item and the one regarding the perceived violations of rights were correlated at r (180) = .51, $p < .001$, (Cronbach's alpha = .62). Because the correlation coefficient between these items suggested that they were somewhat distinct, an additional 2 (Item: harm item vs. rights item) within-participants factor was added to the basic design. A mixed model analysis of variance using a 2 (Item) x 2 (Harm) x 2 (Action) x 2 (Cognitive Load) showed a significant main effect of Harm F (1, 174) = 198.52, MSE = 4.29, $p < .001$, so that there was higher overall perceived harm in the harmful to others condition than in the harmless to others condition. The main effects of Item and Action were non-significant, F (1, 174) = .18, MSE = 1.98, p = .67, and F (1, 174) = .01, MSE = 4.28, p = .98, respectively. The main effect of Cognitive load was significant, F (1, 174) = 4.10, MSE = 4.28, $p < .05$, indicating that there was a higher

perception of overall harm in the no load condition than in the load condition. A significant Harm x Item interaction was present, F (1, 174) = 128.40, MSE = 1.98, p < .001, which in turn was qualified by a significant Harm x Action x Item interaction, F (1, 174) = 4.04, MSE = 1.98, p < .05; further analyses revealed that for the rights item there was a higher perceived harm to others in the harmless to others condition as a result of the disgusting action. This was not the case for the actual harm item. The remaining interactions were not significant and Cognitive load did not show a significant interaction with any of these effects (Table 8).

It was predicted that the manipulation of cognitive load would have an effect on the symbolic presumption of harm, reducing it when no harm to others was described but the action elicited disgust. Although the interaction between Cognitive load, Harm, Action and Item was not significant, F (1, 174) = 0.68, MSE = 1.98, p = .41, simple effects analysis provided evidence that symbolic harm was affected by the manipulation of disgust without cognitive load and when no harm to others was described, whereas this effect was not significant under cognitive load (Figure 4).

Figure 4. Effect of manipulations of Harm, Disgust and Cognitive load on symbolic harm



Evaluation of the action

The four evaluation items formed a reliable scale (Cronbach's alpha = .90) and so were combined to create one single score. Analysis of variance showed significant main effects of Harmfulness, F (1, 174) = 27.50, MSE = 2.19, $p < .001$, indicating more negative evaluation in the harmful condition than in the harmless one; and of Action, F (1, 174) = 8.70, MSE = 2.19, $p < .01$, showing more negative

evaluation for the disgusting action than the non-disgusting one; a marginally significant interaction between these two factors was also present, F (1, 174) = 3.76, MSE = 2.19, p = .054. Simple effects analysis (Table 8), showed that only in the harmless condition, the type of action affected the evaluation, showing a more negative evaluation of the harmless but disgusting action. Cognitive load did not moderate any effects.

Emotions

Word measures. Terms for anger (Cronbach's alpha = .89) and disgust (Cronbach's alpha = .95) once again formed reliable indices that were correlated with each other at r (180) = .67, $p < .001$. In separate correlation analyses for each level of the Harm x Action interaction, anger and disgust were correlated significantly more in the harmful, but non-disgusting story, r (45) = .86, $p < .001$, than in either of the harmless and disgusting, r (41) = .65 $p < .001$, (difference of z = 2.31, $p < .05$) and harmless and non-disgusting, r (44) = .68, $p < .001$, (difference of z = 2.09, $p < .05$) stories. The correlation between anger and disgust for the harmful and disgusting condition, r (45) = .75, $p < .001$, was not significantly different from any other conditions.

In order to analyse the effect of the manipulations on the emotions reported by participants an additional 2 (Emotion: anger vs. disgust) within participants factor was included in the design. A significant main effect of Emotion was revealed, F (1, 174) = 102.22, MSE = .62, $p < .001$; showing an overall higher perception of disgust (M = 4.17, SD = 2.17) than anger (M = 3.37, SD = 1.64); also there was a significant main effect of Action, F (1, 174) = 64.26, MSE = 4.08, $p < .001$, indicating higher overall anger and disgust for the disgusting action (M = 4.62), than the non-

disgusting action (M = 2.92). A significant main effect of Harm was also revealed F (1, 174) = 15.86, MSE = 4.08, $p < .001$, showing more anger and disgust in the harmful condition (M = 4.20) than in the harmless one (M = 3.35). Results also revealed a marginal main effect of Cognitive load, F (1, 174) = 3.43, MSE = 4.08, p = .07, such that higher overall anger and disgust occurred in the no load condition, (M = 3.97), than under load (M = 3.58). A significant Emotion x Harm interaction, F (1, 174) = 19.29, MSE = 0.62, $p < .001$, indicated that although there were higher levels of disgust relative to anger overall, anger was influenced more strongly by the Harmfulness manipulation than was disgust; likewise, a significant Emotion x Action interaction, F (1, 174) = 176.74, MSE = 0.62, $p < .001$, indicated that disgust was more influenced by the disgustingness of the action than was anger. Finally, a significant Emotion x Harm x Action interaction was found, F (1, 174) = 11.34, MSE = 0.62, $p < .001$. Simple effects analyses (Table 8), indicated that the disgusting nature of the action influenced disgust but not anger in the harmful condition, but that both emotions were influenced by the disgustingness of the action in the harmless condition. Means, standard deviations, and simple effects analyses within the higher-order interaction comparing the disgusting and non-disgusting conditions, within harm conditions, are shown in Table 8.

Table 8. Mean and standard deviations of harm, evaluations, words and facial measures of emotions

	Harm					No harm				
	Disgust		No Disgust			Disgust		No Disgust		
	Load	No load	Load	No load	*F*	Load	No load	Load	No load	*F*
Harm others	6.13 (1.45)	6.22 (1.81)	6.13 (1.98)	6.43 (1.47)	0.15	4.45 (1.88)	5.09 (0.95)	4.82 (2.20)	5.00 (1.50)	0.17
Rights violation	7.33 (1.83)	8.13 (1.49)	8.13 (1.01)	8.26 (1.32)	2.64	3.15 (2.35)	4.00 (2.00)	2.64 (2.30)	3.13 (2.13)	5.77*
Evaluation	6.86 (1.66)	7.32 (1.43)	6.86 (1.30)	6.87 (1.29)	0.52	5.99 (1.98)	6.74 (1.09)	5.22 (1.68)	5.35 1.31)	12.99 ***
Anger words	4.03 (1.72)	4.10 (1.66)	3.59 (1.50)	4.12 (1.40)	1.66	2.79 (1.75)	3.71 (1.49)	2.02 (0.89)	2.49 (1.25)	36.77 ***
Disgust words	5.30 (2.00)	5.41 (1.74)	3.28 (1.50)	3.73 (1.74)	128.46 ***	5.61 (1.91)	6.03 (1.37)	1.99 (1.00)	2.17 (1.17)	505.62 ***
Anger face	3.54 (3.36)	1.78 (2.92)	3.43 (2.74)	4.87 (3.03)	25.42 ***	3.20 (2.86)	3.61 (2.97)	1.59 (1.97)	2.63 (2.57)	18.63 ***
Disgust face	5.88 (2.64)	6.04 (2.98)	3.26 (2.97)	3.78 (2.94)	15.38 ***	6.10 (2.94)	7.04 (1.36)	3.05 (1.99)	2.67 (2.43)	34.98 ***

Note: Standard deviations are in parenthesis

Facial measures. The correlation coefficient between the measures of the faces representing the emotions of anger and disgust was r (180) = -.16, $p < .05$. In

addition, analysis of the number of times each of the faces was selected indicated that the face representing disgust was selected more times overall (124) than the face representing anger (58).

Analyses of the effect of the manipulations of harmfulness and disgustingness on the selection of the faces showed that the face representing anger was selected significantly more than the face representing disgust only in the condition where there was harm to others described, but the action was not disgusting. This pattern was reversed in the remaining three conditions, so that the face showing disgust was selected significantly more than the face showing anger (Table 9).

Table 9. Count and percentage of facial choices by Harm and Action

	Disgust		No disgust	
	Harmful	Harmless	Harmful	Harmless
Anger face	9 (19)	4 (9)	30 (65)	15 (33)
Disgust face	38 (81)	39 (91)	16 (35)	31 (67)
χ^2 (1)	17.89***	28.49***	4.26*	5.57*

Note: Numbers in parenthesis represent percentages, * = $p < .05$, *** = $p < .001$

Analyses of the scales of the faces representing anger and disgust using a 2 (Face: anger vs. disgust, within participants factor), instead of the Emotion factor of the previous analysis revealed a significant main effect of Face F (1, 174) = 27.40, MSE = 8.97, $p < .001$, so that the score of the face representing disgust (M = 4.71, SD = 3.00), was higher than the score of the face representing anger (M = 3.09, SD = 2.95). A significant main effect of Action was also present, F (1, 174) = 35.03, MSE = 5.75, $p < .001$; these main effects were moderated by a significant Face x Action

interaction F (1, 174) = 25.47, MSE = 8.97, $p < .001$, that was in turn moderated by a marginal Face x Action x Cognitive load interaction, F (1, 174) = 35.50, MSE = 8.97, p = .06; analysis of this interaction revealed a higher score for the face representing anger in the no load condition than in the load condition, when the action was not disgusting, F (1, 174) = 4.36, MSE = 8.03, $p < .05$; but this effect was not significant for the face representing disgust F (1, 174) = .02, MSE = 6.68, p = .90.

Analysis also revealed a significant Action x Harm interaction, F (1, 174) = 16.30, MSE = 5.75, $p < .001$, that was in turn moderated by a significant Action x Harm x Cognitive load interaction F (1, 174) = 4.44, MSE = 5.75, $p < .05$. Further analysis revealed a significant Action x Harm interaction in the no load condition F (1, 89) = 19.51, MSE = 5.70, $p < .001$, but not in the load condition, F (1, 85) = 1.80, MSE = 5.80, p = .18. Analysis of these interactions showed that in the no load condition, when there is harm to others described, the presence or absence of disgust has no significant effect F (1, 174) = .68, MSE = 2.88, p = .41. However, when there is no harm to others described, the action described as disgusting increased the levels of the emotions reported significantly, F (1, 174) = 29.35, MSE = 2.88, $p < .001$.

The correlation of the selection of the face and the words related to each emotion was calculated for each of the Harm x Action conditions. In stories that were not disgusting, disgust words correlated significantly with anger faces; in disgusting stories, disgust words correlated with disgust faces. Anger words also showed the clearest correlations to anger faces when the story was not disgusting (Table 10).

Table 10. Correlation coefficients between emotion words and emotion faces by condition

	Anger words Anger face	Anger words Disgust face	Disgust words Anger face	Disgust words Disgust face
Harmful and disgusting	.27†	.23	-.02	.46***
Harmful and not disgusting	.53***	.09	.45**	.04
Not harmful and disgusting	.19	-.03	.26m	.32*
Not harmful and not disgusting	.53***	.05	.46***	-.08

Note: † = $p < .10$, * = $p < .05$, ** = $p < .01$, *** = $p < .001$

Combined scores of words and faces. Analyses of the overall selection of the faces indicated that words related to anger were correlated more strongly with the face endorsing anger, r (180) = .38, $p < .001$, than words related to disgust were, r (180) = .22, $p < .01$, and that the difference between the correlation coefficients was significant t (179) = 2.84, $p < .01$. Likewise, words related to disgust correlated more strongly with the face endorsing disgust, r (180) = .49, $p < .001$, than words related to anger were, r (180) = .19, $p < .05$; the difference between these coefficients was also significant, t (179) = 5.78, $p < .001$. Based on these correlations and on the similar results obtained from the separate analysis of words and faces, an index for each emotion was created averaging the standardised scores of the words and facial measures. The correlation between these composite indexes was r (180) = .33, $p <$ .001. In addition, the correlation between the indexes of anger and disgust was reduced significantly, z = 4.55, $p < .001$, using the combined scores of words and faces than using the measures of words only.

The combined scores of each emotion were analysed using a 2 (Emotion: anger vs. disgust, within participants factor) x 2 (Harm: harmless to others vs. harmful to others) x 2 (Action: disgusting action vs. non-disgusting action) x 2 (Cognitive Load: load vs. no load) between participants mixed model design. Results showed a non significant main effect of Emotion F (1, 174) = .04, MSE = .35, p = .84, indicating similar overall levels of anger and disgust; there was a significant main effect of Harm F (1, 174) = 12.91, MSE = .62, $p < .001$, so that there were higher levels of anger and disgust in the in the harmful condition than in the harmless one; a significant main effect of Action was also present F (1, 174) = 64.20, MSE = .62, $p < .001$, indicating that more anger and disgust was reported in the disgusting condition than in the non-disgusting one. The main effect of Cognitive load was marginal F (1, 174) = 3.69 MSE = .62, p = .06, so that more anger and disgust were expressed in the no load condition than in the load one. A significant Emotion x Harm interaction emerged F (1, 174) = 8.54, MSE = .35, $p < .01$, so that anger was affected by the manipulation of Harm but disgust was not. A significant Emotion x Action interaction also emerged F (1, 174) = 63.56, MSE = .35, $p < .001$, so that disgust was affected by the disgustingness of the manipulation but anger was not. The Harm x Action interaction resulted significant F (1, 174) = 16.88, MSE = .62, $p < .001$, revealing that when there was no disgust described in the story, there was higher anger and disgust in the condition when there was harm to others described (F (1, 174) = 30.05, MSE = .31, $p < .001$), than when there was not (F (1, 174) = .13, MSE = .31, p = .72). A marginal Cognitive load x Action x Harm interaction was also present, F (1, 174) = 2.90, MSE = .62, p = .09. Analysis of this interaction showed that the Harm x Action interaction was significant for the no load condition, F (1, 89) = 17.22, MSE = .62, $p < .001$, but marginally significant for the load condition F (1, 85) = 2.84, MSE = .62, p = .10. Further analyses of the no load

condition revealed that the disgustingness of the action increased the reported levels of negative affect (anger and disgust), when no harm to others was described F (1, 89) = 43.90, MSE = .312, $p < .001$, but not when there was harm to others present, F (1, 89) = .515, MSE = .312, $p = .48$.

Based on the different effects on the manipulations on anger and disgust separate analyses were performed on the combined score of each emotion. For anger, a 2 (Harm) x 2 (Action) x 2 (Cognitive Load) between participants design revealed a significant main effect of Harm F (1, 174) = 17.81, MSE = 0.59, $p < .001$; indicating that the harmful stories aroused greater anger than the harmless ones did. The main effect of Action was not significant F (1, 174) = 2.17, MSE = 0.59, $p = .14$, and the main effect of Cognitive load was marginal F (1, 174) = 3.07, MSE = 0.59, $p = .08$. A significant Harm x Action interaction was present F (1, 174) = 9.78, MSE = 0.59, $p < .01$. Simple effects tests indicated that when no harm to others was present, the act described as disgusting increased anger, but that there was no such effect in the harmful conditions. The remaining interactions were not significant. A similar analysis on the score of disgust showed a significant main effect of Action, F (1, 174) = 157.23, MSE = 0.39, $p < .001$; so that disgusting stories aroused greater disgust. The main effects of Harm and Cognitive load were not significant, F (1, 174) = 1.56, MSE = 0.39, $p = .21$, and F (1, 174) = 1.66, MSE = 0.39, $p = .20$, respectively; but there was a significant Harm x Action interaction, F (1, 174) = 12.37, MSE = 0.39, $p < .01$. Simple effects tests showed that when both harm and no harm were described, the disgusting action increased disgust, but that the effect was larger when no harm was described (Table 11).

Table 11. Means, standard deviations and simple effect of action on the combined scores of words and faces

	Harm					No harm				
	Disgust		No disgust			Disgust		No disgust		
	Load	No load	Load	No load	F	Load	No load	Load	No load	F
Anger	.28	.01	.13	.53	1.34	-.16	.19	-.67	.35	10.49
	(.89)	(.79)	(.76)	(.85)		(.76)	(.76)	(.52)	(.71)	***
Disgust	.46	.51	-.45	-.26	41.38	.56	.82	-.78	-.80	127.02
	(.70)	(.84)	(.65)	(.61)	***	(.76)	(.43)	(.42)	(.45)	***

Note: Standard deviations are in parenthesis

Effect of cognitive load on anger and disgust

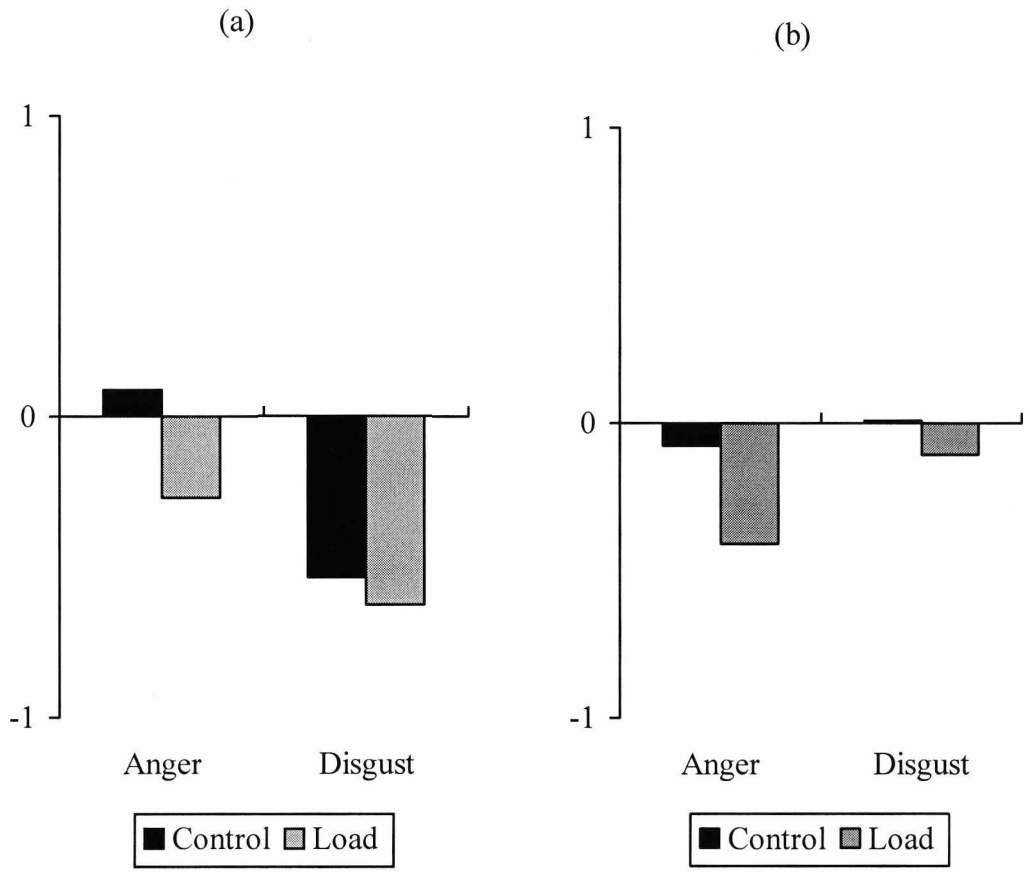
The previous analyses revealed that anger was affected more strongly than disgust by the manipulation of harmfulness; likewise, disgust was affected more than anger by the manipulation of disgustingness. In addition, the main effect of Action was not significant for anger, while the main effect of Harm was not significant for disgust. Importantly, the main effect of Cognitive load was marginal on anger, but not significant on disgust. In order to explore the effect of cognitive constraint on anger and disgust, analyses were performed separating the factors of harm and action. This partition allowed to clarify the effect of cognitive load on anger and disgust when no disgusting action was described, and when no harm to others was described.

In the first analysis—conditions that did not include a disgusting action—a 2 Emotion (Emotion: anger vs. disgust, within participants factor) x 2 (Harm: harmless to others vs. harmful to others) x 2 (Cognitive Load: load vs. no load) between participants mixed model analysis of variance revealed a significant main effect of Emotion, F (1, 88) = 38.06, MSE = .28, $p < .001$, showing higher reported levels of anger than disgust; the main effects of Harm and Cognitive load resulted significant, F (1, 88) = 34.98, MSE = .53, $p < .001$, and F (1, 88) = 4.27, MSE = .53, $p < .05$, respectively; so that there were higher levels of both anger and disgust in the no harm conditions and in the no load conditions. The Emotion x Harm interaction was significant, F (1, 88) = 6.31, MSE = .28, $p < .001$, indicating that the presence of harm increased significantly the levels of both emotions, but the effect was stronger on anger F (1, 88) = 30.50, MSE = .52, $p < .001$, than on disgust F (1, 88) = 15.31, MSE = .29, $p < .001$. The Emotion x Cognitive load interaction was marginal, F (1, 88) = 3.15, MSE = .28, p = .08. However, simple effect analysis showed that cognitive load reduced the level of anger significantly, F (1, 88) = 5.74, MSE = .52, $p < .05$; but this was not the case for disgust, F (1, 88) = .56, MSE = .29, p = .46. The simple effect of cognitive load on anger and disgust is shown in Figure 5 (a). Finally, the Harm x cognitive load interaction was not significant, F (1, 88) = 0.48, MSE = .53, p = .49, as well as the Emotion x Harm x Cognitive load interaction, F (1, 88) = 0.15, MSE = .28, p = .69. Although this 3-way interaction was not significant, the simple effect of cognitive load on anger, when there was harm described resulted marginal F (1, 88) = 3.61, MSE = .52, p =.06 .

The second analysis—conditions that did not include harm to others—a 2 Emotion (Emotion: anger vs. disgust, within participants factor) x 2 (Action: disgusting action vs. non-disgusting action) x 2 (Cognitive Load: load vs. no load) between participants mixed model analysis of variance revealed a significant main

effect of Emotion, F (1, 85) = 6.33, MSE = .26, $p < .05$, suggesting higher overall levels of disgust than anger. A main effect of Action was present, F (1, 85) = 90.72, MSE = .49, $p < .001$, suggesting more negative affect in the disgusting condition than in the non-disgusting one. The main effect of cognitive load was also significant F (1, 85) = 4.56, MSE = .49, $p < .05$, so that load reduced the levels of the emotions reported. A significant Emotion x Action interaction, F (1, 85) = 38.72, MSE = .26, $p < .001$, showed that the levels of both emotions were increased by the manipulation of harm, but disgust was affected more, F (1, 85) = 177.83, MSE = .27, $p < .001$, than anger was, F (1, 85) = 12.55, MSE = .27, $p < .001$. Results also revealed a non significant Emotion x Cognitive load interaction F (1, 85) = 1.99, MSE = .26, $p = .16$. However, in order to replicate the previous analysis, simple effects showed that load reduced anger significantly F (1, 85) = 5.13, MSE = .48, $p < .05$; whereas disgust was not affected, F (1, 85) = 1.09, MSE = .27, $p = .30$. The simple effect is shown in Figure 5 (b). The Action x Cognitive load and Emotion x Action x Cognitive load interaction resulted non significant, F (1, 85) = 0.54, MSE = .49, $p = .47$, and F (1, 85) = 0.62, MSE = .26, $p = .43$, respectively. The main effect of cognitive load on disgust when the action was described as disgusting was not significant, F (1, 85) = 2.52, MSE = .27, $p = .12$.

Figure 5. Simple effect of cognitive load on anger and disgust, in (a) conditions that did not describe disgust, and (b) conditions that did not described harm to others



Relationship between harm and emotions

Regression analyses were used once more to investigate the relationship between anger and disgust on perceived harm. It was found in Experiment 3 that anger, but not disgust, was primarily associated with presumed harm to others when the described action was disgusting and there was no harm to others described. In order to replicate this finding, a regression analysis was carried out using the indexes of anger and disgust to predict the level of perceived harm in the different conditions (Table 12). Results showed that anger ($\beta = .44$, $p < .001$) was a better predictor of

symbolic harm overall than disgust ($\beta = .02$, $p = .82$); similar results were found for perceived harm to others ($\beta = .35$, $p < .001$, for anger and $\beta = -.03$, $p = .69$, for disgust). As in Experiment 3, these results showed that anger only predicted harm in the disgusting condition where no harm to others was described.

Table 12. Standardized regression coefficients of anger and disgust predicting harm by condition

	Symbolic harm				Harm to others			
	Harm		No harm		Harm		No harm	
	Disgust	No disgust	Disgust	No disgust	Disgust	No disgust	Disgust	No disgust
Anger	.27†	.27	.51**	.36*	.39**	.32*	.28†	.01
Disgust	.31*	.22	-.21	-.12	-.04	.03	.08	.13

Note: † = $p < .10$, * = $p < .05$, ** = $p < .01$

Relationship between evaluations and emotions

The relationship of both emotions on the evaluation of the action was investigated with a regression analysis. Here, the combined scores of words and faces of anger and disgust were used as predictors of the evaluation score. Results revealed that when no harm to others was described, anger predicted the evaluation of the action better than disgust in both cases, when there was disgust described ($R^2 = .31$), or when there was not ($R^2 = .10$, Table 13). When there was harm to others described, anger predicted the evaluation of the action when there was no disgust present ($R^2 = .25$), but the emotion of disgust predicted the evaluation better than anger when the story described was disgusting and harming to others ($R^2 = .20$).

Table 13. Standardi sed regression coefficients of anger and disgust on evaluation of the action by condition

	Harm		No harm	
	Disgust	No disgust	Disgust	No disgust
Anger	.13	.47**	.52**	.33*
Disgust	.41**	.08	-.07	-.05

Note: * = $p < .05$, ** = $p < .01$

Based on the findings of Experiment 2, regression analysis was used to test the prediction that cognitive load would reduce the effect of anger on the evaluation of the action. In the conditions in which harm was present, anger was a better predictor of the evaluation of the action than disgust when there was no cognitive load. This effect was reduced under cognitive load and reversed in the condition that included a disgusting element, so that the emotion of disgust was a better predictor than anger. When there was no harm described, anger was a better predictor of the evaluation and was not affected by the manipulation of cognitive load (Table 14).

Table 14. Standardized regression coefficient of anger and disgust predicting the evaluation of the action by Action, Harm and Cognitive load

	Harm				No harm			
	Disgust		No disgust		Disgust		No disgust	
	No load	Load	No load	Load	No load	Load	No load	Load
Anger	.34	.06	.66**	.28	.57*	.52*	.38†	.29
Disgust	.16	.61**	.04	.16	-.11	.10	-.08	-.04

Note: † = $p < .10$, * = $p < .05$, ** = $p < .01$

Action Tendencies

The two punishment items were correlated at r (180) = .68, $p < .001$, and so were the two avoidance items, at r (180) = .78, $p < .001$. Therefore, each pair of items was averaged to create one index for each action tendency, that were correlated at r (180) = .58, $p < .001$. In order to investigate differences between the action tendencies, a 2 (Tendency: punish vs. avoid) within participants factor was included in the basic experimental design. A mixed model analysis of variance similar to the one used to investigate the combined scores of emotions revealed a significant main effect of Tendency, F (1,174) = 51.10, MSE = 2.13, $p < .001$, this indicates that avoidance was endorsed more highly than punishment overall. There was also a significant main effect of Harm F (1, 174) = 21.73, MSE = 6.40, $p < .001$, showing more endorsement of both punishment and avoidance in the harmful stories over the harmless ones. A significant main effect of Action was also present, F (1, 174) = 13.05, MSE = 6.40, $p < .001$, in that disgusting stories elicited more of both

tendencies than the non-disgusting stories. Analysis also revealed a marginally significant main effect of Cognitive load, F (1,174) = 2.88, MSE = 6.40, p = .09, indicating a greater tendency to take negative action in the no load condition than in the load one.

These main effects were qualified by several significant interactions. The Tendency x Cognitive load interaction, F (1,174) = 5.66, MSE = 2.13, $p < .05$, revealed that punishment was significantly higher in the no load condition than in the load condition, while the difference between the conditions for avoidance was not significant. A significant Cognitive load x Harm interaction was present, F (1,174) = 5.43, MSE = 6.40, $p < .05$, which in turn was qualified by a significant Cognitive load x Harm x Action interaction, F (1,174) = 4.22, MSE = 6.34, $p < .05$. Analysis of this interaction revealed that cognitive load reduced both action tendencies, but only when the action was described as disgusting and there was no harm to others, F (1, 174) = 8.11, MSE = 3.20, $p < .01$. The Tendency x Action interaction was significant, F (1,174) = 5.12, MSE = 2.13, $p < .05$, however, this interaction was qualified by a significant Tendency x Action x Harm interaction, F (1,174) = 4.52, MSE = 2.13, $p < .05$. The action described as disgusting increased avoidance relative to punishment, only when no harm to others was described. Means and standard deviations are shown in Table 15.

Table 15. Mean and standard deviations of action tendencies, by condition by Cognitive load

	Harm				No harm			
	Disgust		No disgust		Disgust		No disgust	
	Load	No load	Load	No load	Load	No load	Load	No load
Punishment	4.73 (2.11)	4.46 (2.05)	4.02 (1.87)	5.02 (2.05)	2.95 (1.88)	4.74 (2.14)	2.31 (1.59)	3.06 (1.81)
Avoidance	6.29 (2.23)	5.02 (2.82)	5.61 (1.86)	5.48 (2.30)	5.00 (2.47)	6.33 (1.79)	2.95 (2.02)	3.38 (1.73)

Note: Standard deviations are in parenthesis

Relationship between emotions and action tendencies

Regression analysis was used to assess the relationship between each emotion and the action tendency. Based on the results of Experiment 3 and the theoretical predictions of appraisal theories (Frijda, 1986; Frijda et al., 1989), a expected strong relationships between anger and punishment, and disgust and avoidance. Results revealed that only anger ($\beta = .30$, $p < .001$), and not disgust ($\beta = .00$, $p = .98$), predicted punishment once the shared variance between the action tendencies was controlled for in the analysis. Also, disgust ($\beta = .16$, $p < .05$) but not anger ($\beta = .05$, $p = .48$) predicted avoidance independently of punishment controlling for the same shared variance.

Discussion

The independent manipulations of harmfulness and disgustingness used in Experiment 4 allowed a more careful investigation of the effects of the presence or absence of a disgusting element on the dependent variables. In addition, the inclusion of a cognitive load task proved useful for investigating differences in the cognitive resources required for the elicitation and processing of each emotion.

Anger and disgust

Some of the results obtained in the measures of emotions in Experiment 3 were replicated in Experiment 4. The correlations between the words related to anger and disgust were high and significant in all the conditions, and similar to the correlations in the previous experiment. However, in this experiment the measures of anger and disgust were improved using facial expressions to represent these emotions (Ekman & Friesen, 1971; Rozin et al., 1999). An important feature of the facial measures used is that they were negatively correlated, so that the emotions studied can be distinguished more accurately. The use of faces as well as words representing emotions served two further purposes. First, it clarified the use of words related to disgust as a metaphor of anger by lay people (Nabi, 2002). Results showed that in conditions in which no disgusting element was described, the face representing anger was significantly correlated with the words of disgust and anger at similar levels.

Despite these similarities, overall anger words were more correlated with the face representing anger and disgust words were more correlated with the face representing disgust. Second, using faces representing emotions provided additional information regarding the relative predominance of one emotion over the other. The

face representing disgust was selected more than the face representing anger, except when there was harm to others described and the action was not disgusting. This finding suggests that when both violations (harm to others and a disgusting action) are present, disgust is elicited more easily than anger. These results are similar to those of Rozin and colleagues (Rozin et al., 1999), who also found that harmful actions provoke more the basic emotion of anger, and disgusting actions provoke more the basic emotion of disgust, when the selection of faces representing those emotions is given. While supporting the notion that violations of ethics of autonomy (e.g., harm) generally provoke the basic emotion of anger, and violations of ethics of divinity (e.g. disgusting actions) provoke the basic emotion of disgust, these results also suggest that in cases where both sets of ethics are violated, faces representing disgust are endorsed more strongly than faces representing anger. Based on the results of Experiment 3 it was expected that disgust would be higher than anger overall. The findings of this experiment confirm this finding for the results of both words and faces; as the facial expression representing anger was selected more than the one representing disgust only when there was no disgust present and the action harmed others.

The results also show that anger and disgust responded differently to the manipulations of disgustingness and harm to others. Findings of Experiment 3 indicated that anger was affected more than disgust by the manipulation of the target of harm. This finding was explored in more detail in Experiment 4, showing that anger is more affected than disgust by the manipulation of harm to others, while disgust is affected more than anger by the manipulation of disgustingness. Despite these differences in the mean levels of both emotions, it was found that the description of an action as disgusting or not had no effect on anger when the described action harmed others. However, when the action was described as

harmless, the disgustingness of the action increased the reported levels of both anger and disgust.

As with Experiment 3, the action tendencies of punishment and avoidance were significantly correlated. However, like in the previous experiment, the action tendencies of punishment and avoidance were associated uniquely to the emotions predicted by appraisal theories (Frijda, 1986; Lazarus, 1991). The findings of Experiment 3 regarding the action tendencies associated with anger and disgust were confirmed in this experiment. Once the correlation between them was statistically controlled, anger was associated uniquely with punishment while disgust was linked to avoidance.

Presumption of harm

This experiment also included one measure of symbolic harm in the form of a violation of the rights of other people. The presumption of harm found in Experiment 3 was not specific about the nature of harm that was present, but it is plausible that the violation of a moral norm could elicit harm related to other moral domains, and not only physical harm to others (Rozin et al., 1999; Shweder et al., 1987). Results from Experiment 3 showed that moral violations could lead to the presumption of harm to others, even when no harm to others was described. However, because all stories included some elements that could potentially elicit disgust, such results did not allow the investigation of the independent effects of harm to others and the presence or absence of a disgusting element. Building on these findings, results from Experiment 4 confirmed that the presence of a disgusting element could lead to the presumption of harm to others.

The differences found between the measures of actual and symbolic harm revealed that the manipulation of disgust had an effect on the measure of symbolic harm only. The presumption of harm to others based on the disgustingness of the action found in Experiment 3 was replicated, but analysis also revealed that its effect was stronger on the item related to symbolic harm. In addition, results showed that anger was correlated with the reported harm, but disgust was not.

The combination of the manipulation of harm to others, disgustingness and cognitive load allowed to test the different theoretical models that combined the elements of harm, evaluation and emotions. Although these relationships can be found in several theoretical perspectives, there are differences between the roles of each of the components.

Even though the relationship between harm and anger can be predicted based on cognitive appraisal models (Lazarus, 1991; Ortony et al., 1988; Roseman et al., 1996), this relationship is expected mostly when actions have a negative effect on the perceiver. Similar predictions are not clear when the target of harm is the person performing the action or when no negative consequences are described. Moreover, in cases where disgusting actions that harm no one are described, appraisal models would predict the presence of disgust and the tendency to avoid the negative stimuli, but not the presence of anger or the tendency to punish. However, results of Experiment 4 indicate that the effect of the disgustingness of the action had an effect not only on disgust and the evaluation, but also on the perceived symbolic harm and the emotion of anger, with an association to the action tendency of punishment. In particular, anger was disproportionately high in the condition that described a disgusting, but harmless action.

Another unclear prediction in the case of appraisal models is the relationship between two different emotions. Because these models predict that any given

emotion is based on the cognitive interpretation of any specific event, it would be expected that the harmless but disgusting actions described would elicit disgust, but not anger, and similarly avoidance, but not punishment. Results showed a significant correlation between anger and disgust and between the distinct action tendencies attributed to those emotions.

Unlike cognitive appraisal models, the cognitive neoasociationistic model (Berkowitz, 1989, 1990, 1999; Berkowitz & Harmon-Jones, 2004), would explicitly predict the relationships between anger and disgust, and between punishment and avoidance. This model proposes a close relationship between different emotions, and even predicts that disgust can be a cause of anger. At the same time, this model proposes the existence of aggression-related and escape-related tendencies activated simultaneously, based on primitive attributions that are not processed cognitively to a high level. In addition, the effect of the disgustingness of the action in harmless actions can be also explained using disgust as a direct elicitor of anger. Although this model recognises the role of appraisals in the emotional process, it suggests that appraisals may intensify the expression of anger, but they are not necessarily the cause of anger. In this view, appraisals would be high order processes that are capable of transforming the initial negative affect and action tendencies into a more defined reaction based on social rules, anticipated costs and benefits and interpretative schemes. The correlation found between the action tendencies of punishment and avoidance can thus be predicted by this theoretical model.

The cognitive neoassociationistic model also suggests that the reactions associated with anger can be controlled or reduced if the situation is not appropriate to express it or if the open expression of anger is not safe (Berkowitz, 2003). This prediction is based on the premise that the activation of aggression related and escape related tendencies are activated at the same time, but that higher order cognitive

processes (attributions, consideration of the consequences, appraisals), change the intensity and expression of the anger experience, increasing or decreasing it. Another possible outcome is that the escape related tendencies like the ones related to fear could overcome the effect of the attack tendencies, so that fear would be stronger than anger, leading to avoidance of, rather than approaching, the stimulus. Even though this theoretical model accounts for the relationship between anger and disgust, it offers no clear predictions related to the presence or absence of perceived harm. Results of experiments 3 and 4 suggested differences between situations described as harmful and harmless, but the predictions from the cognitive neoassociationistic model do not indicate differences between the possible effects of harm or disgust on anger, so that the differences between anger based on harm and anger based on disgust are difficult to distinguish.

Another theoretical perspective, the social intuitionist model (Haidt, 2001), can also account for the relationship between harm, negative evaluations and emotions based on the premise that moral intuition and moral emotions are processes that precede the judgement and the perception of harm. For this model, the initial intuitions are shaped by social rules and norms, but its activation does not require cognitive processing, and it is described "more akin to perception" (Haidt, 2001, p. 814). For this theoretical perspective, the evaluation of the action (moral judgement), is the result of an intuitive processing that occurs quickly, fast and without effort, and not the cause of the emotion as the cognitive appraisal models propose. In this model, a disgusting action elicits a negative emotional reaction based on intuition, which can be later justified using a post-hoc presumption of harm. Based on these premises and the close relationship between harm and anger, it is possible to predict anger based on the presumption of harm, even when there is no description of harm to others.

One limitation of the social intuitionist model is that it does not account for the explicit relationship between anger and disgust. Because the content of the moral domain is shaped by social norms and rules, the responses of both emotions would be mixed or combined in the same process. Although anger can be predicted based on the intuitive process and the presumption of harm, this model does not offer a distinct explanation about the emotion of disgust or any other specific emotion, so that both anger and disgust are part of similar intuitive processes and their origins are the same social rules and norms that formed the intuitions.

Cognitive load

The predictions of the appraisal models and the social intuitionist model are different for the nature of the presumed harm. In cases where there is no explicitly described harm, appraisal models are not clear about the source of the reported anger. In any case, these models would predict anger based on harm, but they do not predict harm based on disgust. The social intuitionist model offers no prediction regarding which type of harm is more likely to be used to justify an initial negative reaction, but the more accessible type of harm should be employed. This distinction would be especially clear under cognitive load, since the post-hoc nature of the justification of the initial reaction should be diminished with limited cognitive resources. This experiment shows that in conditions where harm to others is present, the more accessible type of harm (actual harm to others), is used and symbolic harm is not necessary. Results give support to the post-hoc justification of the moral judgement proposed by the social intuitionist model (2001). Finally, the cognitive neoassociationistic model would predict a reduction of anger when there is no cognitive load and there is no harm described, this reduction is based on the high

order, reasoned process of the action, so if there is no harm described, only disgust should be present.

The manipulation of cognitive load was expected to impair the processes that requires more cognitive resources to function (Gilbert et al., 1993). The cognitive constraint of the task had an effect on the reported levels of harm, the overall responses of anger and disgust and on the action tendencies. In all three cases, cognitive load reduced the levels of the reported variables compared to the no load conditions. It is important to notice the possible effect that any cognitive load task can have on the reported measures. It has been suggested that cognitive load may not only affect the measurement of the emotion, but it can also interfere with the underlying process that elicits the emotion, so that cognitive load may increasing the general arousal of the participant (Feldman Barrett, Ochsner, & Gross, in press).

Although the manipulation had an overall effect on both emotions, there were differences in the manner of load affecting anger and disgust. Following the notion that disgust is a more automatic emotion than anger in the sense that it require less cognitive processing (Bargh, 1994). Compared to disgust, anger was affected more by the cognitive load manipulation, reducing it in conditions with limited cognitive resources. It is important to notice that this reduction of anger was not present as a significant 3-way interaction, and only as a marginal Emotion x Cognitive load interaction when no disgust was described, however, simple effect analysis on both conditions revealed a significant reduction of anger, whereas disgust was not affected, when there was no disgust described, and then there was no harm to others described. Because the 3-way interaction was not significant, the interpretation of these results is only suggestive.

The results from Experiment 2 revealed that both emotions are affected by cognitive load, but the mixture of the stories did not allow for a clear differentiation

between anger and disgust. Results of Experiment 4 regarding the effect of the cognitive load task revealed differences in the reported anger and disgust. On one hand, lower anger was reported under load compared to no load in the absence of the disgusting element described in the action; on the other hand, disgust was not affected by the manipulation of cognitive load, so that similar levels of disgust were reported and disgust was affected only by the disgustingness of the action. The fact that the avoidance reported was higher than punishment also supports this prediction. These findings suggest differences in the primacy of one emotion over the other. It has been reported that emotions vary in their automaticity (Giner-Sorolla, 1999), and, in line with this, these results indicate that disgust requires less cognitive processing than anger.

Results of Experiment 2 also showed that disgust is a better predictor than anger for the evaluation of the action under cognitive load when the stories are extreme (Table 5). Results of Experiment 4 reveal that in the conditions that describe harm to others and a disgusting action, disgust predicts the evaluation of the action better than anger under cognitive load. At the same time, the effect of anger was reduced by the cognitive manipulation when harm to others was described, regardless of the presence of disgust in the description of the action. Results suggest that when both anger and disgust are present, the effect of disgust is stronger that the effect of anger. The primacy of disgust and avoidance over anger and punishment could indicate that disgust is more accessible, faster to elicit, or that it requires a smaller amount of cognitive processing that anger to be elicited.

Emotions and action tendencies

As in Experiment 3, the action tendencies of approach and avoidance were significantly and highly correlated. Despite the significant correlation between the reported anger and disgust in both experiments in this chapter, it is possible to distinguish specific features between them such that in both experiments the overall reported disgust was higher than anger. This pattern was replicated in Experiment 4 for both the word measures and facial measures.

Results showed that the correlation between the words related to anger and disgust was reduced significantly once the ratings of the faces showing the emotions and the words were combined. In addition, the correlation between anger and disgust using the facial measures was negative and significant, so that some degree of independence between them is suggested. Despite this reduction, the scores of the emotions remained correlated significantly, and both were affected when the action was described as harmless, but disgusting.

Analysis of this selection in the different conditions of Experiment 4 showed that when there is no disgust present, the words of anger and disgust correlate with the face showing anger. Only when there was an element of physical disgust described, the disgust words were correlated with the disgust face. This findings can be related to the findings of Nabi (2002), about disgust being used as a metaphor for anger when there is no element of physical disgust present.

Another sign of differentiation between anger and disgust is the relationship between the emotion and the action tendencies associated to them. Once the shared variance between the emotions was controlled statistically, the relationship between anger and punishment and disgust and avoidance was clear. In addition, anger was more strongly and sometimes uniquely associated to perceived harm.

Although punishment and avoidance appear to be opposite tendencies, the correlation between them in both experiments was not only significant, but also high. Despite this correlation, the analysis of the action tendencies and their relationship with the emotions of anger and disgust offered an alternative approach to differentiate both, action tendencies and emotions. The unique relationship between anger and punishment, and disgust and avoidance once the shared variance between them is controlled, allowed a clear distinction between the action tendencies as it was explicitly predicted by most theoretical perspectives (Berkowitz, 1989, 1990; Clore, 1994; Darwin, 1872; Frijda, 1986; Frijda et al., 1989; Izard, 1977; Lazarus, 1991; Ortony et al., 1988; Roseman et al., 1996).

CHAPTER 6

DIFFERENCES IN THE PERCEIVED TYPE OF HARM

Introduction

Two experiments are included in this chapter. The first one is a partial replication of Experiment 4, correcting the wording of one of the measures of harm, so that direct comparisons could be performed between symbolic and actual harm, and the effect of the manipulations would be equivalent for both measures. This change also allowed to test the proposal that when a moral violation that does not harms others occurs, symbolic harm would be used as a post-hoc justification for a fast negative evaluation, when cognitive resources are limited; this pattern is predicted by the social intuitionist model (Haidt, 2001). In Experiment 4, an interaction between the type of harm, the disgusting action, and cognitive load was expected, showing that cognitive load would reduce the reported levels of harm only in the disgusting action. However, this interaction was not statistically significant and this tendency was found only as a significant simple effect of cognitive load on symbolic harm. To foreshadow, results of Experiment 5 suggests that correcting for the wording of the item measuring actual harm produced the referred interaction, as well as the simple effect already found in Experiment 4. In addition, these results confirmed that symbolic harm was affected more than actual harm by the manipulation of disgust when no harm to others was described.

The second experiment in this chapter focused on two main but closely related objectives. The first one was to further distinguish between the components that theoretically form the domains of moral violations, as proposed by the "big

three" model of morality (Shweder et al., 1997). The second objective was to investigate the relationship between these proposed components and the emotions of anger and disgust. Results showed the distinction between symbolic and actual harm found in experiments 4 and 5, but also revealed the three components predicted by Shweder in the form of harm to the individual, harm to nature and harm to the community. It was also revealed that the manipulation of disgust affected the measures of harm to nature and harm to the individual, but not harm to the community. Confirming the findings of experiments 4 and 5, disgust was influenced more than anger by the manipulation of the disgustingness of the action, and it was strongly associated to violations of the code of divinity in the form of harm to nature.

Experiment 5

Experiment 4 explored in more detail the presumption of harm found in Experiment 3, manipulating separately the conditions of harm to others and the disgustingness of the action so that their independent effects could be investigated. Results suggested that in conditions in which an action violates a deep-held moral rule –such as eating human flesh–, there was a presumption of harm to others as a product of the action, even when it was described as private, consensual and there was no harm to others described. Results also showed that this presumption of harm was largely of symbolic nature, and it required cognitive resources to be engaged. The effect of cognitive load on the presumption of harm supported the post-hoc nature of the rational justification after an initial negative reaction; this pattern is in line with the social intuitionist model (Haidt, 2001). Although these results suggests a moderating effect of cognitive load on symbolic harm, the overall interaction between the manipulations of disgust, harm and cognitive load on this type of harm

was not significant, and only the simple effect of cognitive load on symbolic harm was.

One possible explanation for this not significant interaction in Experiment 4 is that the item measuring actual harm was different that the one measuring symbolic harm. In the case of the former, the bipolar scale was anchored using the perceived harm to others versus the perceived benefit to others product of the action of the scientist in the story. It is plausible to think that the responses about the perceived harm could be moderated by the possible benefits associated with the action of the scientist, so that the referred action could be beneficial in the future as valuable research or as a scientific experiment. Due to the structure of the item it was not possible to partial out the possible benefit associated with the perceived harm. In order to correct this limitation, Experiment 5 was a partial replication of Experiment 4, focused on the conditions in which no harm to others was described. A crucial change is the separation of the measures of perceived harm to others and perceived benefit product of the action using unipolar scales. This change also allowed for the direct comparison of symbolic and actual harm with identical measures.

It was expected that the findings of Experiment 4 would be replicated, so that there would be a presumption of harm to others based on the disgustingness of the action, even when the action was described as private and consensual. It was also expected that this presumption would be based more on symbolic than actual harm, since the former is easier to justify when no actual harm is described. Finally, and in order to test the post-hoc nature of the justification of an initial negative evaluation as the social intuitionist model would predict (Haidt, 2001), cognitive load should reduce the presumption of harm, impairing the rational post-hoc justification of the initial negative reaction. This should be reflected not only in the form of a significant simple effect of cognitive load on the presumed harm, but also in a significant

interaction between the manipulations of the disgustingness of the action and cognitive load on presumed harm, so that harm would be presumed as a product of the disgusting action only when there is no cognitive load.

It was also hypothesised that the presumption of harm would be associated to the emotion of anger more that to the emotion of disgust. As in experiments 3 and 4, it was anticipated that the anger would be associated with the action tendency of punishment, whereas disgust would be associated with the tendency of avoidance. Following the results of the previous experiment, it was predicted that the faces representing the emotions of anger and disgust will be correlated with the respective words of each emotion.

Method

Participants

One-hundred and nine undergraduate psychology students from the University of Kent and the University of Sussex participated in the experiment on a voluntary basis and received a partial course credit in return. After completing the questionnaire all participants were thanked and debriefed. Of these, 93 participants were female and 16 were male.

Materials

A computer based questionnaire presented a fictitious story similar to the two no harm to others stories used in Experiment 4. The story was manipulated to create two versions, one in which the described action elicited disgust and one in that did not. No harm to others or to the person performing the action was described in any of

the versions. A cognitive load task was included in this study, it consisted in a seven digit number with no digits repeated that the participants were requested to memorise.

Evaluation of the action. The questionnaire contained four evaluation items from 1 (completely right / good / correct / positive) to 9 (Completely wrong / bad / incorrect / negative).

Perceived harm and benefit. Five questions were included regarding perceived harm: "To what extent do you think the action of the scientist was harmful to herself?", "To what extent do you think the action of the scientist was beneficial to herself?, "To what extent do you think the action of the scientist was harmful to anyone else apart from her?", "To what extent do you think the action of the scientist was beneficial to anyone else apart from her?", "Do you think the action of the scientist violated the rights of anyone apart from her?". These questions were answered in a scale from 1 (Not at all) to 9 (Extremely).

Emotion items. In the face emotion items, two photographs of female faces were shown, one showing disgust in the full form and the other showing anger in the open mouth form. Participants were instructed to "select the face that best describes your feelings towards the scientist now". The photos were 300 x 408 pixels in black and white and were taken from Rozin et al. (1999). Participants were then asked to indicate separately how much of each of the feelings represented by each face (anger or disgust) they had towards the scientist from 1 (not at all) to 9 (extremely). In the verbal emotion items, participants were asked to indicated to what extent each story made them feel anger, compassion, depression, disgust, happiness, infuriation, outraged, pity, pleasure, repulsion, sadness, satisfaction, sickness, sorrow, sympathy, grossness and contempt. These measures used scales from 1 (not at all) to 8 (very).

Action tendencies. Participants then were asked to indicate two action tendencies: punishment and avoidance, each one measured using two items. For punishment the items were "How much would you like to punish the scientist?" and "How much would you like to publicly condemn the scientist?"; for avoidance, they were "How much would you like to avoid the scientist?" and "How much would you like to move away from the scientist?" These questions were indicated in a scale from 1 (not at all) to 9 (extremely).

Load manipulation checks. At the end of the questionnaire, participants were requested to write down the number they were asked to memorize.

Design

The basic design of the experiment was a 2 (Condition: control vs. disgust) x 2 (Task: filler vs. cognitive load) between-participants factor design.

Procedure

Participants were tested in groups between 5 and 20. In each session, participants were asked to sit in front of a computer in which the questionnaire was presented and were requested to work individually, then they were randomly assigned to one of the conditions and to one of the tasks. After giving consent, participants were presented with demographic measures and then with instructions about one of the different tasks. In the filler task, participants were immediately presented with the story, followed by the rest of the questions. In the cognitive load task, the seven digit number was presented first for 90 seconds, followed by the story

and finally the rest of the questions. A final space was provided to write the cognitive load number they were asked to remember at the end of the questionnaire.

Results

Manipulation checks for the cognitive load conditions

Fourteen participants reported the cognitive load number incorrectly and they were excluded from the analyses, leaving 95 participants, 81 females and 14 males.

Evaluation

The four items measuring the evaluation of the action (Cronbach's alpha = .90) were combined to create one index. Analyses of variance of it using a 2 (Condition) x 2 (Task) between-participants factors revealed a significant main effect of Condition F (1, 91) = 8.26, MSE = 2.16, $p < .01$, indicating that the disgusting condition was evaluated worse ($M = 6.12$, $SD = 1.34$) than the control condition ($M = 5.27$, $SD = 1.57$). The main effect of Task and the interaction between the two factors were not significant (F (1, 91) = 1.18, MSE = 2.16, $p = .28$, and F (1, 91) = 0.10, MSE = 2.16, $p = .75$, respectively). Means and standard deviations are in Table 16.

Presumption of harm

The items regarding perceived harm to others and perceived violation of rights were correlated at r (94) = .72, $p < .001$, and analysed using a 2 (Harm Type: actual harm vs. symbolic harm, within participants factor) x 2 (Condition: control vs. disgust, between participants factor) x 2 (Task: filler vs. cognitive load, between

participants factor) mixed model analysis of variance. Results revealed a significant main effect of Harm Type F (1, 91) = 8.20, MSE = 1.12, $p < .01$, so that there was an overall higher perception of harm to others (M = 3.41, SD = 2.23) than symbolic harm (M = 3.00, SD = 2.09). The main effects of Task, Condition, and the interaction between these two factors were not significant. A marginal Harm Type x Task interaction was present, F (1, 91) = 3.02, MSE = 1.12, p = .09, as well as a significant Harm Type x Condition interaction, F (1, 91) = 6.31, MSE = 1.12, $p <$ .05. Analysis of this interaction revealed that symbolic harm was significantly higher in the disgust condition (M = 3.45, SD = 2.47) than in the control condition (M = 2.56, SD = 1.53), F (1, 91) = 16.58, $p < .001$, while the reported levels of actual harm were similar in the disgust condition (M = 3.43, SD = 2.43) and in the control condition (M = 3.40, SD = 2.05), F (1, 91) = 0.19, p = .67. These interactions were qualified by a significant Harm Type x Condition x Task interaction, F (1, 91) = 8.23, MSE = 1.12, $p < .01$ (Means and standard deviations are shown in Table 16. Further analysis using simple effects revealed that only symbolic harm was increased by the disgusting action without cognitive load F (1, 91) = 5.34, MSE = 4.24, $p <$ .05, but this effect was not significant under load F (1, 91) = .34, MSE = 4.24, p = .56. These results suggest that only symbolic harm was presumed and only when no load was present (Figure 6).

Figure 6. Simple effects of the manipulations of disgust and cognitive load on actual and symbolic harm

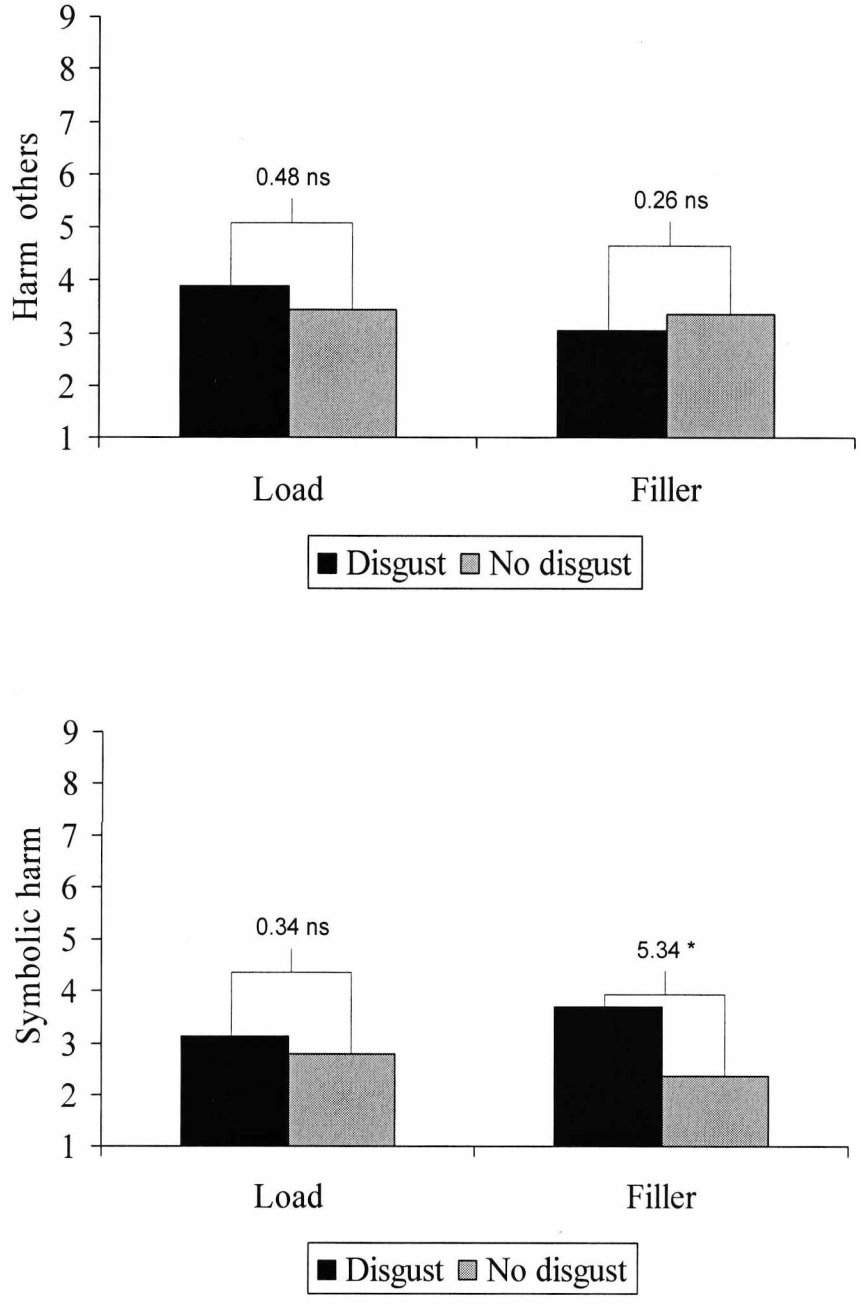


Table 16. Mean and standard deviations of evaluations, perceived harm, emotions and action tendencies by condition and by task

	Filler		Load	
	Control	Disgust	Control	Disgust
Symbolic harm	2.36 (1.15)	3.69 (2.77)	2.78 (1.89)	3.14 (2.08)
Actual harm	3.36 (1.82)	3.04 (2.46)	3.43 (2.31)	3.90 (2.36)
Evaluation	5.16 (1.49)	5.93 (1.12)	5.39 (1.69)	6.36 (1.57)
Anger words	2.71 (1.72)	2.90 (1.78)	2.41 (1.57)	3.52 (1.66)
Disgust words	2.15 (1.38)	4.61 (2.07)	2.10 (1.41)	4.76 (2.08)
Anger face	2.92 (1.98)	3.58 (2.52)	2.91 (1.88)	3.52 (1.99)
Disgust face	2.72 (1.59)	5.04 (2.29)	2.48 (1.56)	5.67 (2.50)
Combined score Anger	-.13 (.92)	.09 (1.12)	-.22 (.88)	.26 (.90)
Combined score Disgust	-.62 (.57)	.48 (.94)	-.68 (.58)	.65 (.96)
Punishment	2.52 (1.93)	2.96 (2.04)	2.34 (1.76)	3.19 (2.17)
Avoidance	3.00 (2.02)	4.58 (2.37)	3.22 (2.08)	5.48 (2.57)

Note: Standard deviations are in parenthesis

Emotions

Word measures. The items measuring anger had a Cronbach's alpha = .92; likewise, the items measuring disgust had a Cronbach's alpha = .96. The items measuring each emotion were averaged to create one single index for each emotion;

the correlation between these indexes was r (93) = .70, $p < .001$; separate correlation coefficients were computed for the disgust and control conditions (r (46) = .73, p < .001, and r (47) = .80, p < .001, respectively), and were not significantly different, z = .79, p = .43. Analysis of variance adding a 2 (Emotion: anger vs. disgust, within participants factor) to the main design revealed a significant main effect of Emotion F (1, 91) = 17.10, MSE = .75, $p < .001$, indicating higher overall levels of disgust (M = 3.39, SD = 2.16) than anger (M = 2.87, SD = 1.71). A significant main effect of Condition was present, F (1, 91) = 23.33, MSE = 5.22, $p < .001$, showing overall higher levels of both, anger and disgust, in the disgust condition than in the control condition. The interaction between these effects was significant F (1, 91) = 57.31, MSE = .75, $p < .001$, so that in the control condition there were higher levels of anger (M = 2.56), than disgust (M = 2.12), F (1, 91) = 5.99, $p < .05$; whereas in the disgust condition, disgust (M = 4.68), was higher than anger (M = 3.22), F (1, 91) = 67.47, $p < .001$. The remaining main effects and interactions were not significant (means and standard deviations are shown in Table 16).

Face measures. Analysis of the selection of the faces representing anger and disgust was performed in order to partially replicate the findings of the previous experiment. Results showed that the face representing disgust was selected more overall (63), than the face representing anger (32), χ^2 (1) = 10.12, $p < .001$. When a disgusting element was included in the stories, the difference between the selection of the faces of anger and disgust was significant, but not when there was no disgust described (Table 17).

Table 17. Count and percentage of the selection of the faces by condition

	Condition	
	Disgust	No disgust
Anger face	8 (17)	24 (50)
Disgust face	39 (83)	24 (50)
χ^2 (1)	20.45***	0

Note: Numbers in parenthesis represent percentages, *** = $p < .001$

Analyses of the scales representing facial expressions of anger and disgust, using a 2 (Face: anger vs. disgust, within participants factor) instead of the Emotion factor of the previous analysis revealed a significant main effect of Face F (1, 91) = 12.24, MSE = 2.13, $p < .001$, so that the score of the face representing disgust (M = 3.94, SD = 2.42), was higher than the score of the face representing anger (M = 3.23, SD = 2.11). A significant main effect of Condition was also present F (1, 91) = 21.01, MSE = 6.44, $p < .001$; however this main effects was moderated by a significant Face x Condition interaction F (1, 91) = 24.94, MSE = 1.85, $p < .001$, analysis of this interaction revealed similar levels of anger and disgust on the control condition t (47) = 1.21, $p = .23$, but significantly higher levels of disgust than anger in the disgust condition t (46) = 5.27, $p < .001$. Task did not moderate any of these effects.

Correlation coefficients were computed between the words and facial expressions of anger and disgust. Overall results revealed that the face expressing anger was significantly more correlated with anger words r (93) = .73, $p < .001$, than with disgust words r (93) = .52, $p < .001$, t (92) = 3.73, $p < .001$. Likewise, The face representing disgust was significantly more correlated with disgust words r (93) =

.76, $p < .001$, than with anger words r (93) = .54, $p < .001$, This difference was also significant t (92) = 4.16, $p < .001$.

As in Experiment 4, the standard scores of the measures of words and facial expressions of anger and disgust were averaged to create one index for each emotion. These combined scores were correlated at r (93) = .64, $p < .001$. Analysis of the combined scores of anger and disgust using a 2 (Emotion: anger vs. disgust, within participants factor) added to the main design revealed that the main effect of Emotion was not significant F (1, 91) = .37, MSE = .25, p = .54, so that there were overall similar levels of anger and disgust reported. A significant main effect of Condition was present, F (1, 91) = 22.53, MSE = 1.29, $p < .001$, so that there were higher overall levels of anger and disgust in the disgust condition than in the control condition. This main effect was qualified by a significant Emotion x Condition interaction F (1, 91) = 34.50, MSE = .25, $p < .001$; analysis of this interaction revealed significantly more anger than disgust in the control condition t (47) = 5.22, $p < .001$, and more disgust than anger in the disgust condition t (48) = 3.42, $p < .001$. The main effect of Task was not significant and it did not moderate any interaction.

Relationship between emotions and the evaluation of the action

As in Experiment 4, the indexes of anger and disgust were used as predictors of the evaluation of the action in the two different conditions (control and disgust). Results showed that overall, neither anger nor disgust were significant predictors of the evaluation in the control condition, β = .22, p = .29 and β = .13, p = .54, respectively. However, in the disgust condition both emotions significantly predicted the evaluation, β = .37, $p < .05$ for anger, and β = .38, $p < .05$ for disgust. In order to test the effect of cognitive load on this relationship a similar analysis as the previous

one was performed, separately for each condition and each task (filler and cognitive load). Results showed that when a disgusting action is described, anger is a better predictor of the evaluation of the action than disgust, but this effect is reversed under cognitive constraint, making disgust a better predictor (Table 18).

Table 18. Standard regression coefficients of anger and disgust as predictors of the evaluation of the action, by condition by task

	Control		Disgust	
	Filler	Cognitive load	Filler	Cognitive load
Anger	-.12	.49†	.74**	.32†
Disgust	.38	-.05	-.04	.54**

Note: † = $p < .10$, ** = $p < .01$

Relationship between emotions and presumed harm

As in Experiment 4, regression analysis was used to assess the relationship between the indexes of anger and disgust and the different types of presumed harm, in the disgust and control conditions. It was expected that when a disgusting but harmless action was described, only anger would be associated with presumed harm. Results confirmed that the presumed harm product of the disgusting action were associated with anger, but not with disgust (Table 19).

Table 19. Standard regression coefficients of anger and disgust as predictors of symbolic and actual harm

	Control		Disgust	
	Anger	Disgust	Anger	Disgust
Actual harm	.11	.35†	.57**	-.09
Symbolic harm	-.44*	.73***	.64***	-.09

Note: † = $p < .10$, * = $p < .05$, ** = $p < .01$, *** = $p < .001$

Action tendencies

The two punishment items were correlated at r (93) = .84, $p < .001$, while the correlation between the two avoidance items was r (93) = .87, $p < .001$; so each pair of items was averaged to create one index for each action tendency. The correlation between these indexes was r (93) = .59, $p < .001$. These indexes were analysed using a 2 (Tendency: punish vs. avoid, within participants factor) added to the main design. A 2 (Tendency) x 2 (Condition) x 2 (Task) mixed model analysis of variance revealed a significant main effect of Tendency F (1, 91) = 42.61, MSE = 1.91, $p <$ .001, suggesting an overall higher tendency to avoid (M = 4.03, SD = 2.44), than to punish (M = 2.75, SD = 1.97). A significant main effect of Condition was also present, F (1, 91) = 10.85, MSE = 7.13, $p < .001$, however these main effects were qualified by a significant Tendency x Condition interaction F (1, 91) = 10.06, MSE = 1.91, $p < .001$. Further analysis revealed that there was a higher tendency to avoid in both conditions, but the effect was stronger in the disgust condition t (46) = 5.95, $p <$ .001, than in the control condition t (47) = 2.78, $p < .01$. Means and standard deviations are shown in Table 16.

Relationship between emotions and action tendencies

The indexes of anger and disgust were used as predictors of each action tendency. As in previous experiments, the effect of the action tendency that was not analysed was included in the model to control for the shared variance between the action tendencies. In the case of punishment, only anger ($\beta = .47$, $p < .001$) was a significant predictor, while disgust was not ($\beta = .07$, $p = .53$). In the case of avoidance the opposite pattern was found, disgust was a significant predictor ($\beta = .53$, $p < .001$), and anger was not ($\beta = .03$, $p = .77$). These results replicated the findings of Experiment 4.

Discussion

The results of this experiment further clarify the relationship between a presumption of harm to others product of an action that violates deep-held moral norm, and the emotions of anger and disgust. This presumption of harm to others was found in Experiment 3, based on descriptions of stories that do not included negative consequences for anyone in the story. Experiment 4 manipulated the described harm to others and the disgusting conditions in order to explore in more depth the presumption of harm based on a disgusting but harmless action. However, an intrinsic limitation of the measure of perceived actual harm to others did not allow for a direct comparison with the measure of symbolic harm.

The changes on the scales measuring actual harm allowed to clarify the role of harm as a justification for the negative reactions. These changes—along with the manipulation of cognitive load—further support the post-hoc nature of the rational justification in the form of harm inflicted to a symbolic entity. Results also confirm

the relationship between the disgusting action and symbolic harm. Although there was a higher presumption of actual than symbolic harm overall, the interaction between the type of harm and the disgusting factor revealed that only symbolic harm was increased when there was an element of disgust present in the story and no harm to others was described.

Another finding replicated from Experiment 4 is the relationship between presumed harm and anger. Although the presumption of harm was based on the disgustingness of the action, only the emotion of anger was associated with harm in the disgusting condition. These results further support previous findings of presumption of harm to others based on personal, consensual and private actions that violate moral norms (Haidt & Hersh, 2001).

As previously reviewed in Chapter 1, the relationship between harm and anger is well establish based on philosophical and everyday knowledge (Aristotle, 4th Century B.C./1984; Plato, 4th Century B.C./1985), as well as theoretically by several perspectives such as appraisal theories (e.g., Lazarus, 1991; Ortony et al., 1988; Roseman, 1984; Scherer, 1999). However, for most theoretical perspectives harm is usually considered one of the elicitors of negative emotions and not the result of them. The CAD triad hypothesis even proposes direct relationships between specific types of harm and specific emotions, but just as appraisal models, the emotion reported is elicited by the perceived harm. Results of Experiment 4 confirm a relationship between harm and anger, so that the anger responses were more affected by the manipulation of harm to others, while disgust was more affected by the manipulation of the disgustingness of the action. However, Results of experiments 3 and 4 also revealed that in conditions where harm to other people is implausible, the presence of an elicitor of disgust elicited presumed harm to others. These finding was confirmed on this experiment, along with the conclusion that only

symbolic harm was presumed and only under no load. The separation of the scales regarding actual harm and benefit allowed to control for the possible perceived benefits associated with the action of the character of the story, clarifying the findings of Experiment 4. This experiment replicated the finding of Experiment 4 regarding the relationship between words and faces representing anger and disgust. The words related to anger were correlated more strongly with the face expressing anger, while the face representing disgust was more correlated with the disgust related words. In addition, the action tendencies of punishment and avoidance were associated with the emotions of anger and disgust respectively as in Experiment 4.

Experiment 6

Introduction

Previous research proposes differences in the realm of harm, so that violations of different moral norms would elicit the perception of harm to different entities based on the moral codes that were violated (Shweder et al., 1997). Based on such theoretical distinctions, the main focus of this experiment was to investigate the effects of the manipulation of disgust on different types of harm. Results of Experiments 4 and 5 showed that such manipulations had different effects on actual and symbolic harm, so that the former was less affected by the manipulation than the latter. Based on the findings of Shweder and colleagues referred above, it is possible to establish a theoretical relationship between specific moral violations and specific types of harm. However, one possible limitation of the relationships reported by Shweder is that some of the moral violations described ('incidents'), were categorised by participants as violations of two different realms – such as autonomy

and divinity—to a similar extent. Although these results are suggestive, it is not possible to establish whether one type of violation is associated exclusively with only one of the moral codes, or to what extent the violation of one type could potentially elicit harm not theoretically associated with it (e.g., a violation of the ethics of autonomy could be also a violation of the ethics of divinity).

In a similar manner, the CAD triad hypothesis proposed a close relationship between the violations of the ethics of autonomy, community and divinity, and the emotions of anger, contempt, and disgust respectively (Rozin et al., 1999). However, the nature of these findings did not allow for an investigation of the possible effects of the violation of one of the ethics on other emotions, so that it is not possible to establish to what extent violations of one cluster elicited other emotions than the one predicted (e.g., a violation of the ethics of divinity could potentially elicit anger as well as disgust). The measurements of Rozin and colleagues were based on a forced selection of one of several faces representing a specific emotion. This forced choice did not allow for the investigation of the possible relationships between the emotions involved –such anger and disgust—although some other research has proposed that this emotions are closely related (Alvarado, 1998; Shaver et al., 1987). Empirically, this relationship can be seen in the results of Experiments 2, 3, 4, and 5, which showed a consistent, high, and significant correlation between the emotions of anger and disgust.

A more detailed investigation of these relationships was presented in Experiments 4 and 5, manipulating the presence or absence of elicitors of anger and disgust independently (Experiment 4), and disgust without harm described (Experiment 5). In terms of the CAD triad hypothesis, the story that was manipulated in Experiment 5 can be associated with the cluster of violations of divinity. The moral violation was described as consensual and violated a moral norm related to

eating behaviours, the body and nature, all of which are part of the cluster of violations of divinity. In addition, in previous studies the results showed that the effect of the manipulation of disgust has been stronger on the emotion of disgust than on the emotion of anger. Results of Experiments 4 and 5 suggested that in the absence of actual harm described, the manipulation of disgustingness created the presumption of harm to others based on symbolic entities such as violations of rights of other people. However, because the described action can be portrait as a violation of the cluster of divinity, and the results showed that disgust was affected more than anger; it is plausible to predict different effects on harm related to nature, the community and the individual.

This experiment included measures of harm towards individuals and two symbolic entities—namely nature and community—following Shweder's categorisation of moral violations. The measure of real harm used in the previous experiments was separated in more detailed questions regarding physical, psychological and emotional harm to someone; whereas symbolic harm was separated in measures regarding harm to nature and to the community. Based on the results of Experiments 4 and 5, it was expected that the manipulation of disgust would have a stronger effect on symbolic than on real harm. Furthermore, and in line with the CAD triad hypothesis (Rozin et al., 1999, see also Chapter 1), and the findings by Shweder and colleagues (1997), it was anticipated that the manipulation of disgust would have a stronger effect on violations of divinity, so that entities such as nature would be perceived as been more harmed, than those related to community or individuals. It was also predicted that the manipulation on disgust would have a stronger effect on the emotion of disgust than on the emotion of anger, replicating the findings of Experiments 4 and 5. Another expected result was the relationship between emotions and action tendencies found in Experiments 3, 4 and 5, so that

anger would be associated to punishment and disgust would be associated to avoidance.

Method

Participants

Seventy-nine participants of the Norwich Arts Centre and the Norwich Environmental Centre responded individually to a questionnaire on voluntary basis. Of these, 43 were males and 36 were females. After the questionnaire was completed, all participants were thanked and debriefed.

Design

This experiment had a single factor with 2 levels between participants design (Condition: disgust vs. control).

Materials

The questionnaire consisted in a booklet that contained one fictitious story that was modified to create two different conditions, whether the main character of the story performed either a disgusting or a non-disgusting action. These stories were similar to the ones used in Experiment 5. In both cases, no explicit harm to others was described as a result of the action of the main character of the story.

Symbolic harm: Four items measured the perceived symbolic harm associated with the action performed by the main character of the story: "Do you think the action of the scientist violated the rights of anyone apart from her?", "Do you think

the action of the scientist violated the laws of nature?", "Do you think the action of the scientist caused any damage to the community?" and "Do you think the action of the scientist caused any damage to the natural order of things?". Responses were given in bipolar scales from 1 (Not at all) to 9 (extremely).

Real harm to others: Three items measured the perceived symbolic harm of the action: "Do you think the action of the scientist caused any physical harm to anyone?", "Do you think the action of the scientist caused any psychological harm to anyone?" and "Do you think the action of the scientist caused any emotional harm to anyone?" These responses were given in a similar scale as those related to symbolic harm.

Evaluation of the action: The evaluation of the action of the main character of the story was measured with four items in the form of bipolar scales from 1 (completely right / good / correct / positive) to 9 (Completely wrong / bad / incorrect / negative).

Emotion items. In the *verbal emotion* items, participants were asked to indicated to what extent each story made them feel anger, compassion, depression, disgust, happiness, infuriation, outraged, pity, pleasure, repulsion, sadness, satisfaction, sickness, sorrow, sympathy, grossed-out and contempt. These measures were answered in scales from 1 (not at all) to 8 (very). In the *facial emotion* items, two photographs of female faces were shown, one showing disgust in the full form and the other showing anger in the open mouth form. Participants were instructed to "select the face that best describes your feelings towards the scientist now". The photos were the same used in Experiment 5 and participants were asked to indicate separately how much of each of the feelings represented by each face they had towards the scientist in scales from 1 (not at all) to 9 (extremely).

Action tendencies: Participants then were asked to indicate two action tendencies: punishment and avoidance, each one measured using two items. For punishment the items were "How much would you like to punish the scientist?" and "How much would you like to publicly condemn the scientist?"; for avoidance, they were "How much would you like to avoid the scientist?" and "How much would you like to move away from the scientist?". These questions were indicated in a scale from 1 (not at all) to 9 (extremely).

Procedure

After the presentation of the story approximately half of the participants were requested to answer the items regarding symbolic harm, while the other half were requested to answer the questions regarding real harm. After that, all participants answered the items regarding the evaluation of the action, followed by the verbal and facial measures of emotion and the action tendencies measures. Participants then answered the remaining measures related to harm that they did not answer before due to the order of the presentation in the booklet.

Results

Evaluation of the action

The four evaluation items (Cronbach's alpha = .88) were averaged to create one single score. Analysis of variance on the evaluation score showed a significant main effect of Condition F (1, 79) = 8.71, MSE = 2.60, $p < .01$, indicating that the disgusting action was evaluated more negatively than the non-disgusting action. Means and standard deviations are shown in Table 20.

Table 20. Mean and standard deviation of evaluations, harm, emotions and action tendencies by condition

	Condition	
	Control	Disgust
Evaluation	4.56 (1.24)	5.63 (1.94)
Real harm	2.56 (1.58)	3.53 (2.03)
Harm to nature	3.01 (2.18)	5.38 (2.89)
Harm to community	2.46 (2.03)	3.13 (2.16)
Anger words	1.70 (1.69)	2.18 (1.28)
Disgust words	1.51 (.82)	3.39 (2.19)
Anger face	1.68 (1.21)	2.29 (2.04)
Disgust face	1.95 (1.76)	3.61 (2.65)
Combined score Anger	-.18 (.74)	.19 (.90)
Combined score Disgust	-.41 (.45)	.44 (1.05)
Punishment	2.44 (2.04)	2.76 (2.29)
Avoidance	3.14 (2.56)	4.49 (3.05)

Note: Standard deviations are in parenthesis

Symbolic and real harm

Principal components analysis with varimax rotation was used to explore the differences between the items measuring real and symbolic harm. Analysis

requesting eigenvalues above 1, revealed two distinctive factors, one with the items of real harm and another including the items of symbolic harm. This analysis accounted for 73.07 % of the variance (54.08 % and 18.99 % by the first and second factor, respectively, Table 21).

Table 21. Principal components analysis of the symbolic and real harm items (2 factors solution).

	Factors	
	Symbolic harm	Real harm
Rights	.704	
laws of nature	.867	
community	.750	
natural order	.891	
physical harm		.808
psychological harm		.833
emotional harm		.840

Note: Factor loadings under .40 are not shown

Two indexes were created using the items related to symbolic harm (Cronbach's alpha = .85) and real harm (Cronbach's alpha = .83). These indexes were correlated at r (77) = .48, $p < .001$; so a 2 (Harm: symbolic vs. real, within participants factor) was added to the basic design. A mixed model analysis of variance revealed a marginal main effect of Harm F (1, 77) = 3.68, MSE = 2.18, p = .06, suggesting a higher perception of symbolic than real harm. A significant main

effect of Condition was present, F (1, 77) = 11.38, MSE = 5.37, $p < .01$; indicating more overall perceived harm as product of the disgusting action than the non-disgusting action. The interaction between the factors was not significant, F (1, 77) = 1.34, MSE = 2.18, $p = .25$.

Because the expected Condition x Harm interaction was not significant, and although the indexes of symbolic and real harm had acceptable Cronbach's alphas and factor loadings, a factor analysis requesting 3 factors was performed. This analysis revealed that the items related to symbolic harm loaded in two different factors, accounting for more variance explained that the previous analysis (83.42 %). These results suggested that the index of symbolic harm was formed by two different sub indexes (Table 22), one regarding harm to the nature or natural order (18.99 % of variance explained) and a second one related to harm to the community (10.34 % of variance explained). Confirmatory factor analysis was used to compare the fitness of the data with three different models. A two-factor model (symbolic vs. actual harm), a three-factor model (real vs. nature vs. community) in which the factors were not correlated, and a three-factor model (real vs. nature vs. community) in which the factors were correlated. Results revealed that the third model was better than the other two, being the one showing the best fit (Table 23). This model also supports the distinction between the three types of harm predicted theoretically by the "big three" theory of morality (Shweder et al., 1997), and the CAD triad hypothesis (Rozin et al., 1999).

Table 22. Principal components analysis of the symbolic and real harm items (3 factors solution).

	Factors		
	Real	Nature	Community
Rights			.840
laws of nature		.880	
Community			.841
natural order		.870	
physical harm	.746		
psychological harm	.856		
emotional harm	.874		

Note: Factor loadings under .40 are not shown

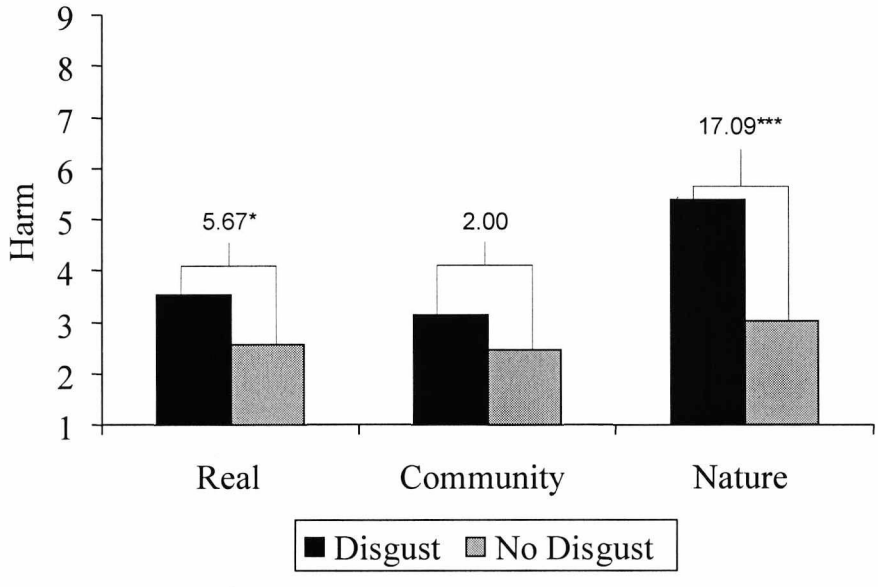
Table 23. Confirmatory factor analysis results and goodness of fit indicators

Model	χ^2	df	p	RMSEA	CFI	NFI
Two factors	44.74	13	<.001	.19	.89	.86
Three uncorrelated factors	64.80	16	<.001	.20	.83	.79
Three correlated factors	6.74	11	.82	0	1.00	.98

A mixed model analysis of variance with a 3 (Harm: nature vs. community vs. real, within participants factor) x 2 (Condition: control vs. disgust, between participants factor) revealed significant main effects of Harm, F (2, 154) = 16.77,

MSE = 2.62, $p < .001$, and Condition F (1, 77) = 11.85, MSE = 8.92, $p < .001$. Importantly, these main effects were qualified by a significant Harm x Condition interaction F (2, 154) = 6.20, MSE = 2.62, $p < .01$. Simple effect analysis revealed that the manipulation of disgust had no significant effect on harm to the community F (1, 77) = 2.00, MSE = 4.40, $p = .16$, whereas there was a significant effect on real harm, F (1, 77) = 5.67, MSE = 3.28, $p < .05$, and an even larger effect of harm to nature F (1, 77) = 17.09, MSE = 6.48, $p < .001$ (Figure 7).

Figure 7. Real, community and nature harm by condition



Emotions

Words measures. The 3 items related to anger (anger, infuriation and outraged; Cronbach's alpha = .78), and the 4 items regarding disgust (disgust, sick, repulsed and grossed-out; Cronbach's alpha = .93) were averaged to create one index for each emotion. These indexes were correlated at r (77) = .61, $p < .001$. A mixed model analysis of variance adding a 2 (Emotion: anger vs. disgust, within

participants factor) to the basic design revealed significant main effects of Emotion F (1, 77) = 12.02, MSE = 0.87, $p < .001$, and Condition F (1, 77) = 16.73, MSE = 3.29, $p < .001$. A significant interaction between these factors was also present F (1, 77) = 23.35, MSE = 0.87, $p < .001$. Simple effect analysis revealed that disgust was more affected by the manipulation of the action F (1, 77) = 26.29, MSE = 2.66, $p < .001$, than anger was F (1, 77) = 3.04, MSE = 1.50, $p = .09$. Means and standard deviations are in Table 20.

Facial measures. Nine participants did not select any of the faces, all of them in the control condition. Analysis of the remaining responses revealed that the correlation between the faces selected was r (77) = .41, $p < .001$. The face representing disgust was selected more overall (53 times, 75.7 %), than the face representing anger (17 times, 24.3 %). Further analysis revealed that this pattern was repeated for both conditions, but the effect was stronger in the disgust condition (Table 24).

Table 24. Count, percentage and χ^2 test of selection of the faces of anger and disgust by condition.

	Condition	
	Disgust	Control
Anger face	6 (15.8)	11 (34.4)
Disgust face	32 (84.2)	21 (65.6)
χ^2 (1)	17.79***	3.13†

Note: Numbers in parenthesis represent percentages, † = $p < .10$, *** = $p < .001$

A mixed model analysis of variance with a 2 (Face: anger vs. disgust within participants factor), replacing the words measures with the facial measures revealed significant main effects of Face F (1, 77) = 9.97, MSE = 2.48, $p < .01$, and Condition F (1, 77) = 9.59, MSE = 5.26, $p < .01$, as well as a significant interaction between these factors F (1, 77) = 4.36, MSE = 2.48, $p < .05$, indicating that there was a significantly higher reported level of disgust than anger in the disgust condition, t (37) = 2.84, $p < .01$, but no significant difference between the emotions in the control condition t (40) = 1.21, $p = .23$ (Table 20).

The face representing anger was more correlated with the index related to anger words r (77) = .41, $p < .001$, than with the index representing disgust words, r (77) = .23, $p < .05$, this differences was marginally significant t (76) = 1.94, $p = .06$. Likewise, the face representing disgust was more correlated with the disgust index r (77) = .63, $p < .001$, than with the anger index r (77) = .39, $p < .001$, this difference was significant t (76) = 2.97, $p < .01$.

As in previous experiments, one score for each emotion was created averaging the standard value of the faces and words measures of each emotion. These scores were correlated at r (77) = .54, $p < .001$. Analysis of such scores using a 2 (Emotion: anger vs. disgust, within participants factor) x 2 (Condition: Disgust vs. control, between participants factor) mixed model analysis of variance revealed a significant main effect of Condition, F (1, 77) = 14.94, MSE = 0.99, $p < .001$, suggesting a higher overall indication of anger and disgust in the disgust condition than in the control condition. This main effect was qualified by a significant Emotion x Condition interaction, F (1, 77) = 6.91, MSE = 0.32, $p < .05$, indicating a higher level of disgust in the disgust condition, t (37) = 1.47, $p = .15$, and a significantly higher level of anger in the control condition, t (40) = 2.92, $p < .01$. Simple effects analysis showed that the disgustingness of the action had a significant effect on both

emotions, but a stronger effect on disgust, F (1, 77) = 22.36, MSE = 0.64, $p < .001$, than on anger, F (1, 77) = 4.09, MSE = 0.68, $p < .05$ (Table 20).

Action tendencies

The 2 items related to punishment (correlated at r (77) = .73, $p < .001$) were averaged to create one index of punishment, the same procedure was used with the 2 items related to avoidance (correlated at r (77) = .82, $p < .001$). These two indexes were correlated at r (77) = .75, $p < .001$ and analysed using a 2 (Tendency: punish vs. avoidance, within participants factor) x 2 (Condition: Disgusting vs. control, between participants factor) mixed model analysis of variance. This analysis showed a significant main effect of Tendency, F (1, 77) = 34.08, MSE = 1.72, $p < .001$, revealing that avoidance was endorsed significantly more than punishment; this main effect was qualified by a significant Tendency x Action interaction, F (1, 75) = 5.88, MSE = 1.72, $p < .05$, suggesting that avoidance was endorsed significantly more in the disgusting condition than in the control condition, t (77) = 2.13, $p < .05$, while the difference in the endorsed punishment between the conditions was not significant, t (77) = .66, $p = .51$ (Table 20).

Relationship between harm and emotions

Previous analysis showed that the presence of a disgusting element in the story increased the perception of real harm and harm to nature. Regression analysis was used in order to investigate the relationship between the emotions of anger and disgust and the types of harm found. The indexes of the three types of harm were used as predictors of each emotion. Results showed that, in the control condition,

both emotions were predicted by real harm only (Table 25), with $R^2 = .29$ for anger and $R^2 = .25$ for disgust; while in the disgust condition, the best predictor for both emotions was harm to nature, being the $R^2 = .17$ for anger and $R^2 = .19$ for disgust.

Table 25. Standard regression coefficients of types of harm predicting anger and disgust

	Control			Disgust		
	Real	Nature	Community	Real	Nature	Community
Anger	.48**	-.13	.21	.11	.32†	.07
Disgust	.34*	-.07	.31	-.11	.45*	.02

Note: † = $p < .10$, * = $p < .05$, ** = $p < .01$

In order to replicate the findings of Experiments 4 and 5 regarding the relationship between presumption of harm and anger, one composite score was computed averaging the scores of the three types of harm. This score was regressed using the combined scores of words and faces of anger and disgust as predictors. Results indicated that in the control condition neither anger ($\beta = .22$, $p = .32$) nor disgust ($\beta = .29$, $p = .18$) were significant predictors of harm and were not significantly different, $t(38) = .11$, $p = .92$. In the disgust condition anger, ($\beta = .33$, $p = .07$) was a marginally significant predictor of harm, while disgust was not ($\beta = .10$, $p = .58$), the difference between them was not significant $t(35) = .28$, $p = .78$.

Relationship between emotions and action tendencies

In order to test the relationship between anger and punishment, and disgust and avoidance; the indexes of the emotions were used as predictors of each action

tendency. As with the previous studies, the correlation between punishment and avoidance was high, so the action tendency that was not being analysed was included in the analyses in a second step in the regression model to control for the shared variance between the tendencies. Results showed that anger significantly predicted punishment ($\beta = .36$, $p < .001$), while the contribution of disgust was significant but in the opposite direction ($\beta = -.34$, $p < .001$). For avoidance, disgust was a significant predictor ($\beta = .40$, $p < .001$), while the contribution of anger was in the opposite direction ($\beta = -.21$, $p < .05$).

Relationship between evaluations, harm and emotions

Regression analysis was used to assess the individual effect of both emotions and the three indexes of harm on the evaluation of the action. Results revealed no significant individual contribution of any of the variables on the evaluation of the action in the control condition ($R^2 = .12$); whereas in the disgust condition the emotion of disgust was a significant predictors of the evaluation, as well as real harm and harm to nature ($R^2 = .64$). The contribution of harm to the community was significant, but in the opposite direction. Standardised regression coefficients are shown in Table 26.

Table 26. Standardised regression coefficients of harm and emotions on the evaluation of the action.

	Condition	
	Control	Disgust
Combined score anger	.20	.14
Combined score disgust	-.01	.34*
Real harm	.06	.61***
Harm to nature	.17	.28*
Harm to community	.04	-.31*

Note: * = $p < .05$, *** = $p < .001$.

General discussion

The experiments in this chapter further investigated the effect of a moral violation that was described without harm to others on the presumption of harm. Experiment 5 replicated the findings of Experiment 4 using only the conditions in which no harm to others was described, and separating the measures of perceived harm to others from the perceived benefit product of the action. This important distinction allowed to account for the possible effect of the benefit associated with the action of the main character of the story, so that possible differences between actual and symbolic harm could be assessed. The separation of these two types of harm also allowed confirmation that symbolic harm was affected more strongly than actual harm by the manipulation of the disgusting action. In line with the social intuitionist model (Haidt, 2001), it was predicted that symbolic harm would be used

as a post-hoc justification for the negative evaluation of the action under cognitive constrain, even when no harm to others was described. The results confirmed this prediction, which was suggestive but not statistically significant in Experiment 4.

Experiment 6 was focused on separating the measures of symbolic and real harm into more detailed components, such as harm to nature, to the community and to the individual. Although the original distinction between symbolic and real harm was useful in Experiments 4 and 5 and was confirmed using factor analysis, a more clear separation between the components of harm allowed to use the theoretical model proposed by Shweder and colleagues (1997), in order to associate real harm with harm to the individual, and to separate symbolic harm into harm to the nature and harm to the community. The more accurate separation of the types of harm was established using a confirmatory factor analysis, and also revealed that the effect of the disgusting action was significant only on the harm related to nature and the harm related to the individual, whereas the harm related to community was not affected.

These findings provide experimental support of the distinction proposed by the "big three" theory of morality (Shweder et al., 1997), so that distinct moral violations are associated to different moral codes. In terms of this "big three" proposal, results of Experiment 6 involved violations of the code of divinity (nature, the sanctity of the body and food), and violations of the code of autonomy (individual harm), but not violations of the moral code of community. The distinction between these 3 types of harm allowed to partially investigate the relationship between harm and emotions proposed by the CAD triad hypothesis. Results confirmed that disgust was affected more than anger by the manipulation of the disgustingness of the action, since its effect was marginal on anger and significant on disgust. It was also found that the relationship between emotions and harm was affected by the manipulation of disgust referred above. Anger and disgust were

associated with real harm in the control condition, whereas in conditions describing a disgusting action both emotions were associated to harm to nature, although anger was just marginally related. This change confirms the relationship between moral violations of the code of divinity and disgust (Rozin et al., 1999). As in previous experiments, there was a close relationship between anger and punishment and disgust and avoidance. The higher level of disgust over anger was also confirmed despite the high correlation between them.

CHAPTER 7

SUMMARY AND CONCLUSIONS

This chapter summarises the results of the experiments reported in the preceding chapters. These results give strong support to the central notion that emotions are closely related to violations of moral norms. In investigating this relationship, this thesis was focused on the emotions of anger and disgust and the role they play in moral judgement. Contrary to rationalistic models of morality that are based only on the consequences of an action, these results suggest that emotions play an important role in the evaluations of actions, at least in the domain of morality. Additionally, it is argued that in the case of actions that do not harm other people physically, but violate deep-held norms that elicit disgust, a presumption of harm is created, mostly in the form of symbolic harm to entities that are important to the individual, such as nature, tradition and values; this presumption of harm is closely related to anger and punishment. One constant finding across the experiments presented in this thesis is the high and significant correlation between anger and disgust. In examining this correlation, it is proposed that these two emotions have distinct specific features such as action tendencies and facial expressions, and they respond differently to different elicitors; however they are closely related.

The sections presented below summarises the main findings of this thesis. Initially, the main findings of each experiment are briefly summarised. Then follows a small meta-analytical integration of the results of the combined effects of several experiments that had similar features. In the next section findings related to anger and disgust are summarised, followed by the outline regarding the presumption of harm. This chapter concludes with a summary of the findings of the evaluation of the

action and the action tendencies of punishment and avoidance. Implications of the findings of this thesis together with limitations of the current research are considered, and possible future research is outlined.

Background and aims of the thesis

Central to this thesis is the investigation of the relationship between morality and emotions. More specifically, this work addresses some of the limitations present in both rationalistic models of morality and cognitive theories of emotions. As previously stated, rationalist models have dominated research in the field of morality. These models roughly propose that the correctness of an action can be established in considering the consequences of an action, so that if an action has negative consequences for others, it is morally incorrect. This proposal can be traced back to moral philosophy and psychology (e.g., Aristotle, 4th Century B.C./1998; Bennett, 1998; Dunning & Wales, 2003; Feinberg, 1989; Foot, 2002; Gauthier, 1987; Turiel et al., 1991). Another important feature of rationalist theories is that emotions and affect are relatively not involved in the processes of moral judgement, because the correctness of an action is established by moral reasoning (e.g., Kohlberg, 1969; e.g., Kohlberg, 1971; Piaget, 1932/1977).

Despite most research on morality focusing mainly on rationalistic approaches, there is considerable evidence that emotional reactions are involved in moral judgement and moral reasoning. Although limited, this research has shown that emotions can be an important part of the moral judgement process, as in the social intuitionist approach (Haidt, 2001); or that different emotions are closely related to morality, as in the CAD triad hypothesis (Rozin et al., 1999).

Theories of emotions that rely mostly on the cognitive evaluation of actions, usually referred as appraisal theories (e.g., Frijda, 1986; Lazarus, 1966, 1991; Ortony et al., 1988; Roseman & Smith, 2001; Scherer, 1996, 2001; Scherer, Schorr, & Johnstone, 2001), have proved useful predicting accurately the elicitors of emotions and their likely outcome, including not only the experienced emotion, but behavioural reactions as well. However, the predictions of these theories are not clear when the elicitors of more than one emotion are present in the same action or situation, or when the cognitive capacities of the person are diminished by a secondary task, as in the cognitive load conditions in this research. Based on the results of some of the experiments in this thesis, it is proposed that the emotion that requires less cognitive processing (in this case, disgust), would have a stronger effect on moral judgement than the other emotion (Bargh, 1994). In order to improve the study of emotional reactions the cognitive demands of the emotions studied should be taken into consideration.

Despite their importance and the accuracy in predicting emotional reactions, one problematic situation for both rationalistic models based on the consequences of an action, and cognitive theories of emotions, is exemplified by the moral dumbfounding effect, in which participants have a strong negative moral judgement that is rationally unjustifiable based on the consequences of the action (Haidt et al., 2004). Even more, this limitation becomes more problematic when the action performed violates a deep-held moral rule and elicits a negative emotional reaction, such as disgust. Contrary to rationalistic models, empirical evidence has shown that in such situations emotions are involved, and it has been proposed that these emotional reactions can precede moral judgement. In the case of cognitive theories of emotions, the evidence has shown that the predictions of these theories are not clear, often leading to confusing results in which emotions are mixed or the predicted

results are inaccurate. In investigating the processes of moral judgement and moral reasoning in situations such as those leading to the moral dumbfounding effect, the social intuitionist model proposes that emotions—in the form of intuitions—can be the cause of moral judgement, preceding moral reasoning.

Work based on the CAD triad hypothesis has also been shown a close relationship between types of moral violations and specific emotions. However, there is a lack of empirical evidence exploring the role of specific emotions as predictors of moral judgement and moral reasoning. Although these two proposals are closely related, the CAD triad hypothesis does not offer clear explanations for the moral dumbfounding effect, and the social intuitionist model does not clarify the 'content' of the intuitive reaction, so it is not clear whether the intuition is formed by a specific emotion, perceived harm or if it is just based on the negativity of the action. The research presented in this thesis fills the gap between the theoretical proposal suggesting the existence of a direct relationship between types of moral violations and specific emotions—the CAD triad hypothesis—and the proposal of the social intuitionist model regarding the use of emotions as predictors of moral judgement.

Summary of results

Six studies investigated the relationship between moral violations and evaluations, emotions, harm and action tendencies. More specifically, the experiments manipulated the nature of the action in order to elicit disgust, while simultaneously the described harm to others produced by the action was manipulated. The scenarios based on core or animal - nature disgust were evaluated as systematically worse than those that did not include references to these types of disgust. This feature was used in scenarios of experiments 4, 5, and 6 where an

element related to contamination, food incorporation and the sanctity of the body was present in the described stories. It is important to notice that this negative evaluation of a disgusting action was present even when no harm to others was described. The most relevant findings of the experiments presented are described below.

Chapter 3 included two experiments that contained six scenarios describing violations of moral norms, half of them with references to core disgust. Experiment 1 focused on the role of perceived harm as a moderator of the evaluation of an action. Results show that participants who perceived the action as low in harm did not change their evaluation after considering its consequences, whereas participants who indicated high levels of harm evaluated the action more negatively after considering its consequences. Results also suggest that the evaluation of actions related to core disgust are more difficult to change than evaluations of violations that are not related to core disgust. Experiment 2 more specifically measured anger and disgust, also including a cognitive load task. This experiment revealed that anger was more influential on the evaluation of the action than disgust when enough cognitive resources were available, while this influence was reversed under cognitive constraints.

Experiment 3 included three scenarios based on core disgust, but the target of harm was manipulated, so that the action either harmed only the person performing the action psychologically, or alternatively someone else, who was not the main character in the scenario. A condition in which no harm to anyone was described was included as a control condition. Measures of punishment and avoidance, which are the action tendencies theoretically associated to anger and disgust were also included (Berkowitz, 1989; Frijda et al., 1989). Results reveal the expected worse evaluation, and higher levels of anger, disgust, perceived harm, punishment and avoidance in the conditions that described harm to others. Importantly, the findings also uncover high

levels of perceived harm to others, together with considerable levels of anger and punishment, in conditions that did not described harm to others. These responses suggest that participants presume some level of harm to others based on the disgustingness of the action.

Building on the finding of presumption of harm, Experiment 4 orthogonally manipulated the described harm to others and the described disgust product of the action, including also a cognitive load manipulation. Another inclusion was a measure of symbolic harm in the form of violations of rights. Pictures of facial expressions of anger and disgust were added to the measures of emotions. It was found that anger is more affected by the manipulation of harm to others, while disgust is more affected by the manipulation of the disgusting action. Importantly, a presumption of harm to others was replicated in conditions that did not describe harm to others, but elicited disgust. Analysis also revealed that this effect was present only in the symbolic harm measure when cognitive load was not present. In line with the social intuitionist model (Haidt, 2001), these results suggest that the presumption of harm was a post-hoc justification of the initial negative reaction product of anger, and that this presumption of harm requires cognitive resources.

Experiment 5 partially replicated the design of Experiment 4, using the conditions that did not describe harm to others, and with an identical manipulation of cognitive load. A correction of the measures of actual harm was included to establish direct comparisons between actual and symbolic harm. These improvements confirm the post-hoc nature of the presumption of symbolic harm product of the action based on core disgust. Experiment 6 more carefully investigated the nature of symbolic harm, and was further based on the proposal that three codes of morality related to autonomy, community, and divinity exist (Shweder et al., 1997), which have respectively different relationships with the emotions of anger, contempt and disgust

(Rozin et al., 1999). Results indicate the existence of perceived harm in three different entities; on the level of the individual, the community or group, and the level of nature and natural order. In line with the CAD triad hypothesis, the manipulation of disgust—which includes references to the body and to food—had a significant effect on the prescription of harm related to the individual, and a stronger effect on the prescription of symbolic harm to nature, while the effect was not significant for the prescription of harm related to the community.

Combination of effect sizes

Although each experiment investigated different specific hypotheses, some of the features of experiments 4, 5, and 6 are similar. These three experiments include a manipulation related to the effect of a disgusting action that does not describe harm to others performed without cognitive load. In all cases the combined effect compared the disgusting action vs. the non-disgusting action, when no harm was described and without cognitive load. Because of these similarities in the experiments, it is possible to combine the effect of their individual outcomes in the form of effect sizes. In order to explore the combination of effect sizes, a small meta-analytic integration was performed on the equivalent results of these three studies (Mullen, 1989). The analyses were related to the evaluation of the action, the emotions of anger and disgust, and to the action tendencies of punishment and avoidance.

The effect of the manipulation was weighted by the sample size of each experiment, resulting in 3 hypothesis tests for each dependent variable (Table 27). Cohen (1977, cited in Mullen, 1989), identified small, medium and large effect sizes corresponding to r values of .10, .30, and .50, respectively. The interpretation of

effect sizes is based on this recommendation. In all the hypotheses, the direction of the effect was as predicted.

Table 27. Hypothesis test for the meta-analytical integration

				Significant effect size					
	Experiment	df	N	Fisher Z	D	r	r^2	z	p
disgust	4	45	47	1.38	3.68	.88	.78	8.20	0.00E+00
	5	49	51	0.66	1.41	.58	.34	4.49	3.53E-06
	6	77	79	0.51	1.06	.47	.22	4.39	5.61E-06
anger	4	45	47	0.37	0.73	.35	.12	2.42	7.71E-03
	5	49	51	0.11	0.21	.11	.01	0.76	2.24E-01
	6	77	79	0.22	0.45	.22	.05	1.97	2.44E-02
avoidance	4	45	47	0.78	1.68	.65	.42	4.95	3.75E-07
	5	49	51	0.35	0.72	.34	.12	2.47	6.85E-03
	6	77	79	0.25	0.48	.24	.06	2.10	1.79E-02
punishment	4	45	47	0.42	0.85	.40	.16	2.77	2.80E-03
	5	49	51	0.11	0.22	.11	.01	0.78	2.17E-01
	6	77	79	0.07	0.15	.07	.01	0.65	2.57E-01
evaluation	4	45	47	0.56	1.15	.51	.26	3.64	1.39E-04
	5	49	51	0.30	0.59	.29	.08	2.04	2.08E-02
	6	77	79	0.33	0.66	.32	.10	2.86	2.15E-03

Note: exact *p* values are given in scientific notation

Anger and disgust

A constant finding across several experiments is the high and significant correlation between anger and disgust. Although theoretically these two emotions can be distinguished based on several features, such as action tendencies, their different elicitors, and distinguishable facial expressions, results of experiments 2 to 6 show that these emotions are hard to distinguish. Some of these results also reveal that there were higher overall levels of disgust than anger, and that anger is affected more by manipulations of harm, whereas disgust is affected more by manipulations of the disgusting action. The inclusion of pictures representing facial expressions of these emotions facilitated the distinctions between them. The face representing anger was consistently more correlated with the words related to anger, while the face representing disgust was more correlated with the words related to disgust. The addition of facial expressions also addresses the concern revised by Nabi (2002), that lay people use disgust terms when referring to anger. The combined scores of words and facial expressions are consistently less correlated than the measures of words only.

It was predicted that the manipulation of the disgusting action would have a stronger effect on disgust than on anger. Results confirmed this prediction, revealing that the combined effects of studies 4, 5, and 6 showed a reliable, large effect size on disgust, $Z_{Fisher} = .78$, $r = .65$, $p < .001$, although these effects were not significantly homogenous X^2 (2) = 22.64, $p < .001$. The effect of the disgust manipulation on anger was reliable, but from small to medium size, $Z_{Fisher} = .23$, $r = .23$, $p < .01$, and significantly homogenous X^2 (2) = 1.50, $p = .47$. Although the difference in effect sizes was expected, the presence of such an effect on anger is in itself an important finding because—as with the presumption of harm—this effect is difficult to address

theoretically using appraisal models of emotions, as these would suggest the presence of disgust only. Berkowitz's cognitive neoassociationistic model (1990), can predict the elicitation of anger based on the presence of disgust. However, this model would also predict a reduction of anger after a high-order cognitive analysis of the action, leaving only the emotion of disgust. If this process is disrupted by cognitive load, the reduction of anger should not occur. Results, however, revealed a reduction of anger under cognitive load, so that the presented findings do not support this prediction. It is important to notice an intrinsic limitation in the predictions of the cognitive neoassociationistic model, as it predicts that disgust can elicit anger, but is not clear about changes in anger under cognitive constraint.

The social intuitionist model is not explicit about anger, disgust or any other emotions. Although it advances the possibility that emotions can predict moral judgement in the form of intuitions, so that the disgusting actions described would be 'intuitively wrong', it offers no specific prediction about anger, or any other emotional reaction because it is focused solely on moral judgement.

Presumption of harm

Results of experiments 3, 4, and 5 uncovers that participants indicate some degree of harm to others when faced with descriptions of actions based on core disgust, even when no such harm is described. Results of Experiment 3 reveal the presence of harm to others in the conditions that describe no harm or harm to the person performing the action, but not to others. This finding was explored in more detail in Experiment 4, using an independent manipulation of the disgusting action and the described harm. Results confirm the presence of a presumption of harm based on the disgustingness of the action. The improvement of the measures of actual

and symbolic harm in Experiment 5 further confirms the findings of Experiment 4, supporting the post-hoc nature of the presumption of harm. This presumption of harm was easier to justify as symbolic rather than actual harm, but only with enough cognitive resources.

The pattern of responses found is not easy to address with theoretical models of morality based on consequences (e.g. Kohlberg, 1969), and it is also problematic for theories of emotions based on cognitive appraisals (e.g. Lazarus, 1991; Ortony et al., 1988; Scherer, 2001). The alternative explanation offered by the social intuitionist model is supported by the results presented in the previous chapters (Haidt, 2001). This theoretical model would predict that participants have a negative reaction based on the disgusting action, before they evaluate its possible consequences, so that a plausible way to justify such a negative reaction is to address some degree of harm to others, symbolic harm being the easier one to justify. The process of justifying this kind of harm is thought to be a task that requires cognitive resources—as has been shown by the moral dumbfounding effect—so in conditions with cognitive load this process should be disrupted. Results of experiments 4 and 5 support this prediction. Results of Experiment 6 were based on the "big three" codes of morality (Shweder et al., 1997), and the CAD triad hypothesis (Rozin et al., 1999). The latter would predict that entities related to the body and nature would be particularly affected by the manipulation of disgust in the scenarios because of its content. This findings support this prediction.

Evaluation of the action

In all the experiments presented (1 to 6), a consistent finding is the more negative evaluation of actions that describe an action that elicits disgust. In

experiments 1 and 2, the group of scenarios that made references to core or animal - nature disgust (Rozin & Fallon, 1987; Rozin et al., 1999), were evaluated worse that those scenarios that did not describe such elements. A similar pattern was found in experiments 4, 5, and 6, as the results of Experiment 3 were focused on the target of harm and not on the comparison of conditions that described disgusting actions or not. A combined analysis of the results of the last 3 experiments reveal a reliable, medium effect of the manipulation of harm on the evaluation of the action $Z_{Fisher} = .38$, $r = .36$, $p < .001$, which resulted significantly homogenous $X^2 (2) = 2.00$, $p = .37$, so that even in conditions that did not include descriptions of harm to others, the effect of the manipulation increased the negativity of the evaluation.

The relationship between negative evaluations and perceived harm is well established in theoretical models such as appraisals (Lazarus et al., 1970; Oatley, 1993; Scherer et al., 2001), and research focused on attributions (Weiner, 1986, 1995). However, the relationship between disgusting but harmless actions and negative evaluations is not easy to predict theoretically using rationalist theories (Haidt, 2001; Haidt, 2003), and it is a complicated process for lay people, as the moral dumbfounding effect suggests. Results presented in the previous chapters and confirmed with the meta-analytical integration, consistently show a more negative evaluation of disgusting actions. Once more, this negative evaluation can be seen as a justification of the negative reaction based on disgust proposed by the social intuitionist model.

Action tendencies

Punishment and avoidance are action tendencies theoretically associated to anger and disgust, respectively. As with the anger and disgust, results (experiments 3

to 6) revealed significant correlations between these action tendencies that were not predicted theoretically. It was expected that anger would predict punishment, while disgust would predict avoidance, it was found that this pattern is accurate once the shared variance between the action tendencies was controlled statistically.

Although significantly correlated, these action tendencies contribute to the differentiation of anger and disgust, so that each action tendency was predicted by the theoretically associated emotion after the statistical control mentioned above. These findings support Frijda's (1986) proposal of action tendencies being an integral part of the emotional process.

The manipulation of the disgusting action had similar effects on the action tendencies as it had on anger and disgust. Because avoidance is associated with disgust, it was predicted that it will be more affected by the manipulation of disgust than anger. Results support these findings, since the manipulation had a medium to large effect size $Z_{Fisher} = .42$, $r = .40$, $p < .001$, that was not significantly homogenous X^2 (2) = 8.39, $p < .05$, while the effect on punishment was small to medium in size, $Z_{Fisher} = .18$, $r = .18$, $p < .05$, and significantly homogenous X^2 (2) = 3.89, $p = .14$, both effects being reliable. The effect the manipulation of disgustingness had on anger can also be extended to the tendency to punish. Results indicate that even when no harm to others is described, moral violations that are disgusting can elicit anger and punishment, and not only disgust and avoidance.

Implications of the research

The findings summarised above can extend our understanding of moral judgement and moral reasoning. As discussed before, research in this field has mainly focused on rationalistic theories of morality, claiming that the perceived

consequences of an action are the main way to establish its correctness. Alternative research has shown that emotions are not only involved in moral judgement (Rozin et al., 1999), but that emotions may even precede moral reasoning (Haidt, 2001), forming the basis of moral judgement. The incorporation of emotional and affective reactions into the research on morality provides more complete explanations of phenomena in which an action elicits a negative emotional reaction, but can also be considered a transgression of a norm endorsed by a group or community.

An important point regarding the emotion of disgust is that it can be elicited not only by contaminating items—core disgust—, but also by violations of social norms or values (Rozin et al., 1999). This feature is central in understanding the negative reactions towards some individuals or groups, such as people with disabilities. For example, prejudice against a person with a disability has been found to be intensified by concerns about contagious disease, even if the disability was a result of an injury (Park, Faulkner, & Schaller, 2003); the perception of contagion, which is closely related to disgust, can also be found in research on stigmatisation (Kurzban & Leary, 2001). Although the scenarios used in this thesis were extreme cases of violations in order to clarify the roles of the emotions involved, these findings can be extrapolated to other situations or groups. The relationship between a contaminating or harmful element and a specific group can be seen also in some comments about homosexuality and people with HIV/AIDS (Reeder & Pryor, 2000), showing that people with HIV is associated with a promiscuous behaviour, even if the person is heterosexual and acquired HIV because of a transfusion. This relationship was also used by the Nazi propaganda against the Jews before and during the Second World War, with references to 'pestilence' and 'decomposition' as descriptors of this group (Hitler, 1933/1974). Because disgust can be used to identify some individuals or groups as a source of contamination, the most likely reaction is

to avoid the individual or group; however, it is plausible to think that anger and aggressive reactions can also be elicited. This effect can be seen more clearly in the meta-analytical integration, showing that anger and the tendency to punish a disgusting action, even when it was described as private, consensual and without harm to other people, can be the result of an action that elicits disgust. Our results can provide a plausible explanation for the negative and sometimes hostile interaction between individuals or groups that do not endorse the same standards of morality or that are associated with contaminating properties. Violations of moral norms can be perceived as harmful to others, even in cases where the action has no direct effect on others, but elicits negative emotional reactions.

A theoretical implication of the results of this thesis is the measurement of anger and disgust. Results revealed that these two emotions are closely related, but they have crucial differences. However, this high correlation can be a potential problem in the differentiation of these emotions, because the measurement of them in most research is often performed with the assumption that the emotion that is theoretically elicited corresponds to the emotion reported by the participant. In partial answer to the concerns raised by Nabi (2002) in the context of disgusting words being used as a metaphor of anger, results of this thesis clarify that anger also can be elicited to some degree by some disgusting actions through a presumption of harm. One possible way to address the problem of accurately measuring one emotion, is the inclusion of several measures related to it, such as facial expressions and action tendencies. Although this procedure can only be performed on emotions that have clear and universal expressions and tendencies, the combination of measures could improve the accuracy of the reported emotion.

The results in this thesis present a difficulty not only for rationalist theories of morality, but for theories of emotions that rely on cognitive processing of information, such as appraisal theories of emotions (e.g. Roseman, 2001; Scherer, 1997; Scherer et al., 2001). Although appraisal theories are without doubt useful, and theoretical predictions of these theories were used in the previous chapters, they are limited when the appraisals of two or more potential emotions are present. The cognitive neoassociationistic model (Berkowitz, 1999; Berkowitz, 2003), offers some predictions about the relationship between anger and other emotions, but it has not been applied empirically to the study of emotions other than anger. Results further enhance the claims of the social intuitionist model, providing empirical support for the usefulness of emotions as intuitions, at least when the action described includes elements of core disgust.

Limitations and future research

The results presented in this thesis provide strong evidence that emotions, and specifically the emotions of anger and disgust, can have an important influence on moral judgement. Although the results are in line with the predictions, there are some limitations that should be addressed in future research. Some of these limitations are related to the scenarios used in the experiments. Although it was expected that the use of extreme stories would elicit the expected emotion, most of the scenarios used had references to core disgust, in the form of contaminating foods, contact with corpses, contagious infections, and others (Marzillier & Davey, 2004; Rozin et al., 1999). Although these scenarios successfully elicited disgust, it would be desirable to investigate whether other forms of disgust, such as socio moral disgust, also produce a presumption of harm to others. It is plausible to think that in groups where the

social divisions are clear, the inclusion of a alien individual that does not belong to the group may create the notion that a symbolic entity, such as the identity of the group, traditions or culture, is been harmed. An example of this situation is caste system in Hindu India, in which disgust has a relevant role. In addition, most of the scenarios used contained creatural elements that elicit disgust, but it remains inconclusive whether these results would be obtained if the elicitors of disgust are symbolic in nature. These two features—that disgust can be elicited by symbolic entities and the creatural nature of them—can play an important but different role in the presumption of harm based on disgust.

Another important point to address in future research is related to the measurement of emotions. A consistent finding in the preceding chapters is the high and significant correlation between anger and disgust, highest when only words for emotions were used (see Nabi, 2002). In order to clarify the use of emotional words, it is sensible to include parallel measures apart from words, such as facial expressions, action tendencies or other behavioural measures associated to the emotions studied. Previous research identifies contempt as part of the family of "other-condemning" emotions together with anger and disgust (Haidt, 2003). However, the emotion of contempt was not included in this thesis. Among the reasons for leaving this emotion out of the present research are the lack of agreement on a universal facial expression for contempt (but see Rozin et al., 1999), it does not have a clear action tendency, and it is not considered a basic emotion. However, the role of contempt as a moral emotion can be relevant when a moral judgement is related to a person or group of perceived lower status. Another point that remains unexplored in the relationship between the emotions of anger and disgust is the effect of anger on disgust. The experiments presented in this thesis focused mainly on the effect of disgust on anger, but is not clear if the reverse effect is feasible.

Some results presented previously suggested that disgust can have a more automatic effect than anger in moral judgement. Although this suggestion is in line with theoretical perspectives (Darwin, 1872; Lazarus, 1991; Levenson, 1992; Marzillier & Davey, 2004), the manipulation of cognitive load used here (Experiments 4 and 5), may have had an impact on anger and disgust themselves. It has been suggested that cognitive load can increase the arousal of emotions (Feldman Barrett et al., in press), and the cognitive neoassociationistic model can potentially predict the elicitation of anger based on cognitive load (Berkowitz, 1989, 1990). Based on these arguments, it is plausible to think that the manipulation of cognitive load may influenced anger and disgust, which could potentially confound their effect on moral judgement. Addressing this potential confound could clarify the automatic effects of the emotions studied.

The research in this thesis is related mainly to moral violations. However, morality is not related only to negative evaluations but to positive reactions as well, in the form of approval and encouragement to behave in a correct manner. Future research should consider the relationship between positive emotions and morality. Even when the relationship between emotions and morality was addressed in this work, positive affect was not considered, so whether emotions such as happiness have an effect on moral judgement remains an open question.

Conclusions

Although most research about morality has focussed on rationalist theories there is scarce evidence showing that emotions are involved in moral judgement and moral reasoning. Previous research on morality and emotions highlight two main relationships, the first one is between types of moral violations and specific

emotions, revealing that different moral violations elicit specific emotions. The second one is between emotions and moral judgements, showing that emotions are important to establish the correctness of an action. However, there is a lack of empirical evidence showing the role of specific emotions in moral judgement. This thesis addresses this empirical absence showing that the emotions of anger and disgust have relevant roles in the judgement of an action as morally correct or not. Taken together, the results of the experiments reported in this work highlight the importance of emotions in the research of morality, and their relevance in moral judgement.

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APPENDIXES

Appendix 1. Photos representing the emotions of (a) anger and (b) disgust used in experiments 4, 5, and 6.

a)

b)