

**Older People's Responses to Age Stereotypes: Implications for Performance Outcomes,
and Health and Well-Being.**

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“I can do all things through him who strengthens me” Philippians 4:13

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ABSTRACT

Age stereotypes are the different and often negative expectations and attitudes held by individuals about a given age group. Not only can age stereotyping lead to the unequal treatment of older people through differences in affective (age prejudice) and behavioural responses (age discrimination) toward them, but older people's own reactions to these stereotypes can have negative and damaging consequences. This thesis addresses the extent to which older adults' responses to negative age stereotypes impact on their performance on tests, and their health and well-being, further increasing age-based inequalities. Chapters 1 to 4, the introduction and theoretical chapters, introduce the thesis and the background for the subsequent studies. Areas reviewed include that of age stereotyping, how this may reflect negatively upon older adults' social identities, 'stereotype threat' as a specific response to this and evidence that perceiving ageism is associated with worse health and well-being in later life. Having identified research gaps, Chapter 5 then presents Study 1 (N = 105) which addresses the question of whether people are conscious of being judged negatively because of their age, what age stereotypes they are most conscious of and in what settings they believe they are applied. Findings confirmed that adults (particularly those aged 18-69) have a strong awareness of age-based judgement and that adults aged 60+ in particular are concerned about negative stereotypes of their competencies in a range of domains. Chapters 6 to 8 present studies 2, 3 and 4 which aimed to extend 'stereotype threat' research (Steele & Aronson, 1995). Stereotype threat theory posits that stigmatised individuals may fear confirming negative stereotypes about their social group. This negative experience ironically disrupts performance making it more likely that they act in line with negative stereotypes. Study 2, a meta-analysis including 82 effect sizes (N = 3882) split into multiple analyses, confirmed that age stereotypes have the potential to negatively impact older adults' memory and cognitive performance through age-based stereotype threat (ABST). Building on the findings from the

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meta-analysis, Study 3 experimentally tested whether uncertainty surrounding stereotype-based judgement explains why more subtle stereotype-based cues to stereotype threat have a greater impact on performance than fact-based cues, as was found in Study 2. Further, Study 4 examined whether the presence of a young observer or the giving of help to older participants might cue ABST and negatively impact maths performance. Although the hypotheses derived from stereotype threat theory were not supported by studies 3 and 4, these studies contribute to the stereotype threat literature by examining the potential everyday cues to ABST and the mechanisms through which it occurs. Finally, Chapter 9 presents Study 5 which uses survey data to examine different reactions—threat or challenge responses—to perceived ageism and whether these responses are associated with better or worse subjective health and well-being. Findings suggest that challenge responses may be a more adaptive reaction to ageism, with potential benefits for health and well-being in later life. Overall, the thesis highlights the damaging effects of older adults' threat responses to negative attitudes to ageing. Both negative societal attitudes and the way older people respond to and cope with negative stereotyping need to be addressed.

CHAPTER 1- HISTORIC RESEARCH ON AGEISM, THESIS AIMS AND OVERVIEW

This review of research draws together relevant literature on attitudes to ageing and older people, and more broadly 'ageism' from the past 35 years. Key themes and findings from the United Kingdom and some international research are noted. Research examining intergenerational relations and ageism in the workplace grew during this period. As the volume of research increased in this area into the 1990s and beyond, the scope of research expanded, such as research examining ageism in healthcare and media, ageism as gendered, and as having implications for the behaviours of older adults. A number of more recent national and international surveys on attitudes to ageing were identified, predominantly building upon the 'Experiences and Expressions of Ageism' international framework (Abrams, Russell, Vauclair & Swift, 2011). These surveys provide the most significant insights into age categorisation, stereotyping and ageism to date. The chapter concludes by providing an overview of how this thesis will build upon research in this area with a particular focus on extending our understanding of older adults' responses to negative age stereotypes and the potential consequences of these responses. Parts of this review have been included in the published Government Office for Science Foresight Report 'The barriers to and enablers of positive attitudes to ageing and older people, at a societal and individual level' (Abrams, Swift, Lamont, & Drury, 2015).

Age and time are integral to and partition our lives, from our nine months in the womb, to our limited years of 'childhood', preparing us for many more years of 'adult' life, and finally death. However, the categorisation of age does more than mark birth, life, and death. Instead, every new birthday celebrated acts as a marker for new experiences, rights and expectations. In our early years these new experiences are often determined by child

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development (e.g., ability to walk, learn language, reproduce), but most of all they are determined by the conventions of a society and the social expectations placed on different so-called ‘age groups’ (e.g., at what age people are expected to leave education, settle-down, retire from work). It is our social constructions of what it means to be an ‘older person’ and people’s expectations of and attitudes toward those in later life that are the main focus of this thesis.

Particular expectations or beliefs about different age groups are described as *age stereotypes*. Brown (2010) explains that “to stereotype someone is to attribute to that person some characteristics which are seen to be shared by all or most of his or her fellow group members” (p.68). Linked to age stereotyping, people’s affective (*age prejudice*) and behavioural (*age discrimination*) responses will vary toward different age groups (Macnicol, 2006). For example, applying negative stereotypes (attributing negative characteristics) to older people may lead to both negative feelings and actions toward them also. Together, age stereotypes, prejudice and discrimination make up the different components of *ageism*, or the devaluing of an individual based on their membership within a particular age group (Macnicol, 2006). Further, age stereotypes of those in later life are also likely to be reflected in people’s expectations of their own future as they get older, or their *attitudes to ageing*. Those that hold more negative stereotypes of older people may also expect worse outcomes from their own ageing process. This introductory chapter starts by expanding on why this area is important to consider in the current societal context, before providing an extensive review and summary of research in this area to-date, including research on attitudes to age and ageing, but also ageism more broadly. In particular, this review identifies areas for further research.

An Ageing Population

Using cohort life expectancy, which takes into account projected changes in mortality, it is estimated that on average, men and women born in 2014 will live to be 90.4 and 93.2 years old respectively. This is a stark contrast from the cohort life expectancy for those born in 1981, which is 84.6 and 88.3 years for men and women respectively (Office for National Statistics, 2015c; ONS). Further contrasts can be seen with the life expectancy of people born in 1901, who could expect to live for 45 and 49 years (Hicks & Allen, 1999) and the projected increase for those born in 2064 (97.4 and 99.8 years for men and women respectively; ONS, 2015c). These statistics show a steady increase in life expectancy.

Population statistics not only show that people can expect to live longer, but that the proportion of older people in comparison with younger people is increasing, known as *population ageing*. This is due to a combination of increased longevity, peaks in birth rates after both world wars and in the 1960s, and decreases in the numbers of people of child-bearing age. The median age of our population has increased, from 33.9 years to 40 years between 1974 and 2014 (ONS, 2015a). Population ageing is set to increase further due to a peak in birth rates in the 1960s, meaning that these 1960s babies are now in their 50s, soon to reach retirement (ONS, 2015b). Lord Filkin (House of Lords, 2013a) reports in his recent review of the UK's readiness for population ageing, that living longer represents both opportunities and challenges. Increased life expectancy is a testament to improvements in modern medicine and quality of life within the UK, but population ageing also poses challenges which will require structural changes, particularly to employment policies and the welfare system. It is highlighted that this will be hugely dependent on attitudinal changes.

The report emphasises that we should both acknowledge the need for suitable health and social care for older people who face illness in later life, but also recognise that this will not represent the experience and needs of the entire older age group. Older people represent

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an expanding age demographic and a far from homogenous group. Even among those of a similar chronological age, there is great diversity in health and ability, and so excluding older people from the workplace based on age alone would be unwarranted. To enable those that are able to and want to work in later life, there is a strong argument for challenging views of older people as dependent, as a burden on society and unsuitable for work. Additionally, it often goes unrecognised that even older people no longer in paid work make an important contribution to the UK economy as informal carers, formal volunteers and through childcare (estimated at £24 billion per year; House of Lords, 2013a). Above and beyond societal and economic impact, attitudes toward older people have implications for the individual, as is demonstrated throughout this thesis.

A Review of Literature

For the purposes of this review a detailed search was carried out using key terms in Google Scholar, including “attitudes/perceptions/views to age/ageing/older/elderly”, “age stereotypes” (and variations of this) in the title of articles from 1979-present. Overall, 1552 Google Scholar results were produced and 738 relevant research articles were found and tabulated (160 of the articles originated in the UK, or internationally including the UK). Around 400 additional articles resulted from a search for the word “ageism” in article titles. The items of over 14 national/international surveys were further reviewed for relevance and a number of research funders and individuals were contacted for their support in identifying relevant research¹, resulting in a further 30 relevant UK articles. In this review, articles and studies of specific relevance within the UK were primarily drawn upon, as well as key international research. This was done in recognition that a review of research internationally

¹ Because some important UK work may exist in forms such as government or research council reports, chapters and working papers I investigated archives or other repositories that might contain useful evidence. Therefore, the second strategy was to contact key UK organisations (e.g. via DWP, ESRC, Joseph Rowntree Foundation, Age UK) and researchers who have historically been involved in this area of study.

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was beyond the scope of this thesis, but also that drawing UK specific conclusions may be informative for UK researchers.

The review highlighted a notable increase in volume of research in this area across the time period examined. To demonstrate this, a search of the term ‘ageism’ in the title of articles using Google Scholar produced just 154 hits for the period 1980-1989, 350 for the period 1990-1999, and 711 results for the period 2000-2009. Since 2010 there are a further 389 hits. Thus the volume of publications produced increased by 103% from the 1990s to 2000s, and by a further 10% from the 2000 level by 2014 (or 20% pro rata to 2019). By comparison, during the same periods, hits for the term ‘sexism’ were numerically much higher but showed a slower rate of increase (9%, 35% pro rata) and those for ‘racism’ even showed some decline (26%, minus 17% pro rata)². This shows that interest in ageism research has gathered pace relative to more established areas of prejudice research over the past 25 years, though it still lags behind in absolute volume. The review will now look in more depth at what the reviewed literature tells us about attitudes to ageing, starting with research from the 1980s.

Early Research

Despite much less UK research on ageism and related issues in the 1980s, national and international surveys were beginning to include relevant items. The first European Values Survey (EVS; 1981), administered to 1200 respondents in the UK, included the questions ‘how much trust do you think younger people have in older people’, and ‘how much trust do you think older people have in the young’. This appears to be one of the earliest attempts to examine age prejudice at a national level (Abrams, Gerard, & Tims,

² Sexism showed 934 hits from 1980-89, 957 hits from 1990-99, and 1040 from 2000-09, and 702 hits from 2010-14, showing percentage changes of 9%, and 35% (pro rata) respectively. Racism showed 2470 hits from 1980-89, 6610 from 1990-99, 8300 from 2000-09, and 3460 from 2010-14, with percentage changes of 26%, and -17% (pro rata) respectively. Despite such trends, ageism remains seriously under-researched. A focused key word search in two leading social psychology journals illustrates this. The *Journal of Personality and Social Psychology* showed 0 results for ageism, 14 for sexism, and 16 for racism, and *Personality and Social Psychology Bulletin* showed 6 results for ageism (none actually on that topic), 147 for sexism and 306 for racism.

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1985). These data were retrieved³ to explore age differences in intergenerational trust. At that time, older people believed that they would be trusted by younger people, and they themselves trusted younger people quite highly. Strikingly, younger people believed they were not trusted by older people, even though they themselves trusted older people. Thus, if anything, it may have been younger, rather than older people who most feared or experienced ageism in the area of trust.

Questions relevant to this review have been identified in three further national and international surveys from the 1980s—the British Social Attitudes Survey (1983), the Social Change and Economic Life Initiative Survey (1986) and the International Social Survey (1989)—all looking at age-related attitudes in the context of employment. In the 1983 British Social Attitudes Survey, carried out in over 100 constituencies in Britain, respondents were asked about their agreement with the statement 'employers give too few opportunities to older people when employing staff' (rated on a 5-point scale from *agree strongly* to *disagree strongly*). Out of 1719 respondents (mean age = 46.33, standard deviation = 18.03, range = 18-99) 35.4% of those that responded said they agreed with the statement and 27% strongly agreed.

The 1986 Social Change and Economic Life Initiative Survey was completed by 6110 respondents (aged 20-60) across six urban areas of the UK. Respondents were asked 'What would you see as the main difficulties you might face if you were trying to get a better job with either your current employer or a different employer over the next two years'. Of the 3597 individuals who responded (there was missing data for those not in work and from non-response), 3.56% (128) chose the set response option 'too young' and 33.53% (1206) chose the set response option 'too old'. Of the 484 respondents that answered the question 'which one of these best explains why you did not get the last job you applied for?', 'I was too old'

³ I am grateful to John Hall for helping us locate the data and with some analysis of the relevant variables.

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was the set response most commonly selected (17.98%). Further, the International Social Survey (ISS; 1989) Work Orientations module (1989) asked respondents (aged 18+) to ‘Think of two people doing the same kind of work [thinking of their main job]. What do you personally think should be important in deciding how much to pay them?’. They were given eight response options and asked to mark and rank their top three. Of the 676 respondents, 624 (92.3%) did not choose the response option ‘the age of the employee’.

The ISS Social Inequality module contained one further question that examined age attitudes longitudinally outside of the employment setting. The question read, ‘In all countries there are differences or even conflicts between different social groups. In your opinion, in the UK how much conflict is there between young people and older people?’ (answers were given on a 4-point scale from 1 = *very strong conflicts* to 4 = *there are no conflicts*). The question was first used in 1987 and then repeated in 1992 and 1999 (unfortunately removed from the 4th survey in 2009). This longitudinal data shows relative stability in perceived tensions between young and old over the period of 12 years (see Table 1.1).

Table 1.1

Responses to ISS Social Inequality Module Question across Three Time Periods

	<i>N</i>	Age <i>M</i> (<i>SD</i>)	Very strong conflicts	Strong conflicts	Not very strong conflicts	There are no conflicts	Can’t choose/ no response
1987	1212	45.43 (16.85)	85 (7.5%)	352 (31.1%)	521 (46.1%)	173 (15.3%)	81
1992	1066	48.48 (16.81)	83 (8.2%)	307 (30.5%)	489 (48.6%)	128 (12.7%)	59
1999	804	50.18 (17.83)	39 (5.3%)	219 (29.5%)	403 (54.3%)	81 (10.9%)	62

Note: *M* = mean; *SD* = Standard deviation. Percentages are given based on the percentage of those that responded, not including non-response.

Overall, these early surveys show that as far back as the 1980s, intergenerational relations and ageism in the workplace were on the research agenda. It also provides evidence

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at a national level that experienced or perceived ageism was problematic within the workplace, but that individuals did not condone this age discrimination or believe they would discriminate based on age themselves in the work setting. This may be a reflection of people's unawareness of their implicit bias towards people of different ages or socially desirable responding.

Subsequent Research- An Evolving Field

An examination of attitudes towards ageing among the general population (approximately 1000 UK respondents aged 15+) was also conducted across two of the early Eurobarometer surveys (1992 and 1999). Between these surveys UK respondents showed a 7% decrease in those who 'look forward to retirement' (51.5% to 44.2%; Walker, 1999). In the 1992 Eurobarometer survey 'Elderly Europeans' section, a number of age-related questions were posed to approximately 400 UK respondents aged 60+ (Walker, 1993). The survey asked 'Are older people treated with greater respect after they reach old age or is the opposite the case?'. In the UK, 34% of respondents said they were treated with more respect and 25% less respect. Additionally, 53% of respondents strongly or slightly agreed with the statement 'old age has given me a new lease of life', 73% of respondents strongly or slightly agreed with the statement 'young people are generally helpful towards older people'. Correspondingly, 74% of respondents said they had a little or a lot of contact with young people (>25 years old). This research highlights some positive attitudes to ageing among the general population and older people themselves, and positive views when reflecting on intergenerational relations not specific to the workplace.

The 1990s saw an expansion of UK research looking at attitudes to ageism in health/social care settings. Research examined how attitudes towards ageing and older service users might affect care and how these attitudes might be improved (e.g., Collins, Catona, & Orrell, 1995; Coupland & Coupland, 1993; Deary, Smith, Mitchell, & MacLennan, 1993;

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Quinn, 1999; Salmon, 1993). This research predominantly portrays ageism in health/social care as something that should not be condoned, but at times also questions the effectiveness of age-based 'rationing' in a health system with limited resources (Shaw, 1994).

Researchers have continued to highlight ageism in health and social care beyond the 1990s (e.g., Wade, 2001; Williams, Bennett, & Feely, 2003). A survey of 200 Geriatricians in 2009 showed that almost half believed that the NHS was institutionally ageist (Help the Aged, 2009). This was supported by reviews in 2007 and 2009 commissioned by the Department of Health to look at ageism in five areas of health and social care in the UK (e.g., Centre for Policy on Ageing, 2009a; 2009b). The reviews show that aspects of ageism are present across primary and community, secondary and mental health care, and social care. For example, concerns were raised about the under investigation and treatment of cancer among older people (Centre for Policy on Ageing, 2009a; see also Macmillan, 2012) and the under-use of mental health services among older people (Centre for Policy on Ageing, 2009b). Discrimination against older people in the health service seems likely to reflect the implicit application of stereotypes in Western societies that older people ubiquitously suffer ill-health, physical and cognitive decline, dependency and closeness to death (Löckenhoff et al., 2009; Nelson, 2002), therefore warranting less investment in terms of medical attention and expense.

Research in the 1900s and 2000s also continued to explore ageism and attitudes to age in the context of work (e.g., Barnes, Smeaton, & Taylor, 2009; Taylor & Walker, 1998). Research showed that although older workers may be seen as good at managing staff, self-motivated, reliable and dependable, good communicators and productive (Magd, 2003; Swift et al., 2013; Taylor & Walker, 2003), people also attribute a number of undesirable characteristics to older workers, including lack of competence, poor health, inflexibility, poor adaptability, resistance to change, cautiousness, low trainability and poor computing skills

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(Abrams & Houston, 2006; Chiu, Chan, Snape, & Redman, 2001; Magd, 2003; see Taylor & Walker, 2003 for a review of UK stereotypes of older workers). Consistent with research from the 1980s, respondents from the 1992 Eurobarometer survey overwhelmingly reported that they believed older workers were discriminated against in different areas of employment; 82% agreed that discrimination occurred in recruitment, 78% in training, 77% in promotion and 58% in terms of status within the workplace (Walker, 1993). Respondents between 1992 and 1999 increasingly desired stronger Government legislation against age discrimination (72% and 83% respectively; Walker, 1999).

The literature review shows a number of more recent publications examining the relationship between public policy and ageism, often with a focus on the workplace (e.g., Hornstein, Encel, Gunderson, & Neumark, 2001; McNair & Flynn, 2005; Metcalf & Meadows, 2010; Taylor & Walker, 1998). This literature is largely based on the build-up to and introduction of the Employment Equality Age Regulations (2006), which formally prohibited employers from discriminating based on age. For example, to examine whether policy changes had immediate effects on attitudes, Metcalf and Meadows (2010) examined attitudes among senior employees (managers or directors) before and after the implementation of the 2006 Employment Equality Age Regulations. They found no changes in whether respondents saw age as affecting suitability for different positions. There were also no changes in respondents' preference for 29-45 year olds in skilled trades (rather than younger or older) and only those under 25 were viewed as unsuitable for managerial and senior roles across both time points. However, the absence of immediate policy effects does not rule out that the policy changes have been important in changing or sustaining the situation of older people. It may be that a larger time span and wider range of contexts need to be considered to detect these sorts of effects.

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A number of other themes within the research looking at attitudes to age are notable after 2000. The media portrayal of older people, and population ageing were increasingly raised as issues (Martin, Williams, & O'Neill, 2009; White, Morrell, Luke, & Young, 2012). For example, qualitative research commissioned by the BBC (White et al., 2012) found that older people were concerned by the small amount of coverage their age group got on television. In the same study, the lack of both middle-aged and older women on television was noted. The gendered nature of attitudes to age and ageing is a repeated theme in the literature (e.g., Grant et al., 2006; Walker, Grant, Meadows, & Cook, 2007).

Most notably, research began to explore the wider consequences of negative age attitudes for older people (beyond discriminatory treatment from others). Negative stereotypes of ageing and competence have been widely evidenced as impacting performance outcomes among older people (Levy, 2009; Meisner, 2012). Two main theories are most commonly used in explaining this phenomena, stereotype priming and stereotype threat theory. *Stereotype priming* occurs when increased cognitive accessibility of stereotypes makes stereotype-consistent behaviours more likely through automatic processes (Bargh & Pietromonaco, 1982; Hess, Hinson, & Statham, 2004; James, 1890). A recent meta-analysis by Meisner (2012) concludes that negative age stereotype primes can indeed negatively impact older adults' behaviours, whereby outcomes included depleted memory and motor skills, also physiological and attitudinal outcomes.

Stereotype threat theory instead posits that highlighting negative stereotypes about an individual's social group can lead to concerns about confirming the stereotype in relevant performance settings. This disruptive 'stereotype threat' then negatively affects performance outcomes (Steele & Aronson, 1995). An early meta-analysis of age-based stereotype threat effects (ABST) has been conducted by Horton and colleagues (2008), concluding also that ABST negatively impacts performance outcomes among older adults. Additionally, more

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recent research indicates that age stereotyping and ageism have negative implications for older people beyond performance decrements. Longitudinal research by Levy and colleagues has shown that negative attitudes to ageing in early years can predict health outcomes in later life (e.g., Levy et al., 2009). Further, a small amount of research has shown that perceived ageism is associated with worse psychological well-being and physical health in later life (e.g., Luo, Xu, Granberg, & Wentworth, 2011; Vogt Yuan, 2007). Together, research highlights the potential consequences of age stereotyping for older people's performance outcomes, and health and well-being.

Contemporary National Surveys

National surveys from the 2000s are the first to look more comprehensively at perceptions of age, attitudes to ageing and older people, and perceived age prejudice. These include the 2004 English Longitudinal Study of Ageing (ELSA; Demakakos, Hacker, & Gjonca, 2006), the 2004 Age Concern England Survey (Age Concern, 2004; Ray, Sharp, & Abrams, 2006), the 2005 National Survey (Abrams & Houston, 2006) and the European Social Survey (Abrams, et al., 2011).

ELSA (Demakakos et al., 2006) asked older people about their experiences of ageing (whether growing old has been a positive or negative experience), perceptions of ageing (12 items looking at topical areas e.g., loneliness, leisure), self-perceived (how old they feel) and desired age (how old they would like to be) and when they believe old age starts and middle age ends. The sample were 8780 respondents all over the age of 52 (mean age = 66.7; 54% women). Results show that only one in 12 respondents reported ageing to be a negative experience (Demakakos et al., 2006), corroborating earlier research (Walker, 1999). However, it was noted that two age groups perceived ageing more negatively, those just reaching old age (55-59) and those in very old age (80+; Demakakos et al., 2006). This may be illustrative of negative expectations among those transitioning to later life and more

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negative experiences among those often described as the oldest-old or in the *fourth age*, whom are more likely to experience illness and disability (Laslett, 1989; Woods & Clare, 2008). Overall, participants did not see old age as a time of loneliness, but a time of leisure and older people as a source of knowledge. However, participants did not consider older people to be respected in society.

ELSA further marked a first national UK survey of self-perceived age, noting that respondents' self-perceived age and desired age was typically younger than their actual age. The perceived age at which people got 'old' increased as respondent age increased, whereby respondents aged 50–54 and 80+ perceived old age as starting at 68 and 75 years respectively (Demakakos et al., 2006). At a similar time, Age Concern England (ACE)—in partnership with the social psychologists at the University of Kent—commissioned a national survey of ageism in Britain, questioning 1843 people (aged 16+) across Great Britain. Similarly to the findings of ELSA, ACE showed that the perceived start of old age increased in step with chronological age of the respondent (Age Concern, 2004; Ray et al., 2006). The findings of both surveys demonstrate the subjectivity of age categorisation. In addition, the ACE survey looked in greater detail at stereotypes of older people and expressions of ageism. Comparable research has also been conducted in Northern Ireland (Gray & Dowds, 2010).

The ACE survey (Age Concern, 2004; Ray et al., 2006) laid the groundwork for subsequent research which has used a similar framework to explore the processes responsible for prejudice, as well as experiences of prejudice longitudinally. This framework is described in the Department for Work and Pensions commissioned research report 'Attitudes to age in Britain 2004-08' (Abrams, Eilola, & Swift, 2009) which examines data from the 2004 ACE survey and a repeat survey in 2006 (Abrams et al., 2009), the National Survey conducted for the Equalities Review in 2005 (Abrams & Houston, 2006), and the British results from Round four of the European Social Survey's (ESS) 'Experiences and Expressions of Ageism'

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module in 2008 (Abrams et al., 2011). In these surveys, data collection was carried out using in-home interviews in samples ranging between 982 and 2042 respondents each year (2004, 2005, 2006 and 2008). These four surveys will be described as the ‘core surveys’ for ease. The framework used in these surveys has been further validated by Vauclair, Abrams and Bratt (2010). Through this assessment of reliability and validity, Vauclair et al. (2010) reduced the final set of 55 indicators used in the 2008 ESS down to 23 indicators of attitudes to age. These streamlined indicators have been used within the 2010/11 Office of National Statistics (ONS) Opinions survey on a sample of 2172 adults (aged 16+) from Great Britain (Sweiry & Willitts, 2012).

Together, this research represents the most comprehensive exploration of attitudes to age and ageism to date, measuring age categorisation and identification, perceptions of prejudice, experiences of discrimination, age stereotypes, intergenerational threats, expressions of age prejudice and intergenerational closeness. The second chapter of this thesis provides more detail on the findings from the four core surveys (Abrams et al., 2009) and the ONS Opinions Survey (Sweiry & Willitts, 2012). In brief, the surveys showed that people on average see old age as starting at the age of 59.21 years (Sweiry & Willitts, 2012) and believe those in their 70s are generally seen as more friendly, moral and admirable than those under the age of 30, but as less capable and enviable (Abrams et al., 2009). However, the ONS Opinions Survey reported that those in their 70s were also seen as more competent than those in their 20s, but comparatively less competent than young (Sweiry & Willitts, 2012). Across age groups, discrimination against people because of their age was seen as a serious issue and is reported as more prevalent than both racism and sexism (Abrams et al., 2009; Sweiry & Willitts, 2012).

Review Summary and Research Gaps

In 1990, Age Concern described ageism as the ‘unrecognised discrimination’, referring to it being institutionalised and generally accepted (McEwen, 1990). Lack of concern regarding ageism is reflected in the dearth of research in this area, compared to sexism and racism. Nonetheless, this review presents an encouraging picture of the development of its evidence base which has both increased in mass and diversified in focus over the 35 year period reviewed.

As revealed in this review, research from as early as the 1980s demonstrates a concern surrounding relations between ‘young’ and ‘old’ (British Social Attitudes Survey, 1983; ISS, 1989), and in particular focuses on ageism within the work context. Findings show that negative attitudes towards older workers are viewed as affecting their opportunities both in recruitment and within the workplace (Social Change and Economic Life Initiative Survey, 1986). A contrast was apparent between negative perceptions of ageism in the workplace and relatively positive experiences of ageing, expectations of retirement and intergenerational relations in the wider context. As research in this area grew in the 1990s and 2000s, negative attitudes to ageing were again highlighted within the work context (Metcalf & Meadows, 2010; Taylor & Walker, 1998), but also in health/social care settings (e.g., Centre for Policy on Ageing, 2009a; 2009b; Deary et al., 1993), in the media (e.g., Martin et al., 2009; White et al., 2012) and as experienced differently by men and women (e.g., Grant et al., 2003; Walker et al., 2007). Importantly, comprehensive measures of experiences and expressions of ageism that recognises its multidimensionality were developed for use in national and international surveys (Abrams et al., 2009; Sweiry & Willitts, 2012). These measures have increased our understanding of age categorisation, stereotyping, prejudice and discrimination.

More recently, research has not only sought to demonstrate the prevalence of ageism, but also examine the impact that being aware of these negative attitudes can have on

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outcomes for older adults. Research shows that awareness of age stereotypes is harmful to the performance, health and well-being of older people (Abrams et al., 2006; Levy, 2009). There are a number of ways in which research in this area should be carried forward. First, surveys of ageism (e.g., Abrams et al., 2009; Sweiry & Willitts, 2012) have provided limited context for understanding the extent to which people are conscious of negative judgements about their age group and in what situations age stereotypes are most salient and might affect them most. Examining this would provide a context and background for experimental research evidencing age-based stereotype threat (ABST) effects. Second, there are a growing number of studies testing ABST effects; however, the previous review conducted in this area does not include the many studies published since 2008, incorporate unpublished ABST research or examine important moderators of ABST effects. A comprehensive review of ABST effects is needed to direct future research in this area. Finally, more should be done to understand the wider consequences for older people of perceiving negativity towards their age group in both more applied settings and longer-term consequences. A brief overview of the thesis shows how the current studies begin to address these gaps in research.

Overview of the Thesis

The three theoretical chapters provide a backdrop to the research conducted for this thesis. Chapter 2 outlines central social psychological theories in the area of age stereotyping. It is explained how group categorisation and stereotypes serve the function of organising our social worlds, but may also negatively impact individuals and exacerbate inequality between different groups. Chapter 3 then provides a detailed account of stereotype threat theory, contrasting it to stereotype priming. It then reviews ABST research, including evidence for ABST mechanisms, moderators and evidence for threat-based concerns. In Chapter 4, the final theoretical chapter, the wider consequences of awareness of ageism are examined. Specifically, evidence for the link between perceived ageism and worse health and well-being

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in later life is reviewed. The theoretical chapters are then followed by five studies, each broadening our understanding of the consequences of age stereotyping and ageism more broadly on performance outcomes, health and well-being in later life.

Study 1 (Chapter 5) is a survey of 105 UK adults, assessing whether they are aware of and self-conscious about negative attitudes toward their age group (age self-consciousness), the specific age stereotypes they believe others' judgements of them are based upon and in what situations they feel judgement occurs. Study 2 (Chapter 6) is a comprehensive meta-analysis of published and unpublished research examining ABST effects on older adults' performance. This examines the consequences of age self-consciousness for older people in performance contexts and factors that moderate ABST effects.

Studies 3 and 4 (Chapters 7 and 8) then address research questions highlighted within the ABST meta-analysis. Study 3 sought to understand why more subtle stereotype-based cues to stereotype threat were of greater detriment to performance than fact-based cues. The Stereotyping Uncertainty (SU) hypothesis was proposed, whereby uncertainty/ambiguity about negative group-based stereotyping is suggested to detract from test performance. This was tested in the area of gender-based stereotype threat using 206 men and women. Study 4 sought to examine ABST effects using settings more realistic to older adults' everyday experiences. The study tested whether the presence of a younger task observer or help from others might negatively impact older adults' cognitive performance (N = 269).

Study 5 (Chapter 9) examined Active Ageing survey data from 1048 UK older people (aged 55 to 101). It was tested whether perceived ageism was linked to worse subjective health and well-being, and whether this varied depending on threat and challenge responses to ageism. The thesis concludes by summarising the findings and discussing their implications for older adults, its relevance for UK policy and practice, and the limitations of the research.

**THEORETICAL
CHAPTERS**

CHAPTER 2- FROM AGE TO AGEISM

Salient and automatic age categories such as 'young', 'old' and so on, help us to structure our many social interactions. Further, categorising people into age groups creates the propensity for people to apply age stereotypes that impose generalised social norms and expectations on that age group. Social Identity Theory (Tajfel & Turner, 1979) posits that the division of people into groups, the stereotypes that accompany these groups and our desire to maintain positively distinct social identities encourages negative intergroup behaviours such as prejudice and discrimination. Focusing on age categorisation, this chapter details this progression from our use of age as a category to experiences of ageism.

What is 'Age' Anyway?

Our chronological age marks the passing of time from the day we are born until the day we die. But what we know and understand about our 'age' is linked to our understanding of biological and social age. *Biological age*, sometimes called *physiological age* and linked to *functional age* (Macnicol, 2006; Neugarten, 1996), is the grading of how well the body's systems are functioning compared to others of the same chronological age. This can be determined by physical or bio-markers of the ageing process such as puberty, frailty or the functioning of the body's many systems (Karasik, Demissie, Cupples, & Kiel, 2005; Mitnitski, Graham, Mogilner, & Rockwood, 2002). Biological age is arguably a more accurate picture of ageing than chronological age as it accounts for variances in health and functionality among people of the same chronological age and is a more accurate predictor of mortality (Karasik et al., 2005). Biological ageing varies according to genetics, gender, poverty and birth cohort (Arber, Davidson, & Ginn, 2003).

Chronological and biological age are assigned both formal (often through law) and informal meanings through *social age*. From this point of view, age is largely socially

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constructed through the shared ideas about what is and is not appropriate for different age groups (Macnicol, 2006). As Settersten (2003, p81) describes, “Individuals use age-related ideas to organise their lives, the lives of others, and their general expectations about the life course”. These expectations may prescribe appropriate times to be dependent upon parents, to be more active, to have children, and to work etc.

The intersection between chronological, biological and social age is demonstrated in the Government’s use of chronological age as a marker for permitting and restricting different activities and support. Many diseases are considered to be age-related and therefore are part of biological ageing. However, in screening for many health conditions (e.g., cervical, breast and bowel cancer), it is chronological age that is used as a proxy for biological age as a way of targeting limited resources for health screening (e.g., age 55+ for bowel cancer). Likewise, young children who are still undergoing physical development (biological age) are considered vulnerable and less ‘mature’, therefore age restrictions are placed upon the activities they can participate in until it is believed they have reached maturity. This again relies on the assigning of an arbitrary chronological age rather than tests for ‘maturity’, whatever that might look like. Social age is also hugely influential here. For example, the age of consent for sexual intercourse varies from 12 in Angola to 21 in Bahrain, or ‘after puberty’ in Nayarit in Mexico to ‘within marriage’ in Yemen. Considerations of chronological, biological and social age likewise influence when we receive education, when we start work, when we marry, have children and retire.

Therefore, it can be seen that age is not just a number, but gains meaning from biological changes that occur as we age (which vary from individual to individual based on genetic and environmental influences) and the social meaning we give to different ages. A more detailed account of social age, its function and its disadvantageous outcomes, is now discussed.

Automatic Age Categorisation

Our age, gender and race are termed ‘privileged categories’ or ‘automatic categories’ based on the primacy given to these forms of categorisation and our unthinking, unconscious categorisation of people based on them (Brewer, 1988; Nelson, 2005). People are able to broadly categorise others’ age, gender and race at first sight as they have obvious physical manifestations, whereas other forms of categorisation may require more extensive interaction, such as sexuality, profession, and socioeconomic status. Group categorisation is more cognitively efficient than individuation for two main reasons. First, it is less cognitively demanding to place individuals in a category than it is to determine their individual identity, especially if that person is not previously known to you. Cloutier, Mason and Macrae (2005) found that participants were better able to categorise celebrities into their gender groups than they were able to identify the celebrity when pictures of celebrity faces had been obscured (inverted, blurred or rapidly presented). This evidence supports the idea that categorisation of people into the groups they belong to is less cognitively taxing. Single physical features can support group categorisation rather than the construal of multiple physical features required for individuation.

Second, as noted when discussing social age, group categorisation enables us to simplify our interactions with others and infer likely characteristics of that individual based on the strong associations and meaning attached to categories. This again makes person perception more efficient (Allport, 1954; Fiske & Taylor, 1991; Macrae, Milne, & Bodenhausen, 1994). For example, in first encounters, automatic age categorisation may help to determine the role and relationships between individuals (e.g., mother and son as opposed to husband and wife), or may inform appropriate topics of conversation (e.g., what school they go to as opposed to buying a house). However, automatic categorisation also risks oversimplification, such as when a young PhD student teaching a University seminar is asked

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by an older student support worker where the teacher is. Likewise, categorising people as very young or very old often acts as a cue to increased dependency and need for help. This can be beneficial for those who do indeed require additional help, but very patronising for those who do not.

Although it is clear that people automatically categorise others based on their age, it is less clear how they define these age categories. The earlier mentioned core surveys measuring attitudes to age in the UK (Abrams, Eilola, & Swift, 2009) and the ONS Opinions Survey (Sweiry & Willitts, 2012) measured perceptions of when ‘youth ends’ and ‘old age begins’. On average across the core surveys, youth was perceived as ending at 45.5 years and old age starting at 62.7 years. Responses to both questions were substantially higher in 2004 (youth end = 51.8 years; old age start = 66.4 years) compared to 2008 (youth end = 35.1 years; old age start = 58.6 years), however this trend does not continue into 2010/11 (ONS Opinions Survey) whereby youth was perceived as ending at 40.71 years and old age starting at 59.21 years. Abrams, Eilola and Swift (2009) note that in the 2004 survey these two questions were preceded by age self-categorisation question which may have potentially affected responses. Based on this, it is unclear whether there has been a reduction in perceptions of when youth ends and old age starts, but these somewhat unstable results are a reflection of the subjectivity and malleability of age categorisation (Abrams et al., 2009).

Such judgements will also be dependent on individual differences such as the age and gender of the person making the judgement (Abrams, Swift, Lamont, & Drury, 2015), and cultural differences. A vivid example of this is that “respondents over the age of 80 believed youth ends at around the same age (mean estimated age = 54.9) that respondents under 24 believed old age begins (mean estimated age = 55.9)” as noted by Abrams et al. (2009; p44). Likewise, an examination of age categorisation in different countries reveals that Greek

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people on average place old age as starting at 68.2 years, while at the lowest end, Turkish people place old age as starting at 55.2 years (Abrams, Russell, Vauclair & Swift, 2011).

Age Stereotypes and Stigmatisation

The word ‘stigmatise’ literally means ‘to mark’, and this is what people do to some individuals based on their attributes (or perceived attributes) that tie them to a given social group (Major & O’Brien, 2005). This stigmatisation may be based upon more controllable attributes such as certain behaviours or aspects of appearance (e.g., religious beliefs, fashion or lifestyle choice). However, some attributes leading to stigmatisation are largely uncontrollable (gender, race, sexuality, disability etc.), including age. It is the linking of these attributes to stereotypes that permits the devaluing of the stigmatised group. Defined, *stereotypes* are both positive and negative characteristics attributed to a person/people from a particular social group and which are believed to be shared by most of that group’s members (Brown, 2010).

Our automatic categorisation of people based on their age elicits stereotypes associated with that age group. However, people are not slaves to stereotypes. Current thinking in social cognition research posits that we are ‘activated actors’. Our environments cue automatic cognitive associations (such as stereotypes) and the feeling and behaviours that accompany these, but individuals also exert motivated control (Fiske & Taylor, 1991). However, motivation to make individuated judgements may not be enough to inhibit stereotyping in some settings (Pendry & Macrae, 1994). For example, settings where capacity for effortful thought is low or information for the formation of alternative perspectives is sparse have been implicated as increasing reliance on stereotypes (Fiske & Taylor, 1991).

Additionally, when people do utilise stereotypes, their application is not always clear-cut. For example, an employer may broadly stereotype older workers as less competent than younger workers, making it overall more likely that they favour younger workers. However,

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when interviewing for a managerial role, they may disregard this negative bias assuming that older workers are more capable in this specific domain. Additionally, the employer may interview two older people for this managerial role, but apply 'senior citizen' stereotypes to one (seeing them as old-fashioned, weak and worried) and 'elder statesman' stereotypes to the other (seeing them as intelligent, competitive, and aggressive; Brewer, Dull, & Lui, 1981). Here, groupings of stereotypes have been used to create subtypes which still allow a certain level of social organisation while accounting for stereotype-incongruent information (Nelson, 2002). Subtypes may also be applied differently due to the intersection of age stereotypes with other social identities (e.g., gender, race and sexuality). For example, this first older person interviewed may have been a woman, and the second a man, or the first showing signs of physical disability, but the other none, accounting for the application of different old-age stereotypes. Within research, old-age stereotypes are discussed at all of these different levels.

Fiske, Cuddy, Glick and Xu (2002) founded the Stereotype Content Model (SCM) as a framework for organising and making sense of the content of different group stereotypes. The framework posits that stereotype content 'responds to principles', whereby individuals' social group/s and its status and competition is used as an indicator of, 1) whether the person is friendly and likeable or not, and 2) whether they are competent and competitive or not. Based on their low status and perceived lack of competitiveness, research has routinely shown that older people are stereotyped as warm but incompetent (e.g., Abrams, Eilola, & Swift, 2009; Cuddy, Norton & Fiske, 2005; Fiske, Cuddy, Glick, & Xu, 2002).

The core national surveys on attitudes to age, as reported by Abrams et al. (2009), asked participants 'To what extent do you think that other people in this country view people over 70...as friendly/capable/moral' and 'with admiration/pity/envy' (1 = *extremely unlikely to be viewed this way* to 5 = *extremely likely to be viewed this way*). These questions were

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also posed in relation to ‘those under 30’ in 2004, 2006 and 2008. Overall, 28% of respondents thought that people over the age of 70 would be viewed as capable (scores of 4 or 5), compared to 45% of those under the age of 30. In reverse, those over the age of 70 were attributed greater friendliness than those under the age of 30 (54% compared to 29%). Greater admiration, pity and morality were also perceived to be assigned to those over the age of 70, while those under the age of 30 were seen to be more enviable. Findings were consistent across surveys.

These items were also used in the 2010/11 ONS Opinions Survey (Sweiry & Willitts, 2012) with minor changes. Most notably, only ‘friendly’, ‘competent’ (rather than ‘capable’) and ‘having high moral standards’ were assessed, and ‘those under the age of 30’ was replaced with ‘those in their 20s’. As with the core survey results, those aged over 70 were perceived as more friendly and moral, but also as more competent when examining mean scores. Despite this discrepancy, the gap between ratings of warmth and competence was again greater for those aged over 70 than those in their 20s. It is also notable that neither the core surveys, nor the ONS Opinions Surveys compare rating of warmth and competence between older adults and middle-aged adults. This would provide a clearer comparison given the high status assigned to the middle-aged (Abrams et al., 2009). Research has even shown that at an automatic level, people are quicker to associate typically older names with warmth stereotypes than competence stereotypes (Zemore & Cuddy, 2000).

Perceptions of older people as warm but incompetent are often reflected in more specific domains. To name a few, research has highlighted perceptions of older people as: lacking creativity, unable to learn new skills, bad drivers (Swift, Abrams, & Marques, 2013; Joannis, Gagnon & Voloaca, 2012), impaired, despondent, recluse and vulnerable (Hummert, Garstka, Shaner, & Strahm, 1994), lacking adaptability, slow and bad with technology (Chiu, Chan, Snape, & Redman, 2001; Magd, 2003), but polite and understanding

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(Swift et al., 2013). An examination of personality traits assigned to different age groups across 26 countries found that older people were stereotyped as having lower levels of extraversion and openness, but higher levels of agreeableness than adolescents and adults. They were also assigned lower levels of neuroticism than adolescents and conscientiousness somewhere in between the other two age groups (Chan et al., 2012). However, not all old age stereotypes infer incompetence and warmth. Stereotypes of older people as good at managing staff and communicating with others infer both competence and warmth, while stereotypes of older people as self-motivated, productive, reliable and dependable (Magd, 2003; Swift et al., 2013; Taylor & Walker, 2003), or as grumpy and intolerant display a picture of competence without warmth (Hummert et al., 1994).

Such incongruence in the stereotypes held about older people may lead to subtyping (Nelson, 2002). Subtyping of older people occurs when some older people are viewed as possessing one group of typical old age characteristics or traits that are different from another set of old age characteristics held by other older adults. Previous research identifying old-age subtypes has typically asked younger respondents to assign trait sets (physical features, personality and behaviours) to different age groups (e.g., Brewer et al., 1981; Hummert, 1990; Schmidt & Balond, 1986). Similar to the two subtypes mentioned earlier ('senior citizen' and 'elder statesman'; Brewer et al., 1981) research has identified the following older person subtypes: Perfect Grandparent, Golden Ager, John Wayne Conservative, Severely Impaired, Shrew/Curmudgeon, Despondent, and Recluse (Hummert et al., 1994). As an example, a common subtype reported by respondents of all ages (young, middle-aged and old) was older people as 'Golden Agers'. This subtype includes positive stereotypes of ageing which commonly co-occur, including 'capable', 'well-informed', 'sociable' and 'independent'. In contrast, the 'Severely Impaired' subtype describes an older individual who is 'incompetent', 'senile', 'slow thinking' and 'incoherent'.

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As a demonstration of the application of sub-typing, Hawkins (1996) asked 420 younger adults to rate older adults of different ages (65-74, 75-99, 100+) and males and females separately along a number of semantic differentials. Positive and negative ratings were indicated by more than 50% of respondents rating <3.5 or >4.5 (respectively) on a 7-point scale from 1 = *positive attitude* to 7 = *negative attitude*. Negativity increased as the target age group increased. Additionally, the study did not find a single item that received positive rating for all three age groups and both men and women. All male age groups however were rated positively for the differential 'wise-foolish'. In contrast, all three older age groups and both men and women were rated negatively for seven of the semantic differentials, 'healthy-sick', 'flexible-inflexible', 'liberal-conservative', 'attractive-unattractive', 'optimistic-pessimistic', 'complaining-uncomplaining'.

People's use of broader, more specific and grouped stereotypes may be dependent on their closeness in age to the target group. Hummert, Garstka, Shaner and Strahm (1994) found that older people themselves had the most complex representations of ageing, then middle-aged adults, followed by younger adults who had the most simplistic representations. Where younger adults held fewer subtypes of old age stereotypes, middle and older aged adults typically held subsets of these broader subtypes. For example, where younger respondents reported the subtype 'shrew/curmudgeon', largely clumping stereotypes of bad temperament into the same category, middle and older aged adults reported both 'shrew/curmudgeon' and a variation known as 'self-centered' (including traits such as 'inflexible', 'stubborn' and 'miserly').

From this research examining age stereotyping, it is apparent that the stereotyping of older people contains both positive and negative components, but may vary depending on the resources and characteristics of the person applying stereotypes, the characteristics of the older person to which they are being applied and the setting in which it occurs. Nonetheless,

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stereotypes of older people as warm but incompetent have been demonstrated panculturally and the negative aspect (incompetence) has been evidenced as most resilient (Cuddy, Norton, & Fiske, 2005).

Social Identity and Self-Categorisation

In the 1970s Henri Tajfel developed Social Identity Theory (SIT), outlining the consequences of social identity for group processes and intergroup relations (Tajfel & Turner, 1979). Here, its relevance in understanding the implications of age categorisation and stereotyping are discussed.

Social identity is defined as “that part of the individual’s self-concept which derives from their knowledge of their membership of a social group (or groups) together with the value and emotional significance attached to that membership” (Tajfel, 1981, p255). We are all part of many social groups. These groups may be based around our specific interests and activities (such as our work group, church group or sports affiliation), our current circumstance (such as our relationship, parental or socioeconomic status), or broader categories (such as our gender group, nationality or racial group). In fact, a social group can be any number of individuals (three or more) that construe themselves as a collective ‘we’ or ‘us’ and as different from others, or ‘them’ (Hogg, 2006). The salience of different group memberships will vary depending on the situation. For example, a person’s religious identity may be more salient in a morally conflicting setting, or their racial identity when visiting a different country. However, age, gender and race, which are automatic categories (Brewer, 1988; Nelson, 2005), are likely to be chronically salient.

In-groups are those with the same social identity to an individual, whereas *out-groups* have a different social identity. The basic premise of SIT is that people seek to maintain a positive in-group social identity through intergroup comparisons and positive distinction from out-groups (Tajfel & Turner, 1979). Building upon research that has shown the importance of

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our personal identity, social identity theory posits that our social identity is important also. This basic premise has since been extended and has played a foundational role in much social psychology research (e.g., Subjective Group Dynamics, Marques, Abrams, Paez, Martinez-Taboada, 1998; The Black Sheep Effect, Marques & Paez, 1994). Extensions include the development of Self-Categorization Theory, theories of what motivates identification with groups, and theories of prejudice and discrimination.

Self-Categorization Theory (SCT; Turner, 1987) posits that the categorisation processes involved in social identity mean that not only do we categorise others as different, but we also categorise ourselves as similar to the in-group, hence 'self-categorisation'. We depersonalise ourselves, seeing ourselves in terms of our common characteristics with the in-group, just as we depersonalise out groups through stereotyping.

The Motivation: Self-Esteem, Optimal Distinctiveness and Uncertainty Reduction

Three main factors are most commonly outlined as motivating our maintenance of social identities and the tendency to self-categorise. The first factor is *self-esteem*. Research stemming from SIT states that maintaining a distinct and positive social identity is self-enhancing and increases our self-esteem (Abrams & Hogg, 1988). This positive view of the in-group is formed through comparison with other out-groups. Linked to this is *optimal distinctiveness* (Brewer, 1991). Optimal distinctiveness is achieved through inclusion and acceptance within a group, but also distinctiveness from others (as with the self-esteem hypothesis). Groups provide an optimal setting for both motives. Support for this self-esteem hypothesis has been mixed, leading researchers to explore alternative explanations (Rubin & Hewstone, 1998). In a review Rubin and Hewstone (1998) found that only 9 out of 12 studies showed higher self-esteem among those with positive intergroup differentiation.

Finally, the *Uncertainty Reduction Hypothesis* (Hogg, 2000) relates more closely to SCT as it draws upon the need for order and categorisation rather than self-enhancement. The

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theory states that our social identities reduce uncertainty by creating stable frameworks through which we can categorise and view ourselves and others. Hogg (2006) suggests that identification with extreme ideologies at times of uncertainty is an example of this. The recent growth in support for far-left or right political parties (e.g., UK Independence Party, the Greek Syriza party and recent demonstrations from neo-Nazis in Germany) may demonstrate that times of economic and social uncertainty can increase identification with hard-line groups.

From Individual Differences to Prejudice and Discrimination

Social identity processes mark the transition from the acknowledgement of individual differences to group-based prejudice and discrimination. Having categorised people into distinct groups based on their traits and characteristics, we then apply positive and negative stereotypes to these groups. These group-based judgements allow us to distinguish ‘us’ from ‘them’, but also permit prejudice and discrimination justified by these differences. Social identity processes provide motivation to favour our in-group and see them as positively distinct from our out-group/s, which can result in degrading of the out-group and lead to negative intergroup behaviours (Hogg, 2006).

Alternative Theories of Ageism

Social identity processes are the foundation of the current thesis, not because they are seen as the only explanation for ageism, but because they are able to provide a basis for also understanding how older people themselves might react to negative stereotyping, prejudice and discrimination directed toward their age group. Developmental and evolutionary theories are also commonly cited when discussing the origins of ageism but need not be incompatible with SIT (Nelson, 2002).

Similar to SIT, developmental theories highlight the centrality of age as a social category which features in our everyday experiences and interactions. Research has shown

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that children as young as 15 months can differentiate between old and young faces (Lewis & Brooks-Gunn, 1979) and that pre-schoolers identify cues to age such as wrinkles and maturation of the craniofacial shape (Montepare & McArthur, 1986). Reviewing the literature on children's attitudes toward older adults, Montepare and Zebrowitz (2002) conclude that from an early age people hold negative views about vitality and activity in later life, but more positive views about older adults' friendliness and kindness. Developmental theorists cite categorisation effects, as well as the effects of older adults' distinct physical characteristics and learned behaviours as causes of negative bias in young children (Montepare & Zebrowitz, 2002). While developmental theories provide valuable contributions to our understanding of how ageism develops, SIT highlights key reasons for the maintenance of ageist attitudes in adulthood.

Terror Management Theory (Greenberg, Pyszczynski, & Solomon, 1986), alternatively states that the terror caused by awareness of our own inevitable death is managed by reinforcing our world views and providing meaning to our existence. However, older people are said to act as a reminder of our vulnerability and inevitable mortality. This creates a terror that needs to be managed, and management may come in the form of ageism toward older people (Boudjemadi & Gana, 2002; Nelson, 2002). Terror management also need not be exclusive from social identity processes; in fact ageism resulting from terror management relies upon the categorisation of older people and the stereotyping of this stage of life as one of decline and deterioration.

Expressions of Ageism

The SCM posits that different combinations of warmth and competence stereotypes applied to different social groups has implications for feelings towards those groups (Fiske et al., 2002). This demonstrates the different forms of prejudice that may arise. An out-group perceived as competent but lacking warmth may be admired but also presents a threat,

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provoking feelings of envy. In contrast, stereotypes of older people as warm but low status, uncompetitive, and incompetent are termed as *paternalistic stereotypes*. This is because they do not encourage disliking but may encourage a lack of respect for older people and feelings of pity (Fiske et al., 2002). Attribution of both competence and warmth is usually reserved for the in-group, provoking feelings of admiration.

The *behaviours from intergroup affect and stereotypes* (BIAS) map further extends the SCM to explain the behavioural implications (age discrimination) of different stereotype content (Cuddy, Fiske, & Glick, 2007). Cuddy, Fiske and Glick (2007) examine behaviours as differing in intensity (along the dimension of active—passive) and valence (along the dimension of facilitation—harm). Active behaviours are direct with the aim of affecting the target group, whereas, passive behaviours are indirect and avoidant. Facilitative and harmful behaviours are pro-social and antisocial respectively. The BIAS map, as the name suggests, maps these combined behavioural dimensions (active facilitation, active harm, passive facilitation and passive harm) onto the stereotype dimensions of the SCM.

Cuddy and colleagues' (2007) research has supported links between attributions of warmth and low competence, the SCM emotions and these behavioural dimensions. Specifically, pitied groups such as older people elicited both higher passive harm and active facilitation. In practical terms, passive harm represents behaviours such as demeaning, excluding and ignoring the out-group, whereas, active facilitation represents more positive behaviours such as helping and defending the group. This makes intuitive sense as people seek to alleviate feelings of pity they are unlikely to harm (active harm) the individual as this would simply replace pity with guilt. Therefore, to lessen this negative emotion, the individual must feel they are doing something active to support older people (active facilitation) or must remove reminders of their pitying which involves ignoring and excluding older people (passive harm). The core national surveys on attitudes to age and the ONS

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Opinions Survey (Abrams et al., 2009; Sweiry & Willitts, 2012) used a number of direct and indirect measures of ageism, summarised below.

Perceived Severity of Ageism

Measures of perceived age-based prejudice differed across surveys. The 2005 survey found that 72% of respondents positively responded to the question ‘In the past year to what extent do you think people over 70 years of age have suffered from prejudice or discrimination or unfair treatment in Britain?’. Fifty one percent said ‘*sometimes*’, 18% said ‘*a lot of the time*’ and 3% said ‘*almost all of the time*’. In the 2004 and 2006 surveys, respondents were similarly asked ‘In this country nowadays, how serious is the issue of discrimination against people because of their age?’ (1 = *very serious*, 2 = *quite serious*, 3 = *not very serious*, 4 = *not at all serious*). The surveys found that 45% and 52% (for 2004 and 2006 respectively) of respondents thought age discrimination was a *quite* or *very serious* problem. The 2010/11 ONS Opinions Survey phrased this question as ‘How serious, if at all, would you say discrimination is against people because of their age – whether they are old or young?’ and changed to a 7-point scale (1 = *not at all serious* to 7 = *very serious*). In comparison, 62% of respondents gave a rating of 5 or above showing that a majority agreed that age discrimination was a problem.

These items aimed to capture the extent to which people perceive age discrimination against older people within British society. The results indicate that age discrimination is seen as a serious problem by the majority of respondents and that either the severity or awareness of the problem of age discrimination is increasing with time.

Experiences of Age Discrimination

Experiences of discrimination based on age, race/ethnicity and gender was measured in the 2004, 2005 and 2008 core surveys by asking ‘In the past year, how often, if at all, has anyone shown prejudice against you or treated you unfairly because of your

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age/gender/race?’ (varied scales from ‘*never*’ to ‘*very often*’). Multiple questions asking about different types of unfair treatment (e.g., ridiculed, insulted, patronised etc.) were aggregated to form a comparable measure for the 2006 survey. Looking at those that did not respond ‘never’ across the core surveys, 26% of respondents had experienced age-based discrimination, only 18% had experienced gender-based and 14% race/ethnicity-based discrimination. This question was only applied to ‘age’ in the 2010/11 ONS Opinions Survey, showing that 33% had to some extent experienced prejudice or treated unfairly because of their age. Reported age discrimination remains largely constant across surveys until a notable peak in 2008 and 2010/11 (35% and 33% respectively). Across the core surveys (also in the ONS Opinions Survey) those aged 16-24 were the most likely to report experiencing age-based discrimination (52%) and those aged 80+ least likely (16.9%). However, those aged over 50 also reported experiencing less discrimination on the basis of all three categories (age, gender and race/ethnicity).

Overall, experiences of discrimination because of one’s age are higher than discrimination based on both gender and race/ethnicity. The increase in reported age discrimination over time mirrors the increase in perceived seriousness of age discrimination and may be a reflection of increased awareness of age discrimination and how it can be manifested. It was also noted that ageism was being reported as problematic by younger adults more often than those in old age. However, this does not necessarily suggest that experiences of ageism reduce with age. Instead, this may be reflective of fewer opportunities for discrimination once someone has left the workplace, or may be a general bias for older people to under-report experiences of discrimination and prejudice.

Indirect Measures of Ageism

Many other measures less directly assessed ageism within the core surveys and the ONS Opinions Survey. For example, the ONS Opinions Survey asked respondents ‘How do

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you think most people in Britain would place the status of people [in their 20s/in their 40s/over 70]?’ (1 = *extremely low status* to 7 = *extremely high status*). Overall, those in their 40s were rated as the highest status, but interestingly scores for those over the age of 70 were more evenly distributed (from 2-6) showing little consensus on status.

Attitudes to age in the employment setting were also explored in the first three core surveys with the question ‘How comfortable or uncomfortable do you think you would feel if a suitably qualified [person over 70/person under 30] was appointed as your boss?’. This question was repeated in 2010/11 using the phrasing ‘most people’ to make it less personal, ‘How acceptable or unacceptable do you think most people would find it if a suitably qualified [70/30] year old was appointed as their boss?’. Results for both questions showed a positive bias towards an older boss. The 2005, 2006 and 2008 surveys asked about overall positivity/negativity towards people aged over 70 and under 30. Both groups were viewed positively, but those over 70 were to a greater extent. Although the framing of the age category ‘those under 30’ was changed to ‘those in their 20s’ for the 2010/11 ONS Opinions Survey, findings did not change.

Intergenerational closeness may indicate positivity/negativity between different age groups. It was therefore assessed in a number of the surveys through measures of perceived similarity between young and old. In 2004, 69% of respondents thought that people aged over 70 have nothing at all or not very much in common with those under the age of 30. In 2005, 2006 and 2008, respondents were asked instead whether people from these two age groups were separate individuals (49%), one group (10%), two groups in the same community (20%) or two separate groups (21%). Applied again in 2010/11, 34% saw these two age groups as separate individuals, 7% as one group, 47% as two groups in the same community and 12% as two separate groups. This shows an increase in perceptions of young and old as two groups

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in the same community, and a reduction in perceptions of young and old as separate individuals or two separate groups.

These additional questions seem to show a mixed picture of age discrimination. While age prejudice seems apparent when rating the perceived societal status of older people and intergenerational closeness, it is absent when looking at the preference for a boss in their 70s (as opposed to 20s) and more positive feeling towards those in their 70s. Although these measures do not directly measure the different categories of discrimination as outlined by the BIAS map (Cuddy et al., 2007), the questions provide another testament to the variability in prejudice toward older adults.

The Unique Nature of Ageism

To end this chapter, I pull together the distinct characteristics of age categorisation, stereotyping and ageism when compared to other forms of group categorisation and prejudice. These unique features are significant in understanding the impact that negative attitudes to age might have on older adults. First, it is clear that age categorisation is much less rigid than other common group categorisations. Unlike race or gender categories, age categories are less clearly defined and perceptions of who is young, middle-aged or old will be in-part based on individual and societal differences (Age Concern, 2004). For instance, increases in longevity (World Health Organisation, 2014) will mean that what is labelled 'old age' will have to encompass a much longer stage of life or its cut-off points will need to be adjusted. Much research has already begun to examine old age as multiple stages or groups (for example; Chou & Chi, 2002; Hawkins, 1996; Hess, Hinson, & Hodges, 2009). Second, age categorisation is distinctive in that it is not static. Whereas we cannot change our race and are unlikely to change our gender, our age (and therefore the age category in which we fit) will inevitably change (North & Fiske, 2012). As a consequence of both the malleability of

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age categories and each person's transition through multiple age groups, the potential consequences of ageism are further-reaching.

Third, ageism represents a paternalistic form of prejudice (Fiske et al., 2002). Older people may be seen as less competent but harmless, provoking controlling and benevolent behaviours from others, but also increased helping, compassion and sympathy (Cuddy et al., 2007). The presence of positive stereotypes, feelings and behaviours may overshadow the negative and leave ageism unnoticed and unchallenged. This is dissimilar to many forms of racism, but may intersect with some racial groups who are viewed as passive and helpless, as well as sexist actions towards more traditional women.

Finally, our transition through different age groups also means that in forming opinions of older age groups, people are in a sense forming attitudes towards their future self (Nelson, 2005). In this instance, people unusually have the potential to be perpetrators of the very same prejudice they have experienced from others. The unique way in which negative old-age stereotypes are internalised at a younger age means that when people reach old age they are less well equipped to counter them. In support of this, research has often found that both younger adults (in line with in-group favouritism) and older people show favouritism toward the young. Both explicit (Hummert et al., 1994) and more often implicit tests (Nosek, Banaji, & Greenwald, 2002) indicate that older people also show negative attitudes towards their own age group and even a preference for younger age groups. This is contrary to patterns among different racial (Levy & Banaji, 2002 for review; Nosek et al., 2002) and gender groups, which show typical in-group bias.

Older people have spent a life time internalising stereotypes of ageing as they pass through their earlier years, it will therefore be much more difficult to dispel this bias when they themselves reach old age. Each of the unique features mentioned increase, rather than

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decrease the likelihood that negative attitudes to ageing will have a detrimental impact on older individuals. Therefore, the current thesis aims to better understand this negative impact.

Summary

Age is far from just a number, it is assigned meaning through commonly held age stereotypes. Therefore, automatically categorising people based on their perceived age, is likely to lead to the simultaneous stereotyping of these individuals based on their age. While providing benefits for cognitive efficiency, age stereotypes often misrepresent individuals and lead to unfair treatment. In trying to maintain a positive social identity people use negative stereotypes as a way of positively distinguishing their in-group from out-groups. This can lead to negative intergroup behaviours such as prejudice and discrimination. Experiences of age discrimination are reported as more common than both race and gender discrimination and a number of unique aspects of ageism might explain its prevalence. Having outlined the foundations of ageism, the next chapter provides a theoretical basis for understanding how age stereotypes might impact performance outcomes among older adults.

**CHAPTER 3- THE CONSEQUENCES OF AGE STEREOTYPES FOR
PERFORMANCE**

Stereotype threat theory (Steele & Aronson, 1995) is one account of how stereotypes might increase the likelihood of stereotype-consistent behaviours. Stereotypes of poor performance in various domains act as a threat to stigmatised individuals and disrupt performance. In this chapter, the literature specific to age-based stereotype threat (ABST) is reviewed in its entirety, including evidence for mediators of ABST, moderators of its effects and evidence for threat-based concerns. Working memory depletion, as well as a prevention focus are considered as accounting for the impact of age stereotypes on the performance of older people. It is proposed that moderators of ABST should be viewed within the framework of the Biopsychosocial Model of Challenge and Threat States (Blascovich & Mendes, 2000). Specifically, ABST moderators are discussed as either moderating perceived task demands, resources and/or stereotype salience, determining whether individuals perceive cues to age stereotypes as threatening or more positively as a challenge. These same factors should be considered when designing interventions to alleviate ABST effects. It is highlighted that as with much of the stereotype threat literature, it is difficult to implicate threat-based concerns through either implicit or explicit measures. The review reveals a growing body of ABST research, exploring a number of performance domains and using varied experimental designs.

Age discrimination and prejudice are often talked about as the definitive outcomes of age stereotyping. However, this is not the only outcome of age stereotyping. Older people themselves are also reactive in the face of these negative attitudes, showing both automatic and more motivated reactions to age stereotypes (Major & O'Brien, 2005). *Automatic stereotype priming* (Levy, 1996) and *stereotype threat* (Steele & Aronson, 1995) are two

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predominant examples of this. The focus of this thesis will be stereotype threat effects; however, stereotype priming is defined by way of distinguishing the two mechanisms through which behavioural assimilation to stereotypes may occur.

Automatic Stereotype Priming

Social cognitive psychology recognises that social cognition can be more or less automatic, and therefore without conscious awareness or intention (Bargh, 1989). Ideomotor theory further posits that automatic activation of stereotype categories has behavioural effects (see Dijksterhuis & Bargh, 2000 for review). A situational context can automatically activate pre-defined stereotypes without individual awareness, an effect known as implicit stereotyping or *stereotype priming* (Levy, 1996). Stereotype priming makes stereotypes more accessible (Bargh & Pietromonaco, 1982) and behavioural assimilation to the activated stereotype or “ideomotor action”, more likely (James, 1890; Wheeler & Petty, 2001). Stereotypes can encompass a multitude of traits (not just one action); therefore behavioural assimilation to stereotypes can take many forms.

Stereotype priming using old-age stereotypes has been shown to have effects on cardiovascular functioning (Levy, Hausdorff, Hencke, & Wei, 2000), measures of will-to-live (Levy, Ashman, & Dror, 1999-2000), walking speed (Bargh, Chen, & Burrows, 1996; Hausdorff, Levy & Wei, 1999), quality of hand-writing (Levy, 2000), and evaluations of self-efficacy and memory ability (Hess, Hinson, & Statham, 2004; Levy, 1996; Levy & Leifheit-Limson, 2009; Stein, Blanchard-Fields, & Hertzog, 2002). However, these automated processes have not been without criticism and failed replications (Doyen, Klein, Pichon, & Cleeremans, 2012)

Some research has even shown that the stereotype need not be self-relevant (concerning a group with whom you identify; e.g., Dijksterhuis, Spears, & Lepinasse, 2001; Dijksterhuis, Aarts, Bargh, & van Knippenberg, 2000) for ideomotor effects to occur.

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Conversely, old-age stereotype primes have not always been found to affect the behaviours of those for whom the stereotype is not relevant (e.g., Hess et al., 2004; Levy, 1996). It can be taken from these findings that self-relevance is an important factor that gives greater force to stereotype priming effects for individuals who are part of stigmatised groups through lower activation thresholds (Shih, Ambady, Richeson, Fujita, & Gray, 2002).

Stereotype Threat

Stereotype priming describes a process whereby stereotypes become more cognitively accessible and directly affect associated behaviour (Bargh & Pietromonaco, 1982; Hess et al., 2004; James, 1890). Ideomotor processes are by nature automatic and ‘cold’ and are not dependent on activation of one’s social identity. Although research suggests that stereotypes that are more self-relevant and linked more closely to valued social identities may be more cognitively accessible (Shih et al., 2002). In contrast to this, the second cause of assimilation to stereotypes to be discussed relies upon the salience of social identities (Tajfel & Turner, 1979). The experience of ‘stereotype threat’ occurs when negative stereotypes concerning ones social identity are activated in stereotype-relevant performance contexts (Steele & Aronson, 1995). This stereotype threat makes behavioural assimilation to negative stereotypes more likely, which operates through distinct motivation-based mechanisms, often linked to emotion (Wheeler & Petty, 2001).

Behavioural assimilation to stereotypes primed without the individual’s awareness (e.g., subliminally or through other forms of priming such as sentence-unscrambling tasks). Instead, stereotype threat theory rests on the premise that individuals have been made aware (to some extent) of a negative stereotype about their group and its relevance to a given performance setting. The stereotype and its associations have therefore been primed (as with stereotype priming), but the level of priming may provoke emotional, motivational or

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behavioural response from the individual. As put by Steele (2010, p59), when discussing how a vulnerability to stereotype threat arises among negatively stereotyped groups:

“These people know their group identity. They know how their society views it. They know they are doing something for which that view is relevant. They know at some level, that they are in a predicament: Their performance could confirm a bad view of their group and of themselves, as members of that group.”

This suggests some important characteristics of stereotype threat. First, stereotype threat only occurs for those who see the stereotype as self-relevant. The individual must recognize that they belong to the stereotyped group and be mindful of the stigma attached to that social group. However, endorsing the stereotype is not a necessary prerequisite of stereotype threat (Steele & Aronson, 1995). Secondly, stereotype threat is a fluid, situational threat. Not only does a self-relevant stereotype need to be activated, but this must also occur in a situation that presents a risk of confirming the stereotype. These factors present a threat to one's identity (Abrams & Hogg, 1990; Tajfel & Turner, 1979).

Stereotype threat effects were first evidenced among Black Americans and used in part as an explanation for discrepancies between their academic performance and that of White Americans (Steele & Aronson, 1995). Growing from this, stereotype threat effects have been evidenced among numerous other social groups based on their stigmatisation in different performance domains. This includes women in maths (Nguyen & Ryan, 2008), students from lower socioeconomic backgrounds on intellectual tasks (Croizet & Claire, 1998; Harrison, Stevens, Monty & Coakley, 2006) and older people on memory tests (Lamont, Swift & Abrams, 2015). Stereotype threat effects have not been restricted to purely cognitive domains or among groups typically seen as dominant. Stereotype threat has been shown to affect gay men's childcare skills (Bosson, Haymovitz, & Pinel, 2004), women's and both white and black men's athletic performance (Chalabaev, Sarrazin, Stone, & Cury, 2008;

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Stone, Lynch, Sjomeling, & Darley, 1999), men when compared to women in situations requiring social sensitivity (Koenig & Eagly, 2005), or White persons when compared to Asian persons in mathematics (Aronson et al., 1999) or with regard to appearing racist (Frantz, Cuddy, Burnett, Ray, & Hart, 2004).

Stereotype threat is typically examined within formal ‘test’ settings under the guise of ‘research’. Research examining what might cue stereotype threat and what outcomes might be affected in everyday settings is much more limited. It is often difficult and unethical to test stereotype threat effects in more applied settings, where underperformance may have real implications for individuals. However, people face formal tests of ability in everyday contexts, such as academic admissions, exams for licensure, or personnel selection (Sackett et al., 2001). Moreover, individual ability and performance may feel continually under scrutiny within settings such as the employment context, as people seek to prove our worth and improve our standing within an organisation.

Age-based stereotype threat (ABST) has been shown to affect older adults’ memory and wider cognitive performance (e.g., Abrams et al., 2008; Hess, Auman, Colcombe, & Rahhal, 2003), but also their driving skills and physical strength (e.g., Joannis, Gagnon, & Voloaca, 2012; Swift, Lamont, & Abrams, 2012). ABST research in particular is lacking evidence in applied settings such as the workplace. However, it has been shown to affect individuals undertaking health-related measures such as grip strength and clinical tests assessing dementia (Haslam et al., 2012; Swift et al., 2012). Additionally, not all ABST studies have been able to evidence threat effects in these performance domains (e.g., Andreoletti & Lachman, 2004; Fritzsche, DeRouin, & Salas, 2009).

Cues to Stereotype Threat

Stereotype threat is typically measured experimentally, whereby stigmatised individuals are randomly assigned to either a ‘threat’ condition, or a comparison group,

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usually a ‘control’ condition or a ‘stereotype nullification’ condition (which aims to disconfirm negative stereotypes). Performance in a stereotyped domain is then measured and worse performance in the threat condition is seen as a demonstration of stereotype threat effects. However, the actual cues used as manipulations of stereotype threat (highlighting the potential for stereotype-based judgement on the task) are very varied, reflecting the various ways in which stereotype threat might be cued in our everyday lives.

In Nguyen and Ryan’s (2008) meta-analysis of gender and race/ethnicity-based stereotype threat effects, they highlight three main groups of stereotype threat manipulations. First, *blatant* manipulations explicitly state negative expectations and the supposed inferiority of the stereotyped group in the task domain. For example, Joanisse, Gagnon and Voloaca (2012) told older people in the threat condition that “the objective of this study is to investigate why older adults aged 65 and above are more implicated in on-road accidents”, while older people in the control condition were told that “the objective of this study is to understand the underlying processes involved in driving”. Blatant manipulations in ABST research are typically achieved through mock newspaper articles or research papers to give credibility to statements (following the example of Hess et al., 2003).

Other manipulations described by Nguyen and Ryan (2008) as *moderately explicit*, similarly highlight that test takers are being judged based on their group categorisation, but do not state the specific performance expectations (e.g., Swift et al., 2012). For example, Fritzsche, DeRouin and Salas (2009) told older participants that “We are interested in understanding how to best provide training...previous research has shown that there are age-related differences in training...”. It is assumed that this comparison will be enough to make well known stereotypes salient.

Finally, more *subtle or indirect* manipulations are often used whereby group comparison and group-based differences in performance are not mentioned. Instead, subtle

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cues to the relevant social identity or negative stereotypes are made. Examples of this include the highlighting of the task as ‘diagnostic of natural ability’ (e.g., Kang & Chasteen, 2009; Mazerolle, Regner, Morisset, Rigalleau, & Huguet, 2012), highlighting the tasks relevance to a stereotyped domain (e.g., memory ability for older adults; Chasteen, Bhattacharyya, Horhota, Tam, & Hasher, 2005) or stating that completion of the task is easier for those with particular skills and then highlighting stereotypically ‘young’ skills (e.g., Hehman & Bugental, 2012). No comparison has yet been made between different types of manipulation used within the ABST literature and whether they differ in their impact on performance.

Mediators of Stereotype Threat

When stereotype threat was first discussed, a number of stereotype threat mechanisms were hypothesized as mediating between the experience of stereotype threat and subsequent performance decrements (Steele & Aronson, 1995). First, it was suggested that the worry elicited by stereotypes ‘diverts attention’ away from the task at hand and onto these anxieties. Second, it was suggested that awareness of stereotypes reduces people’s expectations of what can be achieved (Steele & Aronson, 1995). Since this early research, Smith (2004) has reviewed evidence of the processes of stereotype threat and developed the ‘Stereotyped Task Engagement Process Model’ (STEP model), and Schmader et al. (2008) have introduced their Integrated Process Model (IPM) of stereotype threat effects on performance. Both cross-over with Steele and Aronson’s (1995) initial hypotheses as the STEP model focuses on changes in goal orientation and the IPM focuses on working memory depletion. Both of these models and their sufficiency in explaining ABST effects are considered.

The Integrated Process Model

Schmader, Johns and Forbes (2008) talk about stereotype threat as an ‘acute stressor’ arising from an imbalance between conceptions of the group, the self and the ability domain (e.g., older people aren’t seen as physically fit, I am an older adult, I think I am pretty fit). It

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is stated that this experience of cognitive imbalance which individuals are motivated to resolve “can lead people to appraise their experience in a biased manner that produces negative thoughts and feelings” (Schmader, Johns, & Forbes, 2008, p 338). This experience can lead to cognitive depletion and negatively affect performance due to reduced working memory capacity. Working memory is defined as the area of the brain, located in the prefrontal cortex which with limited capacity controls attention and is responsible for inhibitory processes (Schmader et al., 2008). Some wider stereotype threat research (focusing on different stereotyped groups) has found that stereotype threat can indeed lead to reductions in working memory (e.g., Rydell, McConnell, & Beilock, 2009; Schmader & Johns, 2003), while other research has shown that it may result in reduced ability to inhibit prepotent responses (e.g., Jamieson & Harkins, 2007) or reduce self-control on follow-up tasks (Inzlicht & Kang, 2010), each supporting the role of working memory in the production of stereotype threat effects. However, not all research has been able to support this link to working memory, particularly that examining ABST (Barber & Mather, 2013a; Hess, Hinson, & Hodges, 2009).

In this model, depletion of working memory is therefore implicated as the main path through which stereotype threat effects occur and three key factors are outlined by the IPM as depleting working memory under conditions of stereotype threat (Schmader et al., 2008). First, one’s physiological stress response can have a direct effect on working memory capacity through ‘impairment of prefrontal processing caused by activation of the hypothalamic-pituitary-adrenal axis’ (p338). Secondly, those experiencing stereotype threat may increasingly monitor the situation and their performance, looking for cues that may disambiguate the situation. This is suggested to use up valuable cognitive resources needed for task performance (Schmader, Forbes, Zhang & Mendes, 2009). Finally, individuals may attempt to suppress feelings of anxiety or negative thoughts, again using up valuable

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resources needed for task performance (Johns, Inzlicht & Schmader, 2008). This is a simplified explanation of the proposed model and within the original paper, support for these three processes is provided (Schmader et al., 2008). None of these three factors is independent of the other two; for example, increased monitoring may in turn increase physiological stress as one is attentive to their performance deficits. Likewise, increased physiological stress may require greater efforts to suppress negative feeling. This model is illustrated in Figure 3.1, taken from Schmader et al. (2008).

[Figure 3.1 removed]

Based on early predictions by Steele and Aronson (1995) and Schmader et al.'s (2008) IPM, working memory has been measured in ABST studies (e.g., Hess, Hinson, & Hodges, 2009; Mazerolle et al., 2012), but so have affective response (e.g., Abrams, Eller, & Bryant, 2006; Abrams et al., 2008; O'Brien & Hummert, 2006) and cognitive strategy (e.g., Hess et al., 2003; Mazerolle et al., 2012) as factors that may precede depletion of working memory. Research evidence in these areas is now reviewed.

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Affective response and ABST. Affective or emotional response is one of the earliest and most widely researched mediators of ABST and stereotype threat more widely. Within ABST literature, affective response has been measured through self-reported anxiety (Abrams et al., 2006; 2008; Chasteen et al., 2005; Hess et al., 2003; Hess & Hinson, 2006; Hess, Hinson, & Hodges, 2009; O'Brien & Hummert, 2006; Swift et al., 2013), self-reported positive and negative affect (Hess, Emery & Queen, 2009; Hess, Hinson & Hodges, 2009; Kang & Chasteen, 2009), and through physiological measures such as skin conductance (Hess, Hinson, & Hodges, 2009).

Hess et al. (2003) utilised the Memory Anxiety subscale from the Metamemory in Adulthood questionnaire (Dixon & Hultsch, 1984) after testing older participants' memory performance. This scale includes items about trait anxiety specific to memory (e.g., "I get upset when I cannot remember something"). Anxiety in this case was not related to stereotype threat condition (threat, nullification and control conditions created through presentation of newspaper articles), but this may be because the anxiety questions were not related to the test. Alternatively, Chasteen et al. (2005), Hess, Hinson and Hodges (2009) and Hess and Hinson (2006) measured state anxiety, specific to the testing situation, using versions of the Spielberger State-Trait Anxiety Inventory (Marteau & Bekker, 1992; e.g., "I am worried"). In all three studies, the measure was used after the stereotype threat condition manipulation (threat compared to either nullification and/or control), but before participants took part in the memory test. However, again none of these studies found that anxiety was related to stereotype threat condition or performance.

O'Brien and Hummert (2006) also measured anxiety before testing memory, but after the stereotype threat condition manipulation whereby older participants (note young mean age of 54) were either informed that the research was being done to look at memory ability (control condition), or that memory performance typically declines with age and their

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performance would be compared to that of younger adults (threat condition) or adults over the age of 70 (nullification condition). Anxiety was tested through agreement with emotion words (worried, relaxed, jittery, indecisive, calm and nervous). They found no effect of stereotype threat condition on pre-test anxiety. After the memory test they measured anxiety again through agreement with four statements (e.g., “I got anxious when I was asked to list the words”). Counter to stereotype threat theory, lower levels of post-test anxiety and higher levels of test performance were actually found among those in the threat and control conditions, as opposed to the nullification condition.

Similarly, Abrams et al. (2006; 2008; also Swift et al., 2013) have measured older participants' anxiety both before and after cognitive testing. Older participants rated the extent to which they felt a number of emotions (under pressure, tense, nervous/jittery, confident, uneasy, calm, afraid of not doing well, and uncomfortable) before/during the test. In all four studies, anxiety was found to fully or partially mediate between stereotype threat condition and cognitive test performance, moderated by intergenerational contact (either real or imagined). Notably, Abrams et al. (2006; 2008; also Swift et al., 2013) used less explicit manipulations of ABST than the other studies measuring anxiety. This may have affected the responses of participants when asked about anxiety and provoked less reactance, showing that self-report measures of emotion may be susceptible to bias, especially when blatant ABST manipulations are used.

Finally, Hess, Hinson and Hodges (2009) are the only researchers to look at physiological response to ABST. They did not find that physiological response, measured as skin conductance, mediated between stereotype threat condition (threat vs. nullification) and older people's memory performance. Overall, this comprehensive review of the ABST literature cannot provide support for the assumptions of the IPM, that affective and emotional responses play a key role in ABST processes.

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Working memory capacity and ABST. Hess, Hinson and Hodges (2009) were the first to actually measure working memory capacity within an ABST study, using a computation span task. This was measured after the stereotype threat condition manipulation (threat vs. nullification) but before the memory test. Stereotype threat condition did not predict working memory capacity (this is also the case in Barber & Mather, 2013a). They suggest that, in their efforts to not label the computation span task as a memory test or associate it with negative age stereotypes, they may have reduced evidence of depleted working memory.

Mazerolle, Regner, Morisset, Rigalleau and Huguet (2012) attempted again to look at depleted working memory as a potential mechanism through which ABST effects occur. A reading span task (Desmette, Hupet, Schelstraete, & Van De Linden, 1995) posed as a separate study was used as a measure of baseline working memory. Participants were later given a cued-recall task and another reading span task which were both described as ‘memory tests’. In the threat condition participants were told that ‘both younger and older adults are taking part’, in the stereotype nullification condition they were told that ‘performance on these tasks usually does not differ between young adults and older adults’. Controlling for baseline working memory scores, older people in the threat condition showed worse working memory scores than older people in the nullification condition (this pattern was not apparent for younger participants). This study holds the opposite problem to Hess, Hinson and Hodges (2009): now that memory ability has been highlighted, depletion in working memory under threat may simply represent ABST effects. Given that depleted memory is a predominant stereotype applied to older adults, it makes the measurement of working memory as a mechanism through which ABST occurs more problematic. Further research could usefully examine the impact of age stereotypes on test performance less intertwined with memory

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(e.g., problem solving, driving performance) and examine working memory depletion in these contexts.

Cognitive processes and ABST. Due to complexities in measuring depletion of working memory under ABST, researchers have also looked at changes in cognitive strategies as an indication that working memory might be depleted (e.g., Hess et al., 2003; Mazerolle, et al., 2012). In the same study by Mazerolle et al. (2012), controlled and automatic processing scores were derived from the cued memory task. It was found that among older people in the threat condition, controlled use of memory was undermined and automatic response tendencies increased. They argue that this reduction in controlled processing is consistent with a reduction in working memory (Mazerolle et al., 2012).

Further, Hess et al. (2003) found that mnemonic strategy use (clustering) partially mediated the impact of stereotype threat condition on recall performance of older participants (accounting for approx. 58% of variance). Mnemonic strategy use was measured by looking at how participants clustered semantically similar words during recall. Greater clustering was positively related to recall performance. It was suggested that factors that disrupt executive functioning, such as anxiety and disruptive thoughts or changes in effort/motivation could reduce affective clustering, explaining depleted performance outcomes. Unfortunately, these additional factors were not measured to test this hypothesis. Hess, Hinson and Hodges (2009) found a lower ratio of clustering in the threat condition than in the control condition among young-old participants (aged 60-70 years old), but not old-old participants (aged 71-82 years old). Neither this study nor a similar design by Hess and Hinson (2006) provided strong support for strategy use as a mediator.

In testing recognition memory, Hess, Emery and Queen (2009) asked older participants to not only say if a word had previously been displayed or not, but also whether they ‘remember’, ‘know’ or ‘guess’ that this was the case. This represents participants’

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subjective experience of memory, meaning whether someone is certain of a given memory or more unsure. This was measured under the assumption that processes of coding and retrieval might be altered if ABST is indeed diverting working memory resources. Hess, Emery and Queen (2009) found that there was a lower ratio of 'remember' to 'know' responses among participants subjected to negative expectations of memory with ageing (threat condition) compared to those presented with positive expectations (nullification condition). Tests of mediation were not carried out.

Conclusions. Support for the assumptions of the IPM within the ABST literature is inconsistent. Neither anxiety, cognitive strategies, evaluation apprehension, self-efficacy or working memory depletion itself have been successfully implicated as reliable mediators of ABST effects. However, the ABST literature does not cover all aspects of the IPM, in fact it predominantly looks at the presence of negative thoughts and feelings through self-report measures. Tests of physiological stress response to ABST are limited to just one study which measures skin conductance (Hess, Hinson, & Hodges, 2009). Wider stereotype threat research has shown that stereotype threat among other groups increases blood pressure (e.g., Blascovich, Spencer, Quinn, & Steele, 2001) and elicits broader activation of the sympathetic nervous system (using both heart rate and skin conductance as indicators; e.g., Murphy, Steele, & Gross, 2007). Croizet et al. (2004) also found that heart rate variability (suggested to be a physiological indicator of mental work load among other things) mediated between stereotype threat and subsequent performance. Additionally, no ABST research has examined and provided evidence for thought suppression processes or increased monitoring of performance under stereotype threat. These are potential avenues for future research. It is also worth noting that inconsistent findings may also be a feature of the diversity in ABST condition manipulations, outcome measures and study procedures.

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The IPM cannot account for negative stereotype threat effects that occur on tasks whose reliance is not primarily on working memory. It does highlight that increased monitoring may directly affect performance on more automatic tasks; however, this seems an insufficient explanation for tasks such as strength tests which require motivation and persistence more than automatic processes (Swift et al., 2012). The STEP model, which is discussed next, despite being the older model can be seen as encompassing the IPM and working memory processes as one outcome of avoidance motivations. Going beyond working memory, it provides a better account of stereotype threat effects on a wide range of tasks.

The Stereotyped Task Engagement Process Model

Achievement goal research would suggest that one's analysis of a performance situation and the self within it, leads to different levels of cognitive engagement, affect and subsequent performance (Ryan & Ryan, 2005). The STEP model (Smith, 2004), an alternative model of stereotype threat effects, stresses the link between achievement goals, performance avoidance goals specifically (as opposed to performance approach goals), and stereotype threat effects. Ryan and Ryan (2005) proposed a similar model, however, due to great similarity to the STEP model it will not be discussed here.

When an individual strives to appear competent and improve their performance, they are said to hold 'approach goals'. 'Avoidance goals' on the other hand are reflected in ambition to avoid appearing incompetent. Both approach and avoidance goals are seen as 'achievement goals' as the aim is to demonstrate some level of ability compared to others. Alternatively, people may adopt 'mastery goals' which focus on skill development and mastery of an area. Avoidance goals are associated with worse performance (Elliot & Church, 1997). Figure 3.2 depicts the STEP model. Stereotype threat induces performance avoidance goals (arrow 1), but individual characteristics (arrow 2), such as inclination towards the adoption of either achievement/mastery goals, will determine the outcome of this

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stereotype threat-induced avoidance orientation. It is suggested that this performance avoidance orientation will have behavioural and phenomenological consequences (encompassing other proposed mediators of stereotype threat), leading to potential performance decrements.

[Figure 3.2 removed]

Stereotype threat research examining regulatory focus can also be linked to the assumptions of the STEP model. Higgins (1997) reconceptualised the dichotomy between approach and avoidance goals through his theory of motivational states or differences in *regulatory focus*. Whereas avoidance and approach motivations are to avoid pain and approach pleasure respectively (Higgins, 1997), a ‘prevention’ and ‘promotion’ focus are to seek security or try not to lose positive outcomes and strive for advancement and desired outcomes, respectively (Molden, Lee, & Higgins, 2008). Avoidance motivations and a prevention focus share very similar emotional, motivational and behavioural consequences. These include less adaptive achievement outcomes, negative emotions and poorer performance outcomes (e.g., Elliot & McGregor, 1999; Chalabaev et al., 2012).

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As well as differences in long-term regulatory focus, a given situation can determine whether people have a promotion or prevention focus; for example, negative stereotype expectations are likely to provoke a prevention focus, whereby people strive to not confirm negative stereotypes about their group (Barber & Mather, 2013a; Seibt & Förster, 2004). Seibt and Förster (2004) state that “negative self-stereotypes fostered a risk-averse, vigilant processing style as indicated by higher performance accuracy, diminished creativity, and enhanced analytic thinking whereas positive self-stereotypes fostered a risky, explorative processing style with enhanced speed and creativity and diminished analytic thinking.” (p. 51). Therefore, regulatory focus has been examined as a mediator of ABST.

Regulatory focus and ABST. Two of the most recent ABST papers indicate that regulatory focus mediates between the threat of age stereotypes and poorer performance (Barber & Mather, 2013a; Popham & Hess, 2013). This has been tested using the idea of ‘regulatory-fit’, whereby a match between a person’s regulatory state (such as that induced by stereotypes) and the reward structure of a task can either represent a match or a mis-match (Grimm, Markman, Maddox, & Baldwin, 2009). For example, tasks used in ABST studies often have a gains-based reward structure which is inconsistent with the loss-based focus (prevention) that negative stereotypes promote, this demonstrates a mis-match. Barber and Mather (2013a) manipulated both ABST (threat vs. control) and the task reward structure (gains vs. losses). Consistent with the regulatory-fit account, they found that performance decrements were only apparent for those in the threat condition when the task had a gains-based structure, whereby participants were rewarded with earning additional funds rather than losing funds (representing a regulatory mis-match). Barber and Mather (2013a) also tested baseline and later working memory performance and were unable to show that working memory was affected by stereotype threat condition. They do not conclude that working memory is exempt as a mediator of stereotype threat, but that the mechanisms of threat may

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not be the same across different age groups. This suggestion is reinforced by Popham and Hess (2013).

Popham and Hess (2013) suggest that responses to stereotype threat may differ across age groups due to 'enhanced emotion regulatory abilities'. If older people have more developed emotion regulation abilities, this would then make the mechanisms outlined by the IPM (Schmader et al., 2008) less relevant to them. To test this hypothesis they exposed both younger and older people to stereotype threat. Younger participants were threatened by a comparison with those from different college majors, while older participants were compared with younger adults. They used the regulatory focus questionnaire (Lockwood, Jordan, & Kunda, 2002) and measured speed and accuracy as indicators of regulatory focus, an operation span task was used to look at working memory, and self-report measures of emotion regulation. Consistent with their predictions, younger participants, but not older, showed poorer working memory performance under threat. Older adults, and younger adults to a lesser extent, showed slower performance with higher accuracy in the threat condition, consistent with a prevention focus. Emotion regulation abilities only moderated threat affects for younger participants.

Using a multiple-choice test on driving, Gaillard, Desmette and Keller (2011) also found that ABST effects were only apparent in the threat condition when a prevention focus had also been manipulated through the reward structure of the study. However, the STEP model does not propose that all other mediators are redundant, but rather that performance avoidance goals result in negative emotions, maladaptive thoughts and behaviours which result in poorer performance. In line with this, a number of other mediators have been considered within the ABST literature.

Beliefs, attitudes and expectations and ABST. After testing the memory of older participants who had either been told to expect age differences in memory performance

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(threat condition), to expect no differences (nullification condition) or where age differences were not mentioned (control condition), Andreoletti and Lachman (2004) assessed beliefs about memory ability. Participants rated their own memory (1 = *excellent* to 5 = *poor*) in comparison to other people of their age. Second, the study assessed beliefs about memory decline by asking participants to compare their memory now to five years ago (1 = *a lot better* to 5 = *a lot worse*). Stereotype threat condition had no effect on beliefs about memory or memory decline. Similarly, Hess and Hinson (2006) used the Memory Controllability Inventory (Lachman, Bandura, Weaver, & Elliot, 1995) which measured beliefs about one's present ability, potential for improvement, effort utility and the inevitability of memory decline, and also concerns about ageing. They found that although anxiety and evaluation apprehension did not predict performance differences between stereotype threat conditions (newspaper articles presenting negative vs. positive stories of age and memory), memory controllability and ageing concerns did. Measured both before testing and after testing, memory controllability decreased and ageing concerns increased from before the test to after, in the threat condition only. This pattern was most obvious among those in their 60s. This shows mixed results that ABST might influence beliefs and concerns about memory and ageing, causing disruptive thinking and harming performance.

Researchers have looked more specifically at whether expectations of one's own performance abilities are altered by ABST. The performance expectations of older people were measured after the stereotype threat condition manipulation (threat vs. nullification) but before testing memory by Hess, Hinson and Hodges (2009; also by Hess & Hinson, 2006, however results were not reported). Participants gave an estimate of how many words they predicted they would remember (given an anchor of 15). Hess, Hinson and Hodges (2009) found that, moderated by education, these performance expectations mediated between stereotype threat condition and memory performance, whereby participants with higher

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education predicted lower recall performance in the threat condition (compared to a stereotype nullification condition). Desrichard and Kopetz (2005) also found that performance expectations partially mediated between stereotype threat condition and older participants' performance (lower expectations leading to lower performance in the threat condition). Performance expectations were instead measured using one question asking how they expected to perform (1 = *very poor performance*, 9 = *very good performance*). From these two studies it seems possible that negative age stereotypes reduce performance expectations.

Evaluation apprehension (e.g., "Others may question my ability to do well on this task") has also been measured before memory tests by Chasteen et al. (2005) and Hess and Hinson (2006), and self-reported self-efficacy (five items e.g., "I am unsure if I have the ability to do well on this task") by Chasteen et al. (2005). There were null findings again for both of these potential mediators.

Conclusions. Evidence that motivational/regulatory processes mediate between ABST and performance decrements is sparse but also more consistent than support for the processes of the IPM. The STEP model does not exclude mediators highlighted by the IPM, but considers avoidance goals at the primary mechanism from which these other mediators stem.

Moderators

The fact that not all older people experience ABST to the same extent suggests that there are a number of significant moderators of ABST effects. The biopsychosocial model of challenge and threat states (BPS; Blascovich & Mendes, 2000) is insightful when considering factors that may moderate the impact of negative stereotypes on older people in an evaluative context. The IPM and STEP models predict that ABST will lead to working memory depletion and avoidance orientation respectively, but that this will be moderated by

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individual characteristics. The BPS model sums up these individual differences by considering how demands and resources in evaluative contexts determine whether an individual may perceive and approach a performance situation more or less positively (see it as a challenge) or negatively (seeing it as a threat).

The Biopsychosocial Model of Challenge and Threat States

The BPS model states that experiences of challenge/threat will depend on the perceived balance between task demands and resources (Blascovich & Mendes, 2000). These ‘demands’ and ‘resources’ are defined as the “perception of danger, uncertainty and required effort inherent in the situation” and the “perception of knowledge and skills relevant to situational performance” respectively. Demands may therefore include factors such as required effort, the importance of good performance, and the danger and uncertainty presented by a situation. Resources vary greatly depending on what gives an individual confidence in their ability to succeed in a given situation. Resources may be vicarious cues (e.g., another man your age did well), more solid cues (e.g., you have completed the task before successfully), or very individual factors (e.g., you have your lucky charm with you). The experience of threat is dependent on perceiving insufficient resources in relation to demands. Challenge states occur when resources are seen as sufficient or close to sufficient.

Challenge states are suggested to induce approach orientations, whereas threat states are suggested to be a mixture of both approach and avoidance orientations (e.g., Tomaka & Palacios-Esquivel, 1997). However, the BPS model outlines not only the cognitive component of challenge and threat states, but also distinct physiological and affective characteristics (Blascovich & Mendes, 2000). Although higher negative affect has been linked to threat states (Mendes, Blascovich, Major, & Seery, 2001), differing physiological responses have more consistently been documented as distinguishing between challenge and threat states. Activity of the sympathetic-adreno-medullary (SAM) axis is said to be

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characteristic of a challenge response, whereas those showing a threat response would be expected to show increased activity of the SAM axis together with increased activity of the pituitary-adrenal-cortical (PAC) axis. Increased SAM activity provides superior cardiac performance through increased ventricular contractility increasing stroke volume and a decrease in systematic vascular resistance due to the release of epinephrine from the adrenal medulla. However, when increased SAM activity is accompanied by increased PAC activity, the release of epinephrine is inhibited, restricting the decrease in systematic vascular resistance. This essentially means that more blood is being pumped by the heart, but vascular resistance remains the same, causing higher blood pressure and less efficient cardiac performance (Blascovich & Mendes, 2000).

The BPS model is more generally applied to any evaluative situation and concerns a more general ‘threat’ (in opposition to ‘challenge’). However, this model can be applied to stereotype threat as a specific type of performance situation, based on the evaluative pressure of a potentially threatening stereotype. The same balance of demands and resources will be weighed up, but negative stereotypic expectations will act as the main situational demand.

Stereotype Challenge

Therefore, utilising the theoretical contributions of the BPS model, it can be conceptualised that when presented with negative group stereotypes, some may see demands as outweighing resources and therefore aim to ‘avoid demonstrating incompetence’ (adopting largely avoidance goals and a threat state); others who perceive their resources as outweighing demands may feel more efficacious and believe that they have the potential to wholly disprove the stereotype (adopting largely approach goals and stereotype challenge). The concept of *stereotype challenge* therefore represents a situation in which negative stereotypes are highlighted about an individual’s group, but the individual perceives their resources in this situation as outweighing demands and so responds in a positive way,

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adopting an approach orientation. This is consistent with the STEP model of stereotype threat effects (Smith, 2004).

The concept of stereotype challenge is supported by earlier research, for example, in two gender stereotype threat studies carried out by Crisp, Bache and Maitner (2009). These studies showed that female engineering students (who are pursuing a gender counter-stereotypic field) in fact experienced enhanced maths performance when told that they were being held in comparison with men. This was not the case for female psychology students who performed significantly worse after a gender comparison. Female engineering students did overall outperform psychology students on the task (independent of stereotype threat condition) showing high levels of competence. This may have been reflected in their mind-set when approaching the stereotyped task. Their high levels of skill may have given them confidence to experience it as a stereotype challenge rather than a stereotype threat.

Further, Hehman and Bugental (2013) support this 'challenge' response within the domain of ABST. Both older and younger participants were given an intelligence test with instructions either emphasising the superior performance of those with 'wisdom and experience' (positive old-age stereotypes) on the task, or 'fast-responses and current knowledge' (young-age stereotypes). It was found that counter to stereotype threat theory, the performance of younger respondents presented with positive old-age stereotypes exceeded that of those presented with young-age stereotypes. This was put down to the supposition that for the young it may be easier to perceive a stereotype challenge, as negativity surrounding their age group is non-permanent (they will eventually transition to later age groups). Whereas for older adults, no change can be foreseen. This demonstrates the importance of perceived ability to overcome the negative stereotype. These findings would suggest that some take a wholly different approach to stereotyped tasks.

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Finally, over a decade of ABST research has examined moderators of ABST effects. These moderators can be categorised under the assumptions of the BPS model as; 1) moderators of stereotype salience e.g., positive intergenerational contact, education and age; 2) moderators of perceived situational demands e.g., task pressure and domain identification or; 3) moderators of perceived situational resources or ability to cope e.g., self-efficacy and past experience. These moderators are proposed to contribute to the balance of demands and resources perceived in a stereotype evaluative situation, therefore determining whether individuals experience stereotype threat or stereotype challenge.

Moderators of Stereotype Salience

Some studies that evaluate threat-based concerns in these experimental settings show that stereotype threat can be chronically present for older people in test-based settings irrespective of which stereotype threat condition they are placed in (e.g., Chasteen et al. 2005). It is likely that there are a number of factors other than the experimental manipulation that determine the salience of negative age stereotypes in a given situation. These will be moderators of ABST effects.

Age. Hess, Hinson and Hodges (2009) found that ABST effects were dependent on participant age, whereby ABST effects on memory performance were most evident among the young-old, meaning those between 60 and 70. Hess and Hinson's (2006) research also indicated that the negative effects of a threat manipulation on memory performance were most evident among participants aged 68. This may suggest that age stereotypes are more salient for those in early old age due to the newness of their self-relevance or perhaps due to a rejection of self-identifying as 'old'.

Intergenerational contact. Two studies by Abrams and colleagues identified intergroup contact as a consistent moderator of ABST effects. Abrams et al. (2006) found that the expected ABST effects on cognitive performance were only apparent when prior

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intergenerational contact (between older participants and younger adults) has been less frequent and positive. Abrams et al. (2008) extended this research by showing that both positive prior contact with grandchildren (rather than wider intergenerational contact) and imagined intergenerational contact also moderated the effects of ABST. The moderation of ABST by both actual and imagined intergenerational contact was found to be mediated by reduced anxiety, and partially mediated by reduced anxiety for contact with grandchildren. As proposed by intergroup contact theory (Pettigrew, 1998), intergroup contact can reduce the salience of intergroup boundaries and therefore may reduce reliance on the stereotypes that accompany these group boundaries (Abrams et al., 2006).

Age-group identification. Identifying more strongly with the stigmatised group may increase stereotype salience. The age-group identification scale, including 13 items and measured prior to testing (Garstka, Schmitt, Branscombe, & Hummert, 1997), was used prior to memory testing of older participants by Kang and Chasteen (2009; e.g., “I value being a member of my age group”). Age-group identification was found to moderate recall performance, whereby performance decreased among older people as age-group identification increased. Age-group identification did not moderate stereotype threat effects on performance.

Stigma consciousness. Some studies have directly measured stigma consciousness. Hess, Hinson and Hodges (2009) measured stigma consciousness using ten items adapted from Pintel’s (1999) stigma consciousness questionnaire. Memory performance decrements in the threat condition were greatest for those with higher stigma consciousness, among the young-old. Irrespective of stereotype threat condition, stigma consciousness also worsened recall performance for the old-old with higher levels of education. Hess, Hinson and Hodges (2009) suggested that situational factors (such as stereotype threat condition) may have less impact on the old-old who are more used to age stereotyping, explaining the difference in

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findings. Joanisse et al. (2013) assessed awareness of old-age stereotypes through agreement with the item “even before I registered for this study, I felt that older drivers were perceived as bad drivers by society”. No significant moderating effects of agreement with this statement on performance outcomes were found.

Moderators of Perceived Situational Demands

Aside from moderators of stereotype salience, increases/decreases in other perceived situational demands may determine whether demands outweigh perceived resources, and whether the salience of stereotypes in the performance setting is perceived as a challenge or a threat.

Domain identification. Hess et al. (2003) looked at ‘attitudes towards memory’ using the Memory Achievement subscale from the meta-memory in adulthood questionnaire (Dixon & Hultsch, 1984). Similar to domain identification measures it uses items such as “It is important to me to have a good memory” and was measured before testing. Greater personal investment in memory negatively affected older people (worse memory performance) under conditions of threat. This measure was also used by Hess and Hinson (2006), but with null findings. This was attributed to the high value placed on memory by the majority of their oldest participants.

Gaillard, Desmette and Keller (2011), Joanisse et al. (2013) and Chapman, Sargent-Cox, Horswill and Anstey (2014) tested ABST effects on driving performance (through multiple choice questions, simulated driving and hazard perception, respectively), and whether domain identification moderated these effects. Gaillard et al. (2011) could not carry out moderator analyses due to high identification across participants. Joanisse et al. (2013) asked prior to testing ‘how important is driving in your life?’ (1 = *not at all*, 5 = *extremely important*). They found that domain identification moderated ABST effects on older participants’ driving performance. Those more highly identified were more susceptible to

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ABST effects, showing greater performance decrements in the threat condition. Chapman et al. (2014) alternatively used a 9-item measure of 'driving importance' created by the authors (e.g., "driving is very important to me"). Driving importance did not predict performance outcomes on the hazard perception test or moderate the effects of the stereotype threat manipulation.

Education. Similar to domain identification, education may be a reflection of participants' investment in the task they are taking part in and how important good performance is to them. The main conclusion of Andreoletti and Lachman's (2004) study of ABST was that effects of stereotypical and counter-stereotypical information on memory performance are heavily dependent on education. Only among more highly educated participants did counter-stereotypical information lead to better memory performance (compared to those in the threat/stereotypical and control groups). Any presentation of expectations (stereotypical or counter-stereotypical information) led to worse memory performance for those with lower education. These findings were consistent for both young, middle-aged and older participants. Education, age and stereotype threat condition interacted to predict ABST effects on memory performance in Hess, Hinson and Hodges' (2009) study. Those categorised as young-old and with higher education were most susceptible to these effects. Education did not predict driving performance under ABST (Joanisse et al., 2013).

Task demands. A more obvious demand that may moderate ABST effects is how demanding the task itself is perceived to be, and therefore the resources needed to complete it and overcome any stereotypes that have been made salient. Hess, Emery and Queen (2009) used a 2 (task demands: time limit vs. unlimited time) x 2 (ABST: threat vs. nullification) between subjects design. Time pressure was found to moderate ABST effects whereby typical ABST effects were only found for older people under time pressure. Although Fritzsche et al. (2009) gave all participants the same time limit to complete their task, they let

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some self-pace and gave others time limits. The task was a test of newly learnt knowledge about finding references on a computer-based library catalogue system. Unusually in this study, performance was better in the threat condition. No effects of self-pacing on performance were found.

Moderators of Perceived Situational Resources or Ability to Cope

Finally, a number of studies have taken measures that reflect perceived resources, such as how prepared participants feel and how positive they feel about their abilities on a given task.

Locus of control and memory self-efficacy. Hehman and Bugental (2013) predicted that perceptions of control over one's life outcomes (locus of control) might be an individual difference variable that altered the effects of ABST. Locus of control was measured using the Powerful Others Scale (Levenson Locus of Control test; Levenson, 1973) which contains items such as "my life is chiefly controlled by powerful others". Locus of control did not interact with stereotype threat condition to predict performance but was found to additionally explain some of the variance in cognitive performance. It was concluded that ABST and perceptions of being under the control of others additively damage performance. Along a similar vein, memory self-efficacy was found to moderate ABST effects, whereby lower memory self-efficacy lead to lower memory performance in the threat condition only (Desrichard & Kopetz, 2005).

Ageing expectations and emotions. Hess and Hinson (2006) did not find that anxiety about ageing moderated stereotype threat effects on performance. Haslam et al. (2012) manipulated age-based self-categorisation by showing participants that they were either older or younger compared to other participants, and manipulated 'deficit expectations' through articles about either memory decline or wider cognitive decline in later life. Both age self-categorisation and deficit expectations predicted performance. Those participants that self-

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categorised as ‘older’ experienced ABST effects on memory tasks when they expected memory decline, and on the general ability test when they expected broader cognitive decline to be a characteristic of ageing.

Conclusions

As ever, there are mixed results on what factors moderate ABST effects and this is likely to be a symptom of the varied study manipulations, study sequences and dependent variables used in these studies. However, it is clear that the BPS model provides a useful framework for considering both the moderation and prevention of ABST effects. Although less research has looked at the alleviation of ABST effects, Geraci and Miller (2013) have found that older people given experiences of task success prior to a stereotype threatening memory test, perform significantly better and show less anxiety than comparison groups. This is an example of increasing individual resources to overcome ABST. Additionally, both intergenerational contact and imagined intergenerational contact have been found to moderate the effects of stereotype threat (Abrams et al., 2006; 2008) and this is likely due to reductions in stereotype salience.

Further, each of the three avenues for the alleviation of ABST effects may be more or less applicable in given situations. For example, in a high-pressured workplace where it is not realistic to reduce demands, employers should focus on how they might reduce stereotype salience (e.g., through mixed-age high profile workers) and increase employee resources (e.g., provide additional training in areas that older people may feel they are viewed negatively). Alternatively, in a setting such as within education where older people are likely to be in the minority as mature students, reducing stereotype salience and the demands of the setting may be more difficult, and so increasing resources should be a primary focus.

Threat-Based Concerns

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One limitation (often a practical impossibility) of stereotype threat research is the inability to provide evidential support for the hypothesised threat-based concerns causing performance decrements. Although many ABST studies follow convention and establish a significant overall ABST effect, it is rarely clear that such effects can be attributed to ABST. In other words, it is unclear whether the ‘threat’ has been registered at a conscious level (e.g., Horton, Baker, Pearce, & Deakin, 2010; Rahhal, Hasher, & Colcombe, 2001; Swift, et al., 2012). Without confirming increased threat-based concerns or the mediation of stereotype threat effects through a stereotype threat specific mechanism (e.g., anxiety, reduced motivation, cognitive depletion), it is unclear whether stereotype threat effects are being experienced rather than direct stereotype priming (Bargh & Pietromonaco, 1982). The distinction between these two mechanisms through which behavioural assimilation to stereotypes might occur is important as it has clear implications for understanding and overcoming the negative effects of age stereotypes.

Some ABST studies do include manipulation checks for ‘threat-based concerns’ as an indication that stereotype threat has been experienced. These have included both implicit measures of stereotype activation (Chasteen et al., 2005; Hess et al., 2003; Thomas & Dubois, 2011) and self-report measures of ABST (Chasteen et al., 2005; Gaillard et al., 2011; Joannis et al., 2013; Swift et al., 2013). Both approaches have their strengths and weaknesses.

Manipulation Recall

As a very basic manipulation check, a number of studies have asked participants about their recall of the ABST manipulation (Andreoletti & Lachman, 2004; Horton et al., 2010; Joannis et al., 2013; O’Brien & Hummert, 2006). For example, before administering a test of memory, Andreoletti and Lachman (2004) manipulated stereotype threat by telling participants that the test typically produces age differences in performance (threat condition),

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no age differences in performance (nullification condition) or gave them no information about age differences (control condition). As a manipulation check, participants were asked at the end of the testing session whether they had been told that there were generally age differences in performance, no age differences or whether they were given no information. They found that 91% of participants correctly answered this question, indicating that a negative age-based comparison had been made salient for those in the threat condition.

However, this provides no indication of how this awareness of age made participants feel or whether a threat was perceived. Higher scores were found in the nullification condition compared to the other two conditions, but this was true across both young and old participants and only those with more education. For those with lower education, both experimental conditions were related to lower recall. Therefore, this high level of correct responding to the manipulation check did not equate to typical ABST effects. This type of manipulation check is a useful indicator that attention was paid to manipulations but cannot shed light on the underlying processes affecting performance.

Perceived Stereotype Threat

Multiple studies have looked at participants' perceived stereotype threat through self-reporting on survey items (Chasteen et al., 2005; Gaillard et al., 2011; Hess, Emery, & Queen, 2009; Joannis et al., 2013; Kang & Chasteen, 2009; Swift et al., 2013). Self-reporting on perceptions of age-based judgment addresses this need for more information about the processes of ABST. Chasteen et al. (2005) were the first within the ABST literature to use such a measure, which they adapted from Steele and Aronson (1995). Participants were asked to state their agreement with statements such as 'some people feel I have less memory ability because of my age' and 'the experimenter expected me to do poorly because of my age'. Older people perceived greater stereotype threat than younger adults across stereotype threat conditions and this perceived stereotype threat mediated between participant age and

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subsequent memory performance. This tendency for older people to perceive greater stereotype threat in performance situations regardless of how you frame task instructions shows the chronic nature of negative age stereotypes, and potentially, ABST.

Kang and Chasteen (2009) modified Chasteen et al.'s (2005) perceived stereotype threat measure to look at both situational (e.g., 'today I felt the experimenter expected me to do poorly because of my age') and dispositional perceptions of ABST among older participants (e.g., 'In general, people often underestimate my memory ability because of my age'). Neither situational nor dispositional perceived stereotype threat differed between the threat and control conditions; however, in the threat condition only, greater perceived stereotype threat (both state and dispositional) predicted greater decrements in cued recall memory performance and more negative emotions. This finding was not consistent for free recall performance and a recognition memory task. The use of this measure was repeated in subsequent ABST studies. Despite finding ABST effects on memory performance when constraints were high (Hess, Emery, & Queen, 2009) and on driving mistakes (Joanisse et al., 2013), these studies did not find a significant effect of stereotype threat condition on perceived stereotype threat (using items from Chasteen et al.'s 2005 measure).

In contrast, both Gaillard et al. (2011) and Swift, Abrams and Marques (2013) used two questions asking 'were you worried that your ability to perform well on the test was affected by your age?' and 'were you worried that if you performed poorly on the test, the researcher would attribute your poor performance to your age?'. In both studies, perceived stereotype threat was significantly greater in the threat condition than in at least one of their alternative comparison conditions. However, Joanisse, Gagnon and Voloaca (2013) did not find that stereotype threat condition predicted perceived stereotype threat on a driving task. None of these studies included a younger comparison group and so it cannot be shown that

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threat is higher for older people than young, and whether this is affected by stereotype threat condition.

Overall, these findings suggest that perceived stereotype threat may be chronic in stereotype relevant test settings for older people and may be less dependent on how the test is framed (Chasteen et al., 2005). The alternative measure used by Gaillard et al. (2011) and Swift et al. (2013) has a slightly different emphasis on ‘worries’ because of one’s age, rather than asking about whether one simply feels judged. This difference seems to have made the measure more sensitive to stereotype threat condition differences in perceived stereotype threat. Nonetheless, not one study found that perceived stereotype threat fully mediated between stereotype threat condition and performance. As underlined by Gaillard et al. (2011), you might not expect this mediation as Schmader, Johns and Forbes (2008) in their Integrated Process Model suggest that it is not one’s emotional response alone that leads to underperformance, but rather attempts to override this emotional response and perform well in spite of it. Additionally, it may not be the case that individuals are fully aware of their cognitive or affective state, or willing to report on them (e.g., Fisher, 1993; Nisbett & Wilson, 1977).

Implicit Measures

Implicit measures such as the Implicit Association Tests (IATs) and lexical decision tasks have been used as indicators of threat-based concerns to overcome the biases of self-reporting (Chasteen et al., 2005; Hess et al., 2003; Thomas & Dubois, 2011). Hess, Auman, Colcombe and Rahhal (2003) used an IAT to test for the activation of stereotypes. In the threat condition, an article described older adults’ memory abilities as worse than younger adults, compared to a more positive article used in the nullification condition, and no article in the control condition. The IAT, used after the stereotype threat condition manipulations but before the free recall test, looked at participant’s response times when categorising positive,

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neutral and negative words as either 'good' or 'bad'. These words were always preceded by either the word 'young' or 'old' which participants were told to ignore. Those for whom implicit negative stereotypes of older people have been activated are expected to have longer response times when the word pairs are not congruent with this implicit association (e.g., 'old' followed by 'vibrant'). Following the 'old' prime, participant responses to positive traits in both the threat and control conditions (but not the nullification condition) were slower than to negative traits. However, stereotype activation effects were not found to be specific to old or young participants, and responses to positive and negative traits following the word 'young' did not significantly differ.

In this study, the control condition acted similarly to the threat condition suggesting once again that in the absence of efforts to counteract stereotypes, negative ageing stereotypes are likely to be salient (Hess et al., 2003). Despite finding that both young and old participants in the threat condition showed an implicit association between older people and negativity, decrements in performance were only found for older participants. This shows the limits of the IAT. It is able to show stereotype activation, but not the emotional or motivational response that result from this, as reflected in different performance outcomes for young and older participants.

In Chasteen et al.'s (2005) study of ASBT, the performance task was described as a memory test in the threat condition, whereas, the control condition described it as an impression formation task. Following this manipulation, to-be-remembered sentence predicates were presented, followed by a lexical decision task and then a test of recall. In the lexical decision task, both pronounceable non-words (e.g., Ketchen) and actual words were individually presented on a computer screen. Thirty-three of the 99 real words were relevant to age stereotypes, 11 to memory failures, 11 to memory successes and 11 to negative (non-

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memory) aspects of ageing. Participants were asked to press ‘yes’ or ‘no’ to indicate whether the word presented was a word or a non-word.

Analyses looked at how participant age (young vs. old), threat condition (threat vs. control) and word type (memory failures, memory successes, or negative ageing) affected response times. It was expected that negative age stereotypes would be most salient—and therefore reaction times quickest to memory failures and negative ageing words—for older people in the threat condition. For memory-related words the only findings were a main effect of age and stereotype threat condition, whereby younger adults and those in the threat condition were faster. For the negative ageing words, young people were slightly faster in the threat, as opposed to control condition. In contrast, older people’s speed did not differ between stereotype threat conditions. In corroboration of their findings from the measure of perceived stereotype threat and from the IAT (Hess et al., 2003), it seems that negative stereotypes were activated equally across stereotype threat conditions for older people (Chasteen et al., 2005).

Thomas and Dubois (2011) used the same lexical decision task as Chasteen et al. (2005) but presented it to older participants at the end of their study. Their manipulation of ABST used paragraphs of text discussing age-related decline and a more neutral discussion of language processing research in the control condition. It was found that older adults’ lexical decision response times were quicker for words with negative stereotype concepts than neutral words. This difference was not apparent for younger adults.

These three studies show that implicit tests can be usefully used to show age stereotype activation. However, they also show that this is unlikely to provide evidence for the mechanisms of ABST since; 1) implicit tests are likely to show stereotype activation across both old and young as all ages are aware of these stereotypes even if they are not self-relevant; 2) implicit tests are likely to find that stereotype activation is chronic for older

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people in test settings and not specific to conditions with an ABST manipulation; 3) these implicit tests are not a measure of emotion and so cannot provide evidence for a ‘threat’ being experienced under conditions of ABST.

Conclusions

In summary, implicit tests can show that stereotypes have been activated but not whether this has provoked threat-based concerns, while explicit questioning relies heavily on an individual’s self-awareness and honesty in reporting. Neither measure provides solid evidence for the presence or absence of threat-based concerns. Furthermore, there is an ambiguity surrounding the nature of ‘stereotype threat’ and how this manifests itself as an individual concern, as highlighted by Shapiro and Neuberg (2007) in their Multi-Threat Framework.

Shapiro and Neuberg (2007) look in more depth at what it means to be threatened by a negative stereotype about one’s group. They ask who is the target of the threat, the self, or one’s social group. Additionally, they highlight different potential sources of the threat, the self, out-group others, or in-group others. Looking back to Chasteen et al.’s (2005) explicit measure of perceived stereotype threat, it can be seen how the questions may not be applicable to all experiences of ABST. For example, one statement is ‘In memory experiments people my age often face biased evaluations’. This statement shows the social group as the target and outgroup others as the source of the threat. In contrast, the target is the self and the source could be either the self or others in the statement ‘I often feel I have to prove to others that their perceptions of my memory ability are wrong’. This is just an illustration of ambiguity surrounding the exact nature of ABST and stereotype threat more broadly and how this is problematic when designing measures of threat-based concerns. As an alternative to measuring threat-based concerns, researchers often look at mediators of

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ABST to show that emotions and motivations are at play and are leading to performance decrements, rather than automatic processes.

Summary

This extensive review of ABST literature included all known published ABST research and provided an account of the mediators and moderators of ABST that have been considered to date. Based on the IPM and STEP models of stereotype threat, working memory depletion and motivational or regulatory processes were evaluated as two likely mechanisms through which age stereotypes negatively impact performance. More recent ABST research has provided evidence that stereotype threat processes may differ between older people and younger people facing other stereotype threats. Due to older people's enhanced emotion regulation abilities, working memory processes are argued to be less relevant for ABST. However, as is outlined by the STEP model, it is likely that both regulatory and working memory processes are important but to a varying degree depending on the stigmatised group. Along with ambiguity as to the mechanisms of ABST, very little of the reviewed literature was able to implicate threat-based concerns through either implicit or explicit measures. Nonetheless, the outcomes of ABST are very real and so research should continue to tackle these questions, perhaps placing a stronger focus on interventions to reduce ABST which may also provide more information about the underlying processes at work.

Moderators of ABST have been outlined within the framework of the BPS model. A multitude of ABST moderators were categorised as either altering task demands, resources or stereotype salience, determining whether individuals perceive cues to age stereotypes as threatening or more positively as a challenge. These same factors should be considered when designing interventions to alleviate ABST effects.

The review reveals a growing body of ABST research, exploring a number of performance domains, including many different mediators and moderators, and measures of

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threat-based concerns. However, studies in this area also utilise a mixture of research designs which would most effectively be examined through a complementary meta-analysis of ABST research to date. Within this, a comparison could be made between the different cues to age stereotypes, the performance domains measured, and the characteristics of participants used in the studies (e.g., age and gender), pinpointing how these factors impact upon ABST effects. As a final point, research should aim to answer the question of ‘what does this mean for the performance of older people in everyday settings?’.

**CHAPTER 4- THE IMPLICATIONS OF AGEISM FOR OLDER ADULTS' HEALTH
AND WELL-BEING**

It has been speculated that ageism has long-term implications for health and well-being in later life; however, a literature review in this area has revealed only a handful of studies that have shown perceived ageism to be linked to worse psychological well-being (Garstka, Schmitt, Branscombe, & Hummert, 2004; Luo, Xu, Granberg, & Wentworth, 2012; Redman & Snape, 2006; van den Heuvel & van Santvoort, 2011; Vogt Yuan, 2007), with fewer studies exploring its link with physical health (Luo et al., 2012; van den Heuvel & van Santvoort, 2011; Vauclair et al., 2014). This chapter reviews the findings, including the mechanisms through which perceived ageism might negatively impact health and well-being.

Improving health and well-being are key goals for governments and welfare organisations (e.g. Public Health England, 2013). The World Health Organisation defined 'health' more than half a century ago as "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity" (World Health Organisation, 1948), encompassing both physical health and psychological well-being. More recently well-being has been recognised by national and international organisations as an important indicator of quality of life, in addition to objective measures of the social and economic context (e.g., Tinkler & Hicks, 2011; OECD, 2013). Diener (1994) outlines that those high in subjective well-being are those that "make a preponderance of positive appraisals of their life events and circumstances". Subjective well-being is used in national and international surveys as an indicator of positive psychological well-being, and as a way of examining whether, irrespective of a country's economic and social situation, people are happy and satisfied with their lives.

Perceived Ageism and Subjective Well-Being

Perceived discrimination has been linked to lower self-esteem and negative affect among African-Americans (Branscombe, Schmitt, & Harvey, 1999), and lower life satisfaction, personal self-esteem, positive affect, and higher anxiety and depression among women (Schmitt, Branscombe, Kobrynowicz & Owen, 2002; Schmitt, Branscombe & Postmes, 2003). Klonoff, Landrine and Campbell (2000) have also linked perceived sexism to negative psychiatric symptoms such as depression, anxiety and somatic symptoms among women (Schmitt et al., 2003). More comprehensively, Pascoe and Smart Richman (2009) meta-analysed 134 research articles examining the effects of discrimination—predominantly based on gender, race, sexual orientation or unspecified discrimination—on psychological and physical health outcomes. The majority of these articles examined psychological well-being, and a meta-analysis of 105 effects representing a correlation between discrimination and psychological health, found an average correlation of $-.20$ (Pearson's r). Although this demonstrates a small to medium association, it is worth noting that this meta-analysis excluded 78 research papers based on insufficient statistics for calculating a correlation coefficient and so may not represent the entirety of research in this area. Additionally, only two articles relating to age discrimination were included (Garstka et al., 2004; Redman & Snape, 2006).

Assessing survey responses from 60 older and 59 younger adults using structural equation modelling, Garstka, Schmitt, Branscombe and Hummert (2004) found support for a link between perceived age discrimination and psychological well-being (measured self-esteem and life satisfaction). Greater perceived age discrimination was linked to lower psychological well-being among older adults, but not younger. Similar negative effects of age discrimination on life satisfaction (Redman & Snape; 2006; van den Heuvel & van Santvoort, 2011), depressive symptoms (Luo et al., 2012) and psychological distress (Vogt Yuan, 2007)

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have been found. Therefore, there is limited research examining the link between ageism and well-being, but the research that has been conducted found that ageism does have negative implications for subjective well-being.

Perceived Ageism and Physical Health

Evidence also suggests that ageism may be detrimental to physical health (Pascoe & Smart Richman, 2009). Pascoe and Smart Richman (2009) additionally meta-analysed 36 effects representing the correlation between perceived discrimination and physical health, finding an average correlation of $-.13$ (Pearson's r). This effect supports the link between perceived discrimination and worse health, but included no age discrimination studies. Only two studies to-date have examined this relationship and both found that age discrimination is associated with worse subjective health (van den Heuvel & van Santvoort, 2011; Vauclair et al., 2014). Luo, Xu, Granberg and Wentworth (2012) additionally found that among a sample of 6377 older adults, perceived everyday discrimination (based on any group membership, not just age) was associated with depressive symptoms, worse self-rated health, functional limitations and chronic illness over a period of two years.

No research could be found that has looked at the impact of age discrimination on objective measures of physical health. However, research using the stereotype priming paradigm predominantly conducted by Rebecca Levy at Yale School of Public Health has demonstrated that negative age stereotypes and expectations about ageing held by older people can negatively impact health outcomes, including increased illness (Wurm, Tesch-Romer, & Tomasik, 2007), worse functional health (e.g., ability to do everyday activities; Levy, Slade, & Kasl, 2002) and recovery from disease and trauma (Levy, Slade, May, & Caracciolo, 2006; Levy, Slade, Murphy, & Gill, 2012), hearing decline (Levy, Slade, & Gill, 2006), and increased mortality due to respiratory causes (Levy & Myers, 2005). Examining 660 adults aged 50+ over a 23 year period, Levy, Slade, Kunkel and Kasl (2002) found that

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individuals who held more positive perceptions of ageing on average lived 7.5 years longer compared to those who endorsed more negative perceptions. Those that endorse negative stereotypes of ageing themselves may also be more likely to perceive ageism from others. This research supports the assumption that perceived ageism might negatively impact physical health among older adults.

How Ageism Might Impact upon Health and Well-Being

Baumeister and Leary (1995) describe the need to belong as a ‘fundamental human need’ and Social Identity Theory (Tajfel & Turner, 1979) outlines how people use social groups to satisfy this need. In identifying with social groups people obtain a sense of belonging and distinguish themselves from others who are not part of that social group. People aim to maintain social identities that are positively distinct from their out-groups. However, prejudice from others threatens this positive social identity. The self-esteem and positivity associated with one’s social identity is threatened by others’ negative views of the social group. Therefore, older adults’ well-being may be affected when they perceive ageism due to the value placed on maintaining a positive social identity. Reactions and responses to this negative experience may further impact upon physical health through a number of mechanisms.

Physiological Response

Pascoe and Smart Richman (2009) suggest that due to the value people place on maintaining a positive social identity, discrimination may incite a negative stress response, which in turn negatively impacts cardiovascular health. Research has supported this assumption showing that perceived prejudice and discrimination can increase blood pressure (Steffen, McNeilly, Anderson & Sherwood, 2003), and that highlighting negative performance stereotypes during a cognitive task can increase blood pressure (Blascovich, Spencer, Quinn & Steele, 2001). High blood pressure is linked to worse health outcomes such

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as coronary heart disease and hypertension. Longitudinal research found that negative age stereotypes held earlier on in life (mean age = 36.5 years) predicted worse cardiovascular outcomes over the next 38 years (Levy, Zonderman, Slade, & Ferrucci, 2009).

Beyond the direct impact of perceived ageism on health, it is possible that it may impact positive health behaviours, which in turn affect health outcomes. Stuck et al.'s (1999) systematic literature review outlined a number of risk factors for disability and physical function decline among older adults, including (but not limited to) increased and decreased body mass index, low level of physical activity and low frequency of social contacts. One study of older people revealed that a one-point increase in social activity (scored from 1 to 4.2) was associated with a 47% decrease in decline in global cognitive function (average follow-up of 5.2 years; James, Wilson, Barnes & Bennet, 2011). The possible impact of perceived ageism on health behaviours such as these is considered further.

Ego-Depletion

Exposure to discrimination may impact health through ego-depletion, reducing self-control and increasing negative health behaviours. Ego-depletion, or the depletion of limited cognitive resources required for self-control, is suggested to occur when individuals deal with threats to their social identity (Inzlicht, McKay, & Aronson, 2006). This reduced ability to regulate behaviour may impact other actions that require self-control. For example, positive health behaviours such as resisting foods or substances negative to one's health, and motivation to participate in physical activity. A series of studies looking at 'stereotype threat spill-over' demonstrated that dealing with negative stereotypes can deplete cognitive resources required for effortful self-control (Inzlicht & Kang, 2010). In these studies, reduced self-control was manifested through increased aggression, indulgence in unhealthy food and risky decision making, all examples of behaviours that may affect health outcomes.

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Although the impact of age discrimination on health behaviours has not been explored, Levy and Myers (2004) found that more negative self-perceptions of ageing correlate with fewer preventative health behaviours. These behaviours included exercise, diet, alcohol consumption, smoking, seatbelt use, regular doctor visits and following medication guidelines. Sarkisian, Prochaska, Wong, Hirsh and Mangione (2005) additionally report that older people with lower expectations of health-related quality of life as they age also show lower levels of physical activity. Perceived discrimination based on other social identities has also been linked to a number of maladaptive health behaviours, including smoking (Bennett, Yaus Wolin, Robinson, Fowler & Edwards, 2005; Landrine & Klonoff, 1996), alcohol abuse (Martin, Tuch & Roman, 2003) and reduction in positive health behaviours such as condom use (Yoshikawa, Wilson, Chae & Cheng, 2004).

Performance Decrements

Stereotype threat may also account in part for negative health behaviours and negative health outcomes. Stereotype threat effects leading to performance decline in cognitive and physical domains (Lamont, Swift, & Abrams, 2015; Swift, Lamont, & Abrams, 2012) may deter older people from repeating or persisting with an activity. For example, research by Von Hippel, Kalokerinos and Henry (2012) demonstrates that feelings of stereotype threat in the workplace are associated with worse job attitudes and intentions to retire or resign. Gender-based stereotype threat and race-based stereotype threat research suggests that coping with stereotype threat can lead stigmatised individuals to disengage with or disidentify with the stereotyped domain (e.g., Davies, Spencer, Quinn, & Gerhardstein, 2002; Major, Spencer, Schmader, Wolfe, & Crocker, 1998). This may be detrimental for maintaining cognitive and physical functioning in later life (Blondell, Hammersley-Mather, & Veerman, 2014). Further research is needed to explore these hypothesised mechanisms.

Summary

It is intuitive that a negative experience such as being the target of prejudice and discrimination could have implications for an individual's well-being. Although, this review shows that the majority of research examining the association between perceived prejudice and discrimination and health and well-being has concerned sexism and racism. The handful of studies that do consider the link between perceived ageism, and health and well-being in later life support this hypothesised relationship. None of these studies have examined the mechanisms through which this might occur, and so it is surmised that negative physiological responses to ageism impact health, in addition to ego-depletion and stereotype threat. Ego depletion and stereotype threat may encourage engagement in negative health behaviours and inhibit engagement in preventative health behaviours. Further research should explore how reactions to perceived ageism impact outcomes in later life and through what mechanisms.

Conclusions from Chapters 1 to 4

The preceding theoretical chapters have provided an overview of the research literature that the studies in this thesis build upon. Highlights include:

- ❖ Age stereotyping, prejudice and discrimination is prevalent and often more subtle than other prejudices, meaning that it may go unnoticed and unchallenged.
- ❖ Not only can negative attitudes to ageing directly disadvantage older people through unequal treatment from others, but more recent research has shown that mere awareness of negative age stereotypes may disadvantage older adults.
- ❖ For example, people aim to maintain positive social identities and so age stereotypes may threaten this. When highlighted in performance contexts, negative age stereotypes have been shown to disrupt both cognitive and physical performance, otherwise known as age-based stereotype threat effects (ABST).

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There are a number of gaps in this area of research highlighted within the theoretical chapters which the current research aims to address:

- ❖ More could be done to understand to what extent people are aware of age-based judgement and which negative stereotypes of their age group are most salient. This will provide a context for ABST research in more applied settings (Study 1).
- ❖ There is a growing body of research testing for ABST effects in a number of performance domains, examining various mediators and moderators of these effects and employing a range of experimental designs. These research findings need to be integrated so that they can inform future research in this area (Study 2 and 3).
- ❖ Both ABST effects and wider stereotype threat effects have been predominantly tested within lab-based settings using cues to ABST unlikely to be experienced in an every-day context. Applied stereotype threat research, examining wider cues to ABST should be conducted (Study 4).
- ❖ As an extension of ABST research, the question arises of what the longer-term consequences of being subject to negative age stereotypes are. Might perceiving ageism have consequences not only for performance, but also health and well-being? (Study 5).

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CHAPTERS**

CHAPTER 5– AGE SELF-CONSCIOUSNESS AND PERCEIVED AGE-BASED JUDGEMENT

The theoretical chapters highlighted the comprehensive measurement of attitudes to age by more recent national/international surveys (Abrams, Russell, Vauclair & Swift, 2011; Sweiry & Willitts, 2012). The current survey extends this measurement of attitudes to age by looking at the extent to which people are self-conscious about negative attitudes toward their age group (age self-consciousness), the age stereotypes they believe others' judgements of them are based upon (perceived age-based judgement), and in what situations they believe others' judgements of them are affected by their age. Survey data was collected in and around Kent (N = 105) using a mixture of closed and open-ended survey questions. The data showed that age self-consciousness was more prevalent than both race and gender self-consciousness, and reported most among men and those not in the oldest age group (those aged 70+). Qualitative data provided a detailed look at the stereotypes that underpin this age self-consciousness, ranging from younger adults as irresponsible/reckless to older people as an economic burden. Stereotypes of being old-fashioned and past-it were reported as early as middle age and those of cognitive, physical and broader incompetence, from early older-age onwards. This age self-consciousness seems to inhabit diverse settings, whether at work, in the home or when participating in hobbies and social activities. Evidence of prevalent age self-consciousness provides cause for concern about age-based stereotype threat (ABST), and qualitative data provides contexts and stereotypes for the attention of future ABST research.

Study 1. Age Self-Consciousness and Perceived Age-Based Judgement

The 'Experiences and Expressions of Ageism' module of the European Social Survey in 2008 (Abrams et al., 2011), and its variants (Sweiry & Willitts, 2012), have provided the most comprehensive measurement of attitudes to age to date. Specifically, they have used

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national and international samples to examine perceptions of societal prejudice towards different age groups. Overall, this research has provided definitive evidence that age discrimination is widely perceived across age groups, and that status is regarded differently, and friendliness and competence stereotypes are applied unevenly to younger and older people (Abrams, Eilola, & Swift, 2009; Cuddy & Fiske, 2002; Sweiry & Willitts, 2012). This evidence on attitudes to age is relevant to ABST research, as age discrimination and unfair treatment from others may cue age-based social identity contingencies, potentially leading to ABST.

However, ABST is not dependent on perceiving age discrimination. As Steele (2010) suggests, stereotype threat is a threat ‘in the air’ (Steele, 2010). By this, Steele proposed that we are all aware of our social identities and the stereotypes that are tied to them, but certain settings or cues will make these negative identity contingencies more salient or ‘in the air’. An older worker does not need to experience workplace discrimination to know that others might stereotype them as less innovative or past-it, but may be more/less aware of these age-based judgements depending on the setting, such as when working with a younger colleague, when using new technologies, or going for promotion. Steele and Aronson (1995) used cues as subtle as telling Black American cognitive test-takers that the test was diagnostic of natural ability. This was suggested to cue stereotypes of Black Americans as less naturally able in cognitive domains, leading to stereotype threat. Very subtle situational differences can act as cues to negative identity contingencies.

The aim of the current study was to assess vulnerability to ABST using a measure that encapsulates not only perceptions of age discrimination, but also individuals’ wider awareness of age and age-based judgement. The current survey therefore examined ‘age self-consciousness’ using a number of closed-ended survey questions. Fenigstein, Scheier and Buss (1975) conceived of self-consciousness as self-directed attention, whether being aware

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of one's feelings and motives, or how others may perceive one's behaviours and appearance. Therefore, this study proposes age self-consciousness as a person's general awareness or self-consciousness of their age and others' judgements of them based on their age. Higher age self-consciousness may entail that ABST 'in the air' is more likely for that individual.

Using a number of open-ended survey questions, respondents were additionally asked to outline the specific stereotypes they believe are applied to their age group. If these stereotypes devalue the individual (are negative) they are likely to be threatening, particularly if they are negative about group competencies. Alternatively, stereotypes that place positive expectations on an individual are 'identity-safe' and not considered triggers to ABST (Purdie-Vaughns, Steele, Davies, Ditlmann & Crosby, 2008). Most commonly, age stereotypes have been examined under the framework of the Stereotype Content Model and its dimensions of 'warmth' and 'competence' (SCM; Cuddy, Norton & Fiske, 2005). Research has shown that where older people are seen as warmer than younger adults, the reverse is true for competence (Abrams, Eilola, & Swift, 2009). Responses were therefore looked at within the framework of the SCM, but also examined in more detail for information about the specific stereotypes each age group was most conscious of. Respondents were finally asked about the settings in which they are most age self-conscious and perceive age-based judgement, and whether they believe that the economic climate has affected attitudes towards their age group. From this settings in which ABST might occur can be inferred.

Method

Sample and Design

The overall sample of 118 respondents was reduced to 105 for analysis due to incomplete data from thirteen respondents. Respondents were acquired through the distribution of questionnaires around community groups in Kent. Questionnaires were completed both online (N = 36; 34.3%) and during visits to community groups, using paper

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copies of the questionnaire (N = 69; 65.7%). Respondents were 63.5% female, had a mean age of 51.12 ($SD = 20.37$; range = 18 to 83) and all but three respondents stated that their race was 'White' (97.14%).

Procedure

Whether responding to the survey online or on paper, all respondents completed the questionnaire independently. Following a short introduction, respondents were asked to provide their consent to participate and demographic information. The questionnaire was then split into two sections.

In section one, respondents were asked to reflect on their weekly activities and told to "write a list of the 3 most likely places you will go in that week (excluding your home) and briefly remark what you would do there e.g., 'work- secretary', 'town- shopping' or 'village hall- council meeting'." Respondents were then asked to reflect on these places when answering the section one questions. The questions first measured gender/racial diversity and gender/race/age self-consciousness. Questions concerning gender were asked all together, as were those for race, and those for age. Next, respondents answered questions on the effect they thought the economic climate had had on positivity towards their gender/race/age group. Respondents then moved on to section two of the questionnaire which was specific to age categorisation and contained questions about the situations in which they perceive age-based judgement to occur, the specific stereotypes that are held about their age group, and their previous contact with other age groups. At the end of the questionnaire, respondents were debriefed in writing.

Measures

Gender/race diversity. Items were constructed to determine the level of gender and racial diversity in the everyday lives of respondents, giving context to other measures. For gender diversity, respondents were asked "In these three places, are the majority of people

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male or female?” (1 = *mostly male*, 4 = *equal*, 7 = *mostly female*). To examine racial diversity respondents were similarly asked, “Overall, to what extent are these three places racially diverse (have many people from different racial backgrounds)?” (1 = *not at all* to 7 = *very much*). To examine age diversity a more comprehensive measure of intergenerational contact was used (details below).

Gender/race/age self-consciousness. Four items were constructed to look at self-consciousness based on the three characteristics. The first item asked “In these three places, are you ever conscious of your [gender/race/age] or things about you associated with your [gender/race/age]?”; the second asked “In these three places, to what extent do you think others notice your gender/ age/race or things about you associated with your [gender/race/age]?”, then “In these three places, to what extent do you think others’ judgements of you are affected by your [gender/race/age]?” and finally “To what extent do you feel you are compared to people [of the opposite gender/of other races/from other age groups]?” (7-point scale 1 = *not at all*, to 7 = *very much*). Together, these four items formed a reliable measure for gender (Cronbach’s $\alpha = .82$), race (Cronbach’s $\alpha = .86$) and age (Cronbach’s $\alpha = .82$). Three overall scores for ‘self-consciousness’ based on each characteristic were created with higher scores indicating greater self-consciousness.

Perceived effect of economic climate on positivity towards groups. When this study was carried out in 2012, the economic recession of 2008/9 was still very salient. Social groups such as older people and immigrants were being discussed in the news as groups that were problematic for the UK economy (as they still are today). Therefore, participants were asked “Do you think that people are now more or less positive towards your [racial/gender/age] group due to these changes in the economic climate?” (1 = *less positive*, 4 = *equally*, 7 = *more positive*). Scores above and below four indicate increased and decreased positivity respectively. Respondents were then asked “What group/s (if any) do you think are

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seen by others as the biggest burden as Britain struggles economically?”. Respondents gave free responses which were then assessed for similarities in content.

Subjective age group. In section two, age was the focus and questions were asked regarding judgement and stereotypes based on belonging to a particular age group. To establish a context for these questions, respondents were first asked how they would categorise their age group, “What would you call the age group that you feel part of? e.g., a 12 year old may say they are a ‘child’ or ‘teenager’”. Respondents gave free responses which were then examined for similarities in content and used as an indication of where shifts in subjective age groupings are apparent (i.e. around what chronological age that descriptions of age groups change).

Perceived age-based judgement. To look at how people believe their age group is stereotyped, respondents were asked “What do you think are the most common stereotypes (popular/common beliefs or expectations) that are held by others about your age group?”. Space for up to five free responses were given. Both the quantity and theme of stereotypes were examined.

Situations presenting age-based judgement. To delve further still into age self-consciousness, respondents were asked, “In what area/s of your life (e.g., this may be on a specific task/activity/action or more general) do you feel others judge you differently based on your age?”. The question allowed for two open ended responses. Again, both the quantity and theme of situations was examined.

Quality and frequency of intergenerational contact. The quality and frequency of contact that respondents had with the age groups 18-30, 30-60 and 60+ (non-family members) was assessed using items modified from Voci and Hewstone (2003). Looking at frequency of contact, respondents were asked “How much contact have you had with this age group during the last week?” and “How much contact have you had with this age group

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during previous weeks?" (1 = *none*, 2 = *a little*, 3 = *average amount*, 4 = *a lot*, 5 = *large amount*). One item also asked about the specific number of close friends the individual had within that age group, however, this item proved problematic as some people wanted a definition of 'close' before answering, and others gave hugely inflated answers (e.g., 50). Future use of this item should give set responses to pick from with a realistic upper limit as in Voci and Hewstone (2003). Using the first two items, a mean contact frequency score was created for contact with each age group (age 18-30, $r = .91, p < .001$; age 30-60, $r = .81, p < .001$; age 60+, $r = .76, p < .001$).

To assess contact quality, respondents were asked "How would you describe your experiences with this age group?" (1 = *always negative* to 7 = *always positive*) and "How comfortable would you say your interactions with this age group have been?" (1 = *always uncomfortable* to 7 = *always comfortable*). A mean contact quality score was created for contact with each age group using these two highly correlated items (age 18-30, $r = .76, p < .001$; age 30-60, $r = .67, p < .001$; age 60+, $r = .81, p < .001$). Overall scores for intergenerational contact quality and frequency were computed by categorising respondents into the pre-determined age groups (18-30, 30-60 and 60+) and then taking mean scores of their contact with the other two age groups.

Background information. Respondent age (in years), gender (0 = *male*, 1 = *female*), race, residence (0 = *independent living*, 1 = *dependent living*), their current employment status (0 = *unemployed*, 1 = *some employment, whether voluntary or paid*) and how long they had spent in full-time education (in years) were assessed.

Analyses

Quantitative and Qualitative Analyses

A number of the survey questions were answered using scales (e.g., age self-consciousness, intergenerational contact) or numerical values (e.g., age) and so were analysed

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using quantitative techniques such as correlations, regression and univariate analysis of variance (ANOVA). In addition to this, open-ended responses to a number of the survey questions were analysed using content analysis, a technique in which the frequencies of themes (patterns or attributes) in data are counted (Joffe & Yardley, 2004). This content analysis was carried out without a pre-existing coding framework, allowing for the data to be examined in all its richness, and therefore using what Braun and Clarke (2006) describe as an inductive approach. Open ended responses were largely one-word answers or a short phrase, allowing words to be simply categorised looking for ‘repeated patterns in meaning’, or common views expressed by respondents (Braun & Clarke, 2006).

Subjective Age Groups

Because analysis of the following data was dependent on comparing age self-consciousness and perceived age stereotyping between different age groups, respondents first needed to be categorised into these groups. The most recent Office for National Statistics data reveal that UK respondents thought that adults stop being young at 41 years and start being old at 59 years of age (Sweiry & Willitts, 2012). Earlier data showed that instead UK respondents believed adults stop being young at 35 years and start being old at 60 years of age (Abrams et al., 2009). Subjective age group names given by the current respondents in answer to the question “What would you call the age group that you feel part of?” were examined using content analysis to explore whether the current data supports the use of these age group boundaries.

Two 18 year-olds described their age group as ‘teenager’, while the majority of those aged 19 to 31 described themselves as one of ‘young adult’, ‘young professional’, ‘student’ or ‘twenty-something’. More consistent with Abrams et al. (2009), respondents stopped describing themselves as ‘young’ and started to use the description of ‘adult’ or ‘early/middle/late thirties’ around the age of 32. The term ‘middle-aged’ then began to creep

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in at age 37, with this being the predominant descriptive until the age of 59. Consistent with Sweiry and Willitts (2012), those in their early 60s started to use descriptive terms common in the older ages, but often caveated e.g., ‘young/active/early retired’. Various terms referring to old age were then used among respondents from the mid-60s, including ‘retired’, ‘older person’, and ‘pensioner’. The terms ‘elderly’, ‘senior citizen’ and ‘OAP’ were most common among those over 70. Age groups were therefore created, aligning with the transitions of these common descriptions; those aged 18 to 31 are described as ‘young adults’, those aged 32 to 59 as ‘middle-aged adults’, those aged 60-69 as ‘early older-aged adults’ and those aged 70 and above as ‘late older-aged adults’. See Table 5.1 for demographic information split by age grouping.

Table 5.1

Demographic Information Split by Subjective Age Groupings

Age group	Age range	N	% completed online	% female	M age (SD)
Young	18-31	27	70.4%	77.8%	23.52 (3.83)
Middle-aged	32-59	30	76.7%	58.6%	45.67 (8.38)
Early older-aged	60-69	25	72%	60%	64.80 (3.22)
Late older-aged	70+	23	39.1%	56.5%	75.78 (4)

Results

Preliminary Analyses

See Appendix A (Table A.1) for correlations between main survey variables, means and standard deviations. Although both the survey format and education were positively correlated with gender, race and age self-consciousness, they were not included as covariates in analyses due to their correlations with age also. The association between online surveys and greater perceived judgement may be due to the greater use of online surveys by younger

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adults. This was also the case for education, which positively correlated with gender, race and age self-consciousness, but was negatively associated with age.

Gender, race and age self-consciousness were all positively correlated, showing a tendency for some respondents to report higher self-consciousness than others. As expected, gender correlated with gender self-consciousness, but also race and age self-consciousness. Women were overall less likely to report gender, race and age self-consciousness, and reported higher quality of intergenerational contact and age identification. There was a significant negative relationship between age and racial diversity in respondents' environment. Relationships between variables are now examined in more detail.

Age Self-Consciousness

Mean scores for perceived gender, race and age self-consciousness were created from four items (e.g., "In these three places, to what extent do you think others' judgements of you are affected by your [gender/race/age]?"), all tapping into respondents' consciousness of others noticing and judging them based on these characteristics. Analyses examined whether age self-consciousness varied based on respondent age and gender, and how this compares to gender and race self-consciousness. A repeated measures ANOVA was conducted using characteristic type (gender, race or age) as a within-subjects factor and age and gender as between-subjects factors. Self-consciousness was the dependent variable. Results showed that the characteristic type referred to significantly predicted self-consciousness ($F(2, 186) = 77.49, p < .001, \eta_p^2 = .46$), as did age group ($F(3, 93) = 3.36, p = .02, \eta_p^2 = .10$) and gender ($F(1, 93) = 10.95, p = .001, \eta_p^2 = .11$). There was a marginally significant interaction between characteristic type and age group ($F(6, 186) = 2.14, p = .05, \eta_p^2 = .07$). All other interactions were non-significant ($p > .05$; see Figure 5.1).

Pairwise comparisons revealed that age self-consciousness ($M = 3.83, SE = .14$) was reported more than gender ($M = 3.14, SE = .14$; mean difference = .69, $p < .001$), and race

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self-consciousness ($M = 2.00$, $SE = .13$; mean difference = 1.83, $p < .001$), while gender self-consciousness was also reported more than race self-consciousness (mean difference = 1.14, $p < .001$). Late older-aged respondents were less likely to report self-consciousness based on the three characteristics ($M = 2.47$, $SE = .22$) than middle-aged adults ($M = 3.37$, $SE = .19$; mean difference = $-.91$, $p = .002$) and marginally less likely than younger adults ($M = 3.09$, $SE = .24$; mean difference = $-.62$, $p = .06$) and early older-aged adults ($M = 3.04$, $SE = .21$; mean difference = $-.57$, $p = .06$). Further, women ($M = 2.64$, $SE = .13$) were less likely than men ($M = 3.34$, $SE = .17$) to report self-consciousness based on the three characteristics (mean difference = $-.71$, $p = .001$).

Simple main effects analyses on the marginal interaction between age group and characteristic type revealed that late older-aged adults report less gender and age self-consciousness than the other three age groups, but show no difference ($p > .05$) in their reporting of race self-consciousness. This is due to overall low levels of reporting of race self-consciousness among younger ($M = 1.84$, $SE = .28$), middle-aged ($M = 2.51$, $SE = .23$), early ($M = 1.77$, $SE = .25$) and late older aged adults ($M = 1.88$, $SE = .26$). Middle-aged adults reporting of race self-consciousness was however significantly greater than early older age adults ($p = .03$).

Overall, the survey showed that for all three characteristics (gender, race and age), women were less likely to report self-consciousness. The late older-aged group were also less likely than the other three age groups to report gender and age self-consciousness, but showed similar low levels of race self-consciousness. This may be explained by the lack of ethnic diversity within the sample and ethnic diversity within the respondents' environments. Most importantly, age self-consciousness was found to be more prevalent than both gender and race self-consciousness.

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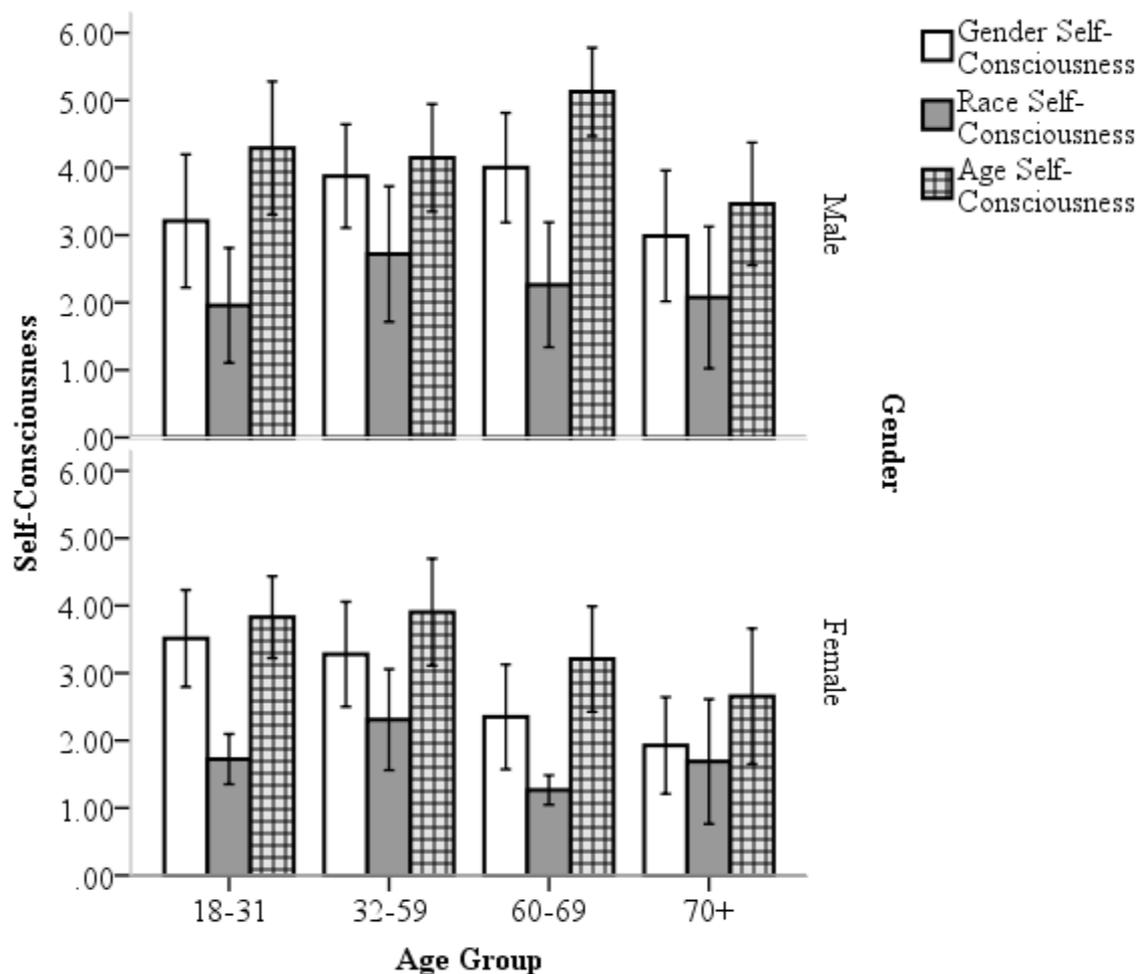


Figure 5.1. Perceived gender, race and age self-consciousness, split by gender and age group.

Note: error bars show the 95% confidence intervals.

Perceived Age-Based Judgement

Respondents were asked what they thought were the most common stereotypes (popular/common beliefs or expectations) that are held by others about their age group. Enough room for five short responses was provided and results show that age group did not significantly predict the number of stereotypes given ($F(3, 101) = 1.07, p = .37, \eta_p^2 = .03$).

Alignment with the Stereotype Content Model. Open-ended responses were first categorised into the primary dimensions of the SCM, warmth and competence (Fiske, Cuddy, Glick & Xu, 2002). Responses were categorised as either showing positive intent towards others (0 = *warmth*) or negative intent towards others (1 = *lacking warmth*). The large

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number of free responses that did not fit into either of these categories (e.g., career-focused, technologically illiterate, grandparent etc.) were left blank. Likewise, responses were categorised as either showing capability, whether broadly or in a specific area (0 = *competence*), lack of capability (1 = *incompetence*) or no relevance to capability (left blank). Loglinear analyses were not possible due to lack of data categorised along both the warmth and competence dimensions⁴ and so two separate chi-square tests were conducted.

Warmth vs. lacking warmth. A chi-square test examined independence between the categorical variables, age group and warmth stereotypes. The expected values within each cell were all above 1 and only 50% of the expected values were below 5, justifying the use of chi-square analyses (Field, 2013). The Pearson chi-square statistic was significant, indicating that frequency of warmth stereotypes is related to age group ($\chi^2(3) = 8.85, p = .03$). The proportion of warmth stereotypes that were accounted for compared to lacking warmth stereotypes (both as a proportion of the total frequency across age groups) was compared for each age group using z-tests. Only the early older-age group showed a significant difference in the number of warmth stereotypes they accounted for (50%) compared to lacking warmth stereotypes (11.9%). The young age group also showed a marked but non-significant difference in the number of warmth stereotypes they accounted for (16.7%) compared to lacking warmth stereotype (45.2%). The middle-aged (16.7% and 19% respectively) and late older-aged (16.7% and 23.8% respectively) groups showed little difference in the proportions of warmth and lacking warmth stereotypes they accounted for.

There is a clear bias towards the reporting of more negative stereotypes and so the default is to report more lacking warmth and incompetence stereotypes, rather than warmth and competence stereotypes. Despite this, a pattern is still apparent whereby early older-aged

⁴ It was explored whether a loglinear regression could be used to analyse the data when categorising all responses on three levels, warmth (showing warmth or lacking warmth), competence (showing competence or incompetence), and the age group of the respondent (young, middle-aged, early old-age or late old-age). However, few responses could be categorised in terms of both the warmth and competence dimensions (e.g. 'useless but harmless' shows both warmth and incompetence). Instead responses were categorised as either showing warmth, lacking warmth, competence or incompetence.

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adults are the only age group to account for a greater proportion of the total warmth stereotypes than lacking warmth stereotypes. This finding is in line with the SCM; however one might have expected late older-aged adults to also report a larger proportion of warmth stereotypes. Instead, stereotypes of older adults as grumpy, moaning and difficult were more salient among those over the age of 70.

Competence vs. incompetence. A second chi-square test examined independence between the categorical variables, age group and competence stereotypes. Again, the expected values within each cell were all above 1 and 100% of the expected values were above 5, justifying the use of chi-square analyses (Field, 2013). The Pearson's chi-square statistic was significant, indicating that the frequency of competence stereotypes is related to age group ($\chi^2(3) = 29.21, p < .001$). The proportion of competence stereotypes that were accounted for compared to incompetence stereotypes (both as a proportion of the total frequency across age groups) was compared for each age group using z-tests. The z-test was significant for all four age groups. The young age group accounted for a significantly larger proportion of competence stereotypes (40.5%) than incompetence stereotypes (20%), as did the middle-aged group (38.1% and 11.7% respectively). In contrast, the early older-aged group accounted for a significantly larger proportion of incompetence stereotypes (39.2%) than competence stereotypes (14.3%), as did the late older-aged group (29.2% and 7.1% respectively). See Figure 5.2 for a summary of results.

These results are also consistent with the predictions of the SCM, that younger people are stereotyped as more competent than older people. In addition, it was found that middle-aged adults are also more likely to account for a greater proportion of competence stereotypes, compared to incompetence. Previous tests of the SCM have not included this middle-aged group and so this is a first comparison of middle-aged and older adult stereotypes (Abrams et al., 2011; Cuddy & Fiske, 2002; Sweiry & Willitts, 2012).

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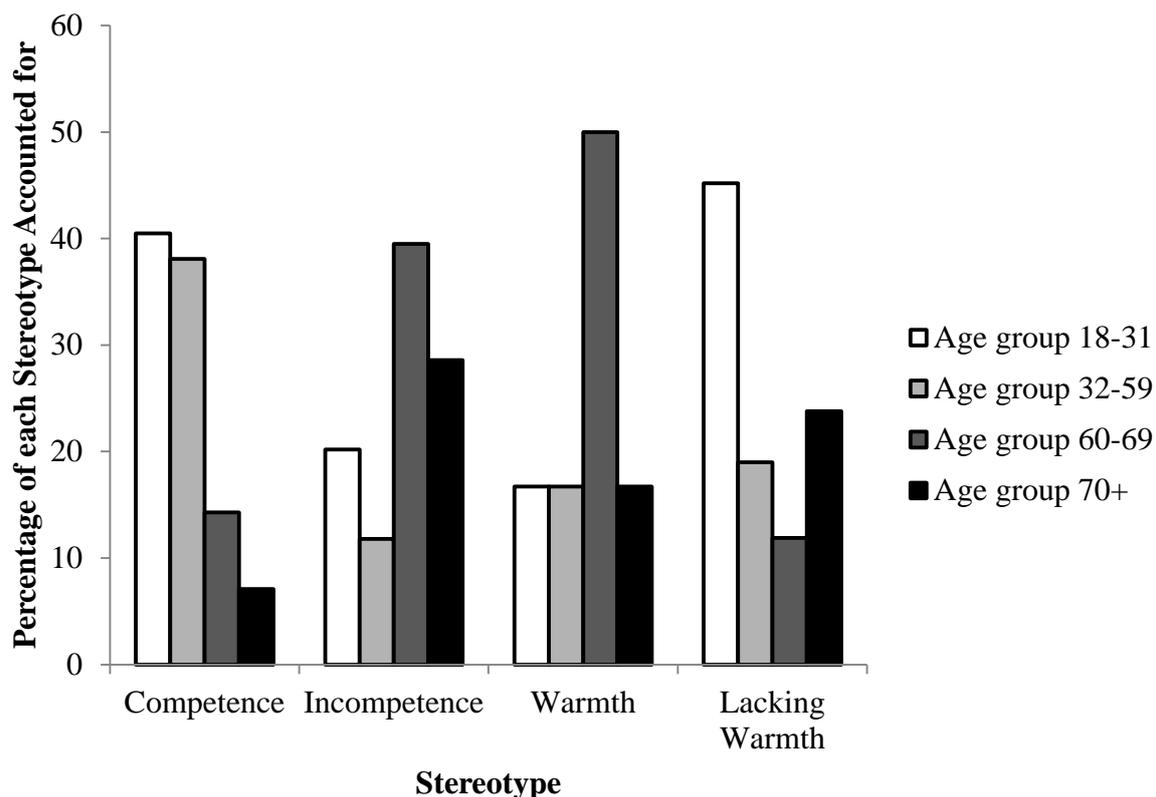


Figure 5.2. Percentage of different stereotypes (competence, incompetence, warmth and lacking warmth) accounted to each age group.

Content analysis. Content analysis was then applied to open-ended responses in two stages. In stage one, the researcher and one other independent coder went through the open-ended responses and assigned themes to each response, identifying commonalities in the stereotypes people felt were applied to their age group. In this first stage of coding, coders were not given set themes or a target number of themes. Despite this, much commonality between coders arose. The main differences arose in the overarching names given to some themes, for which the lead researcher chose from the two names, or created an alternate name (e.g., coder 1: 'well-off', coder 2: rich, theme name: 'well-off'; coder 1: 'grandparent', coder 2: 'helpful with children/grandchildren', theme name: 'grandparent'). Other discrepancies lay in the breadth of themes applied, for example, coder two used the themes 'physically ill/incapable' and 'slow physically' while coder one simply applied 'physical problems' to

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cover the same responses. Again, the lead researcher decided on final categories, ensuring content of stereotypes was not lost.

In the second stage of the analysis, a third coder again categorised all open-ended responses, but this time was asked to use the themes defined in stage one of coding. This was to confirm the appropriateness of the 35 themes that emerged at stage one. High inter-rater reliability between the third coder and the themes assigned by the lead researcher was found (Cohen's Kappa or κ ; $\kappa = .86$; Cohen, 1960). In total, 34 themes were used (Appendix A, Table A.2).

In reporting all thematic analyses in this paper, it is acknowledged that there were uneven numbers of respondents in each age group and so numbers between age groups cannot be meaningfully compared. For example, it cannot be concluded that a theme reported four times by the late older-aged adults ($N = 23$) is less common than a theme reported six times by the middle-age adults ($N = 30$). This limitation of interpretation has been taken into account when describing findings and only clear and marked differences in the reporting of themes between groups are remarked upon. The nature of these themes among the different age groups is now discussed.

Younger adults. Younger adults overwhelmingly perceived that they were stereotyped as irresponsible/reckless, including descriptions such as 'drinkers', 'partiers', 'immature', 'promiscuous' and 'irresponsible'. In a similar vein, younger adults perceived that their age group was stereotyped negatively as antisocial, inexperienced/naïve and lazy, but also as lively. It is notable that contradictory stereotypes are also listed by younger adults, those of being settled with children, being focused on work/careers, responsible/reliable and being in a relationship/married. However, these are also highlighted by the middle-aged group, suggesting that these are stereotypes that are salient across a large part of our early adult lives.

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Middle-aged adults. The stereotypes that are salient to middle-aged adults are those listed above: being settled with children, being focused on work/careers, responsible/reliable and being in a relationship/married. These stereotypes are less negative and more expectant, outlining standards which the middle-aged are expected to meet. It is clear that these expectations are gleaned by the young at different ages, becoming progressively more common into middle-age. This contrasts with the perceived stereotyping of other age groups who often describe negative/positive stigmatisation. Middle-aged adults were also the only age group to highlight the stereotype of being ‘boring’, perhaps due to the salience of the transition from younger adults to middle-aged. Additionally, stereotypes of being old-fashioned, out of touch with the modern world, being past their best and no longer useful start to emerge among this age group.

Early older-aged adults. As well as stereotypes of being old-fashioned/out-of-touch and past-it reaching their peak in early older-age, stereotypes of incompetence start to emerge. This includes beliefs that early older-aged adults are stereotyped as physically incompetent (slow, weak, deaf etc.), cognitively incompetent (less mentally alert, forgetful, senile etc.), and more broadly incompetent (e.g., technologically illiterate, and bad drivers). Positive stereotypes of early older-aged adults as prosocial, experienced/knowledgeable and grandparents caring for their grandchildren also appear. Stereotypes of being well-off and unburdened were particularly prominent for this age group. However, these stereotypes were highlighted in a negative way that suggests early older-aged adults believe they are despised for having these privileges.

Late older-aged adults. Stereotypes of early older-aged adults as well-off continue into later years and link with the predominant stereotype reported by late older-aged adults, who believe they are seen as an economic burden to society. Late older-aged adults believe they are seen as ‘bed-blockers’ in health and social care, ‘economically unproductive’,

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‘hogging property wealth’ and receiving ‘generous pensions’. Stereotypes of being old-fashioned/out-of-touch, past-it, and physically and cognitively incompetent also continue into later years. Late older-aged adults were the main age group to report stereotypes of their age groups intolerant/prejudiced. This was often stated as an intolerance or prejudice towards the young.

Situations Presenting Age-Based Judgement

To examine in what settings age-based judgement was believed to occur, respondents were asked, “In what area/s of your life do you sometimes feel others' judgements of you are affected by your age?”. Respondents were prompted for a first response to this question, and then given the opportunity to provide a second response. As with the perceived age-based judgement open-ended responses, content analysis was conducted in two stages using three coders. High inter-rater reliability was found between the third coder and the themes assigned by the lead researcher at stage one (Cohen’s Kappa or κ ; $\kappa = .92$; Cohen, 1960). Overall, 22 themes arose from the content analysis, summarised in Table 5.2.

Age-based judgement in the workplace was the most widely mentioned theme. Age-based judgement in recruitment and within the workplace was of concern primarily among respondents who were less likely to be retired (age 18-59). In addition to this, across age groups, situations such as using technology, leading and being responsible for others, organisation, and cognitive ability were highlighted. These themes touch upon skills used most often within the workplace. Early and late older-aged respondents in particular were concerned about age-based judgement when using technology. For these same two age groups, they reported age-based judgement when doing physical activity in a wide number of areas, from walking the dog to martial arts.

These are the areas/situations that show a marked number of responses or greater responses for particular age groups. However, a multitude of other situations were

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highlighted showing that age-based judgement has been perceived by respondents in diverse areas of their every-day lives. For example, age-based judgement was highlighted as a problem around the house (DIY, housework, gardening and cooking), when doing hobbies, when looking after kids and volunteering more formally, when socialising and shopping, and in education and healthcare.

Table 5.2

The Most Frequent Situation Themes, their Definitions and Distribution across Respondent Age Groups

Theme/situation	Situation specifics	18-31	32-59	60-69	70+	Total
Work	Applying for jobs, and in the workplace	12	12	5	1	30
Physical activity	Doing a range of physical activities from walking the dog and swimming, to sailing and martial arts.	2	6	12	9	29
Driving	When driving.	1	5	3	6	15
Technology	When using computers primarily.	2	3	4	4	13
Hobbies	When doing a range of hobbies, from art and music to knitting and bridge.	2	3	2	2	9
Childcare	When looking after children.	2	-	4	2	8
Socialising	When socialising/going out.	3	2	1	1	7
Volunteering	When volunteering.	-	1	3	2	6
Leadership	When leading others.	2	4	-	-	6
Organisation	When organising something, whether a party or something within work.	1	1	2	1	5
Cognitive ability	When thinking quickly or needing to show cognitive competence.	1	1	1	1	4
Responsibility	Being responsible for others.	1	2	-	1	4
Giving advice	When giving advice, either formally or informally.	2	1	-	-	3
Gardening	When gardening.	-	-	1	2	3
Cooking	When cooking.	2	1	-	-	3
DIY	When doing DIY and fixing things around the house.	-	-	-	3	3
Education	Within education/when studying	3	-	-	-	3
Housework	When doing/managing the housework	-	1	1	1	3
Healthcare	Within the healthcare system.	-	-	2	-	2
House buying	When buying a house.	1	-	1	-	2
Public speaking	When lecturing or giving a talk to others.	-	-	-	2	2
Shopping	When shopping.	-	1	1	-	2
Total		37	44	43	38	162

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Economic Climate and Positivity towards one's Age Group

As an examination of perceived age-based judgement in a specific context, respondents were asked, “Do you think that people are now more or less positive towards your [racial/gender/age] group due to these changes in the economic climate?”. The aim was to examine whether people perceive more positive or negative age-based judgement toward their age group, whether this varies based on age and gender, and to look at how this compares to the valence of perceived gender and race-based judgement.

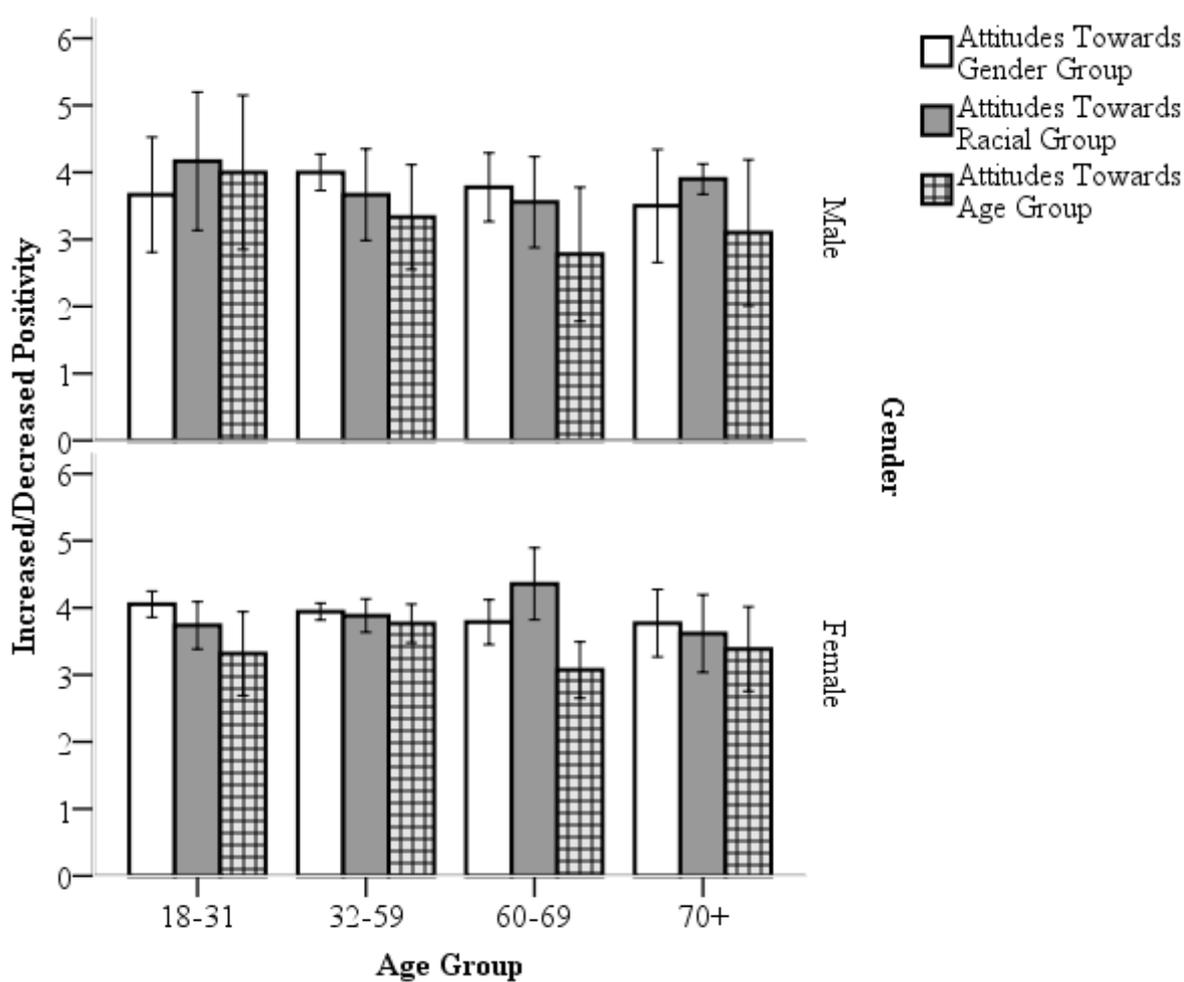


Figure 5.3. Perceptions of increased/decreased positivity towards one's gender, race and age groups in light of the country's economic struggles, split by gender and age group.

Note: error bars show the 95% confidence intervals.

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A repeated measures ANOVA was conducted using characteristic type (gender, race or age) as a within-subjects factor and age and gender as between-subjects factors. Perceived valence of judgement was the dependent variable. Results showed that the characteristic type referred to significantly predicted perceived judgement ($F(2, 184) = 12.59, p < .001, \eta_p^2 = .12$), but no other main or interaction effects were significant ($p > .05$). Pairwise comparisons revealed that scores for age-based judgement ($M = 3.34, SE = .12$) are lower than those for gender-based ($M = 3.81, SE = .07; p < .001$), and race-based judgement ($M = 3.86, SE = .09; p < .001$; Figure 5.3). Given that these means are below the scale midpoint, they show that respondents believe judgements of their age group have been more negatively affected than judgements of their gender or racial group due to the economic climate.

Respondents were also given the chance to open-endedly report which group/s (if any) they thought are viewed by others as the biggest burden as Britain struggles economically. The content analyses reveal that both the young (12 mentions) and old (20 mentions) were commonly mentioned. So too were non-British residents of the UK (16 mentions), the unemployed (21 mentions) and a number of other groups to a much lesser extent (e.g., those living unhealthy lifestyles, bankers and politicians, and the disabled). Overall, both the quantitative and qualitative analyses suggest that economic struggles in recent years are perceived to have negatively impacted age-based judgements.

Implications for ABST Research

Previous research has measured perceptions of age-based discrimination, but has not examined self-consciousness due to one's age and concerns about age-based judgement which go beyond overt discrimination from others (e.g., Abrams et al., 2009; Sweiry & Willitts, 2012). This is aligned with the theory of stereotype threat which is described as a threat "in the air" (Steele, 2010). Items ask respondents if they, 1) feel conscious of their age,

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2) think others notice their age, 3) believe others judgements of them are affected by their age and, 4) feel compared to people from other age groups.

Age self-consciousness was reported as more common than both gender and race self-consciousness. This is consistent with previously published ESS findings showing that age discrimination is more commonly experienced than sex or racial discrimination in the UK (Age UK, 2011). Further, Only 5 out of 105 respondents reported no age self-consciousness (mean score of 1 across items) and on average respondents rated age self-consciousness at 3.79 (SD = 1.44) on a scale from 1 (*not at all age self-conscious*) to 7 (*very much age self-conscious*). The findings provide evidence for the prevalence of age self-consciousness, from which you might infer that the threat of age stereotypes is also highly salient. Basic analyses revealed that women are less likely than men to report age self-consciousness, as were older respondents (70+) less likely than the other age groups. However, this also applied to gender self-consciousness (and race self-consciousness for women) suggesting that these groups are either less self-conscious overall, or are less likely to report it. Future research should examine the effects of age and gender on ABST effects.

Although age self-consciousness is an initial indicator of whether ABST is likely to occur or not, not all stereotypes devalue the individual and present a threat. Some stereotypes place positive expectations on an individual and are described as 'identity-safe' (Purdie-Vaughns et al., 2008). The survey data provides a wealth of information about the specific stereotypes and the settings in which different age groups feel subject to age-based judgement. From this it can be inferred which age groups are most likely to experience ABST and in what settings.

Young and Reckless...

Younger adults felt subject to negative stereotyping of their behaviours and character as irresponsible and reckless, antisocial, lazy, inexperienced and naïve, but also lively.

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Perceiving stereotypes of irresponsibility, laziness and inexperience may pose a threat to younger adults, particularly in the work context. However, Hehman and Bugental (2013) found that highlighting stereotypes of young people as less experienced and wise than older people resulted in a 'stereotype challenge' effect, whereby younger adults (mean age = 18.72) performed better when confronted with these stereotypes. It has been suggested that younger people's stigmatized status is temporary, unlike that of older people (Garska, Schmitt, Branscombe, & Hummert, 2004), and therefore they are less likely to be threatened by these negative stereotypes in performance contexts. This is supported by the overlap seen between negative stereotypes of younger adults' irresponsibility and stereotypes of middle-aged adults' achievements and responsibility.

...to Middle-Aged and Responsible

Some younger and a large amount of middle-aged adults in our sample reported a more prescriptive form of stereotype, which outlines the expected components of adult life, including relationships, marriage, children, having a career and responsibility. These prescriptive stereotypes were unusual in their neutrality, contrasting with the largely negative stereotypes that were perceived by other age groups. This suggests that middle-aged adults may feel pressures to achieve these conventional components of adult life; however, these stereotypes do not attribute negative characteristics or behaviours to middle-aged adults and so are unlikely to act as a stereotype threat.

Middle-Aged Onwards- Quickly Past-It

As early as middle-age (32-59) participants believe that they may be stereotyped as old-fashioned, out of touch with the modern world and past-it. This peaked in early older-age (60-69) and continued into late older- age. When asked about the areas in which age-based judgement occurs, the workplace (within recruitment and at work) was the most widely mentioned theme among respondents between the ages of 18-59. From these findings it can

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be concluded that even middle-aged adults may be susceptible to ABST based on stereotypes of being old-fashioned and past-it, particularly in the work context. To-date no ABST research has examined the impact of negative age stereotypes on middle-aged adults, often seeing them as the privileged age group. It is unclear whether, as with younger adults, they would perceive these stereotypes as a challenge or a threat. There is much room for experimental research in this area.

Early Older-Aged- Doddering but Dear

Early older-age respondents were the first age group to perceive stereotypes of physical (slow, weak, deaf etc.), cognitive (less mentally alert, forgetful, senile etc.), and broader incompetence (e.g., technologically illiterate, and bad drivers). Respondents from early older-age onwards reported age-based judgement during activities related to physical and cognitive competence. Some competencies were work-based (leadership, organisation, public speaking etc.), but many occur outside of work (DIY, child-care, gardening, driving). Judgement during physical activity was of particular concern among those aged 60+.

Despite this surplus of negative stereotypes, those in early old-age were also more likely to believe they were stereotyped as prosocial, experienced/knowledgeable and as grandparents, along with the more ambiguously positive stereotypes of them as well-off and unburdened. Overall, these findings align with the SCM (Cuddy et al., 2005) which suggests that as people get older they are more likely to be stereotyped as doddering but dear. The current survey offered less support for stereotypes of ‘friendliness’, but this may be due to the perception that stereotypes are something negative. People of all ages were less likely to report positive, than negative stereotypes.

Continued into later life, late older-aged adults also believed they were stereotyped as old-fashioned and out of touch, past-it, cognitively, physically and more broadly incompetent. This late older-age group highlighted stereotypes of ‘doddering’ but were less

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likely than early older-aged adults to also highlight the ‘dear’. The majority of ABST research has examined how the stereotyping of older people as incompetent affects their performance on memory/cognitive tasks, but also on driving and physical performance. The stereotypes highlighted by both early and late old-aged respondents confirm that ABST in these areas is important to examine. Furthermore, ABST among early and late older-aged adults in the workplace, and when using technology should be examined; and among older people not in work, negative stereotypes of incompetence may still affect their lifestyle choices and in particular, their physical activity.

The Oldest Old- An Economic Burden

The most notable stereotype salient among late older-aged adults was that of being an economic burden. Late older-aged adults believed they were seen as ‘bed-blockers’ in health and social care, ‘economically unproductive’, ‘hogging property wealth’ and receiving ‘generous pensions’. In addition, respondents of all ages believed that attitudes to age, but not gender and race, had grown more negative during recent economic troubles. This finding that older people believe they are viewed as an economic burden is interestingly contrasted to the self-reported beliefs of other age groups. The Office for National Statistics opinions survey 2010/11 reported little evidence that either the young or old were perceived by the general population as an economic threat (Sweiry & Willitts, 2012). Additionally, Abrams, Eilola and Swift (2009) report that 77% of respondents believed those over the age of 70 put in a bit more than they take out of the economy.

This stereotype of older people as an economic burden is linked to both stereotypes of incompetence (and therefore reduced productivity), but also stereotypes of older people as well-off and over privileged. ABST research has not yet examined how such stereotypes might impact older adults, but given its links with stereotypes of incompetence it is expected that it will also pose a threat to older adults.

Limitations

This study expands our understanding of age self-consciousness and perceived age-based judgement, but three key limitations of the research design are apparent. First, respondents were not prompted to consider both positive and negative ‘stereotypes’ when listing those applied to their age group. The negative connotations held by the word ‘stereotype’ therefore led participants to outline the negative or ambiguously positive ways in which others stereotype their age group. In future research, a more comprehensive definition of stereotypes should be given so that respondents are encouraged to consider both positive and negative stereotyping.

Second, the survey demonstrated the graveness of age-based judgement through a comparison with gender and race-based judgement. However, the comparison with race-based judgement was of little value due to the lack of racial diversity in the sample used. This is partly representative of the lack of racial diversity in Kent which was reported as 89.1% White British in 2011 (Office for National Statistics, 2012a). It may have also been the case that the use of opportunity sampling and visits to community groups led to only a sub-section of the Kent population being represented within the sample. This links with the final limitation that there were a large number of thematic categories, but a relatively small sample of participants. It would have also been beneficial to have a larger sample when analysing data split by age and gender categories. The small sample led to small counts within each stereotype category and made it difficult to confidently draw conclusions about stereotype prevalence between groups. Obtaining a larger and more representative national sample in future research (as with Abrams et al., 2009; Sweiry & Willitts, 2012) would present more useful results.

Conclusions

This survey of 105 adults aged 18 and above has demonstrated that age self-consciousness is prevalent across age groups, apart from those in late older-age, and is more commonly reported among men. However, the stereotypes that underlie age self-consciousness differ between age groups, ranging from younger adults as irresponsible/reckless to older people as an economic burden. Stereotypes of old-fashioned and past-it were reported as early as middle age and those of cognitive, physical and broader incompetence, from early older-age onwards. Building upon ABST research that already shows ABST effects among older people in test-based settings, including memory, cognitive, physical and driving capabilities, future research should: 1) Examine ABST among middle-aged adults who show awareness of negative age-based stereotyping in the workplace; 2) consider how ABST might affect older adults' engagement with and ability in wider areas such as volunteering, solving household problems, looking after grandchildren, physical activity etc.; 3) examine whether the portrayal of older people as an economic burden causes ABST effects as with highlighting stereotypes of incompetence. Additionally, age self-consciousness may be a useful addition to measures of attitudes to ageing, going beyond reports of actual age discrimination.

CHAPTER 6- A META-ANALYSIS OF AGE-BASED STEREOTYPE THREAT

Among older people, underperformance across cognitive and physical tasks is hypothesised to result from age-based stereotype threat (ABST) because of negative age-stereotypes regarding older adults' competence (Steele & Aronson, 1995). The present review and meta-analyses examine 22 published and 10 unpublished articles, including 82 effect sizes ($N = 3882$) investigating ABST effects on older people's ($M_{age} = 69.5$) performance. The analysis revealed a significant small-to-medium effect of ABST ($d = .28$) and important moderators of the effect size. Specifically, older people are more vulnerable to ABST when (a) stereotype-based ($d = .09$) rather than fact-based manipulations are used ($d = .52$), (b) when performance is tested using cognitive measures ($d = .36$), and (c) when the dependent variable is measured more proximally to the manipulation. The review raises important theoretical and methodological issues, and areas for future research. A version of this meta-analysis has been published in 'Psychology and Aging' (Lamont, R. A., Swift, H. J., & Abrams, D. (2015). A review and meta-analysis of age-based stereotype threat: Negative stereotypes, not facts, do the damage. <http://dx.doi.org/10.1037/a0038586>).

Study 2. A Meta-Analysis of Age-Based Stereotype Threat

There is now more than a decade of research accumulating to show that older people may be vulnerable to ABST when they perform memory, cognitive, or physical tasks (Abrams et al., 2008; Hess, Auman, Colcombe, Rahhal, 2003; Swift, Lamont, & Abrams, 2012). However, not all older people are vulnerable to ABST effects (e.g., Andreoletti & Lachman, 2004; Fritzsche, DeRouin, & Salas, 2009). This raises important empirical questions about the size and scope of ABST effects and the circumstances under which older

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people are more or less vulnerable to ABST. The aim of the current meta-analysis was to investigate this.

Group-Specificity of Stereotype Threat

Stereotype threat effects have been studied across different negatively stereotyped social groups (e.g., women, gay men, ethnic minorities; Major, Spencer, Schmader, Wolfe, & Crocker, 1998; Steele, James, & Barnett, 2002; von Hippel et al., 2005). Three previous meta-analyses examined stereotype threat among ethnic minority groups and among women (Nadler & Clarke, 2011; Nguyen & Ryan, 2008; Walton & Spencer, 2009). Walton and Spencer (2009) found similarly sized stereotype threat effects affecting ethnic minorities and women, whereas Nguyen and Ryan (2008) found stronger effects for race/ethnicity ($d = .32$) than gender ($d = .21$). Importantly, Nguyen and Ryan (2008) and Shapiro (2011) highlight the diversity in the experience of stereotype threat associated with different group memberships. Given that there are some quite distinctive features of age prejudice and stereotypes, it cannot be assumed that the size and relevant predictors of ABST are the same as stereotype threat effects for other groups (Shapiro, 2011).

In contrast to gender and race/ethnic groups, age boundaries defining old age are construed more fluidly. This potentially makes the application of age stereotypes and stereotype threat a more subjective and variable experience. Moreover, becoming 'old' applies to the *majority* of the population, meaning the potential social, psychological and economic impact of ABST is substantial. Thus, a review of the size and scope of ABST is both a necessary and timely contribution to the literature.

Review of Age-Based Stereotype Threat Literature

At the time of writing, 22 published manuscripts had tested ABST effects, several of which failed to find effects on performance (Andreoletti & Lachman, 2004; Hess & Hinson, 2006; Hess, Hinson, & Hodges, 2009; Horton, Baker, Pearce, & Deakin, 2010; Kang &

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Chasteen, 2009; O'Brien & Hummert, 2006). Others found that ABST effects were dependent on situational and individual factors such as, prevention or promotion focus (Gaillard, Desmette, & Keller, 2011), or the level of task demands (Hess, Emery, & Queen, 2009). Moreover, some studies have shown that ABST manipulations can improve performance (Fritzsche et al., 2009). A meta-analysis exploring effects of explicit positive vs. negative age primes revealed a significant effect on memory performance ($d = 0.38$; Horton, Baker, Pearce, & Deakin, 2008). Although they are indicative, these findings cannot be directly extrapolated to ABST because explicit primes (e.g., a sentence unscrambling task) do not necessarily meet the criteria for ABST.

The mixed findings across ABST studies highlight the need for a review and meta-analysis to understand what factors might moderate ABST effects. Therefore, as well as focusing directly on ABST, the present meta-analysis complements the meta-analysis by Horton et al. (2008) in several ways. It includes the much larger set of papers and effect sizes available today and also includes unpublished studies to examine potential publication bias. Moreover, because the literature highlights a number of potential moderators of ABST, the present meta-analysis examines conditions under which ABST effects flourish or diminish and the impact of ABST in different performance domains and types of population.

Experimental Differences

Experimental manipulations of ABST. A variety of manipulations have been used to test ABST. Some manipulations explicitly state negative expectations regarding ageing whereas others subtly reference the relevance of the task to an age stereotype relevant domain. Previous meta-analyses of stereotype threat effects have compared explicit/implicit or blatant/subtle stereotype threat manipulations (Nadler & Clarke, 2011; Nguyen & Ryan, 2008). However, here it is proposed that stereotype threat manipulations can be categorised

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more clearly based on their factual content versus allusion to a stereotype, which are labelled *fact-based* and *stereotype-based* manipulations, respectively.

Fact-based. In many studies ABST is manipulated by presenting factual statements of age-based differences to affect participants' expectations about performance. For example, O'Brien and Hummert (2006) told those in the threat condition that 'past research has shown that memory performance declines with age'. For a researcher to present evidence that supports age-differences in performance is arguably going beyond 'stereotype' threat.

Stereotype-based. Other studies have used stereotype-based manipulations. For example, Abrams, Eller and Bryant (2006) stated that; 'it is widely assumed that intellectual performance declines with age'. Other stereotype-based manipulations rely on more subtle cues—such as an age comparison or framing the task as stereotype-relevant—to activate negative stereotypes of ageing (e.g., Chasteen, Bhattacharyya, Horhota, Tam, & Hasher, 2005; Desrichard & Kopetz, 2005; Swift et al., 2012).

Stereotype-based manipulations could be considered a purer form of stereotype threat manipulation, whereby the threat comes solely from awareness of societal stereotypes, whether or not they are believed to be true (Steele & Aronson, 1995). In contrast, presenting facts about age-based differences in competence not only acts as a reminder of societal stereotypes, but also gives credibility and removes ambiguity surrounding these stereotypes. Therefore, the distinction between operationalisations of fact-based and stereotype-based stereotype threat manipulations allows us to more clearly explore the impact that stereotyping has on older adults.

Stereotype-based cues could be more of a threat to performance outcomes because they introduce greater ambiguity in a performance situation. Although the 'subtlety' of stereotype-based manipulations varies, they are overall more ambiguous than fact-based manipulations due to their omission of this factual evidence, and therefore may have a greater

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negative impact on older adults. Ambiguity and uncertainty about the application of the negative age stereotype may increase distracting thoughts (Hirsh, Marr, & Peterson, 2012), which in turn deplete cognitive resources needed for the task at hand (Schmader, Johns, & Forbes, 2008). Indeed, when testing the distinction between ‘implicit’ and ‘explicit’ stereotype cues, a number of studies have actually contrasted fact- and stereotype-based manipulations. For example, Kray, Thompson and Galinsky (2001; Study 3) found that fact-based cues (defined as blatant) led participants to behave contrary to expectations defined by the stereotype, in line with ‘stereotype reactance’ theory (Brehm, 1966); whereas stereotype-based cues (defined as subtle) led to behavioural assimilation, as predicted by stereotype threat theory (Steele & Aronson, 1995).

Stereotyped performance domains. ABST effects have been investigated in a number of performance domains including tests of memory, cognitive and physical ability, skill acquisition and driving. ABST may vary according to performance domain if different skill-sets and resources are required for these different types of tasks (Beilock, Jellison, Rydell, McConnell, & Carr, 2006; Schmader et al., 2008). According to Schmader et al.’s (2008) model of stereotype threat processes, stereotype threat might affect controlled processing due to heightened physiological response, increased task monitoring, and attempts to suppress negative emotion. All of these can cause cognitive depletion, reducing working memory capacity and the ability to perform tasks requiring controlled processing.

It is less clear how stereotype threat affects motor skills, which are less dependent on cognitive resources and controlled processing, and more reliant on unconscious or automatic processing. However, some research suggests that stereotype threat may affect physical performance if the individual attends too much to largely proceduralised tasks (Beilock et al., 2006; Baumeister, 1984), or if threatened individuals alter performance goals (Smith, 2004;

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Stone & McWinnie, 2008). At present, ABST effects on motor skills have produced mixed findings (Horton et al., 2010; Swift et al., 2012).

Differences in ABST effects between performance domains may also suggest that the different content of aging stereotypes poses different levels of threat to older adults. Some research has suggested that the extent to which individuals identify with the performance domain and see it as important can moderate ABST effects, such that ABST effects are stronger on domains that are highly valued (Hess et al., 2003; Joanisse, Gagnon, & Voloaca, 2012). Although too few studies have measured domain identification to test it as a moderator in this meta-analysis, stronger ABST effects on one performance domain over another may indicate the relative strength of the particular ageing stereotype and the subsequent increased vulnerability of older people on that particular performance domain. The present meta-analysis therefore examines differences in ABST effects in several performance domains.

Baseline conditions. Across the ABST literature we discerned two types of baseline conditions. *Control* baseline conditions do not mention the age/stereotype relevance of the task, whereas *nullification* baseline conditions attempt to challenge the relevant negative age stereotype. Comparing the use of control vs. nullification conditions provides useful insights for reducing the impact of ABST effects. For instance, in situations that may present an ABST, it is important to know whether it is better to avoid all mention of age (as with control conditions) or to present counter-arguments to commonly held stereotypes (stereotype nullification). This has implications for the subtlety of campaigns that aim to encourage counter-stereotypical behaviours such as active ageing campaigns or advertising for later-life learning.

Sample Characteristics

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Previous stereotype threat meta-analyses have not investigated the extent to which sample characteristics moderate stereotype threat effects (Horton et al., 2008; Nadler & Clarke, 2011; Nguyen & Ryan, 2008; Walton & Spencer, 2009). Understanding effects of sample characteristics helps to provide parameters for the generalisability of findings. In the present analysis the focus is on demographic details available across most studies. These are the age, gender and the region in which research participants live.

Age. Given the arbitrary category boundaries that define ‘young’ and ‘old’, the age of participants used in ABST studies could plausibly affect the strength of ABST. It might be expected that ABST has a greater effect on older people, due to the increased self-relevance of ageing stereotypes. However, Hess, Emery and Queen (2009) noted a greater effect on the performance of those aged 60-70 years than those aged 71-82 years. Similarly, Hess and Hinson (2006) found threat-based effects were most evident around the age of 68, but not evident among the older participants. It is suggested that those entering ‘old age’ find the implications of this category membership more salient due to its relative newness; this creates a heightened sense of self-relevance (Hess, Hinson, & Hodges, 2009). It is therefore tested whether the mean age of the study sample moderates ABST effects.

Gender. Stereotypes of ageing have been argued to be more self-relevant for women (Levy, Ng, Myers, & Marottoli, 2013). There are notions of a ‘double-standard’ of aging whereby it is less acceptable for women to show the signs of ageing than for men (Sontag, 1997). Stereotype threat research has further suggested that multiple social identities can be involved in performance situations. For instance, alternative positive social identities may act as a buffer against stereotype threat (e.g., Rydell, McConnell, & Beilock, 2009). However, additional stigmatized social identities, such as being older and a woman, could magnify stereotype threat. If these ideas are correct it can be predicted that studies including a higher proportion of women should also display larger effects of ABST.

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Region of study. The reviewed studies were carried out in a number of countries (USA, Canada, England, France, Belgium and Romania). There may well be macro-social contextual moderators of ABST. These might range from the transitory salience of specific very old people (e.g., the Queen) to more stable differences between cultures, including the age profile of the population and the role and status of older people within that culture. There are cross-cultural differences in perceptions of when ‘old age’ begins, as well as differences in experiences of age discrimination and the prevalence of intergenerational relationships (Abrams, Russell, Vauclair, & Swift, 2011). All of the studies in the current meta-analysis originate from either Europe or North America. Cultural, economic, social and political differences between these continents may influence the experiences of older people and may therefore alter the experience of ABST.

Method

The present meta-analysis draws on 37 identified ABST studies to assess the strength of ABST effects as well as whether they are moderated by experimental differences and sample characteristics.

Article Selection Criteria

General population evidence shows that older people do self-categorise themselves according to age and are generally aware of stereotypes regarding their age group (e.g., Abrams et al., 2011). Following this premise, articles were selected based on meeting relevant criteria for stereotype threat (Steele, 2010). The first criterion for inclusion was the presence of an objective measure of performance. Studies were excluded if they did not include performance-based dependent variables (e.g., Auman, Bosworth, & Hess, 2005; Coudin & Alexopolous, 2010; von Hippel, Kalokerinos, & Henry, 2013). Second, studies must manipulate the relevance of the performance task to salient negative age-based stereotypes, in order to ensure that the performance setting is diagnostic of the age-based

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stereotype. When a stereotype is primed without the individuals' awareness (e.g., subliminally or through other forms of priming such as sentence-unscrambling tasks), the stereotype may become more cognitively accessible and directly affect associated behaviour (Bargh & Pietromonaco, 1982). This is stereotype priming. Studies were excluded if the performance domain was not under threat, this included studies that used stereotype-priming methods or combined these with manipulations of stereotype threat (e.g., Bensadon, 2010; Hess, Hinson & Statham, 2004). For example, Hess, Hinson, and Statham (2004) used a sentence unscrambling task in which target words represented common beliefs about older people (Experiment 1), and a lexical decision task, which presented consciously perceivable prime words (Experiment 2). These procedures involve explicit stereotype priming but not necessarily stereotype threat because the activation of the stereotype does not necessarily elicit the threat of confirming the stereotype.

A third criterion was that studies had at least one baseline comparison condition so that the threat effect could be quantified. Studies were excluded if they used a non-experimental design (e.g., Scholl & Sabat, 2008; von Hippel et al., 2005). All remaining studies used a between-participants design whereby older people were randomly assigned to the control or experimental group. Finally, searches only included articles written or translated into English. Two studies that explored ABST on young participants (Herman & Bugental, 2013; Moldoff, 2010) were excluded because there were too few to permit separate meta-analysis.

Literature Search

First, online database searches were carried out using a database for 'Abstracts in Social Gerontology', also 'PsycINFO' and 'PsycARTICLES. Search one included the terms "stereotype threat*" or "stereotypic expectancies*" AND "age*" or "elderly*" or "young*" or "old*". Search two included the terms "age stereotype*" AND "performance*". Nineteen

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published articles met the requirements for the meta-analysis (out of 914). A further three studies were extracted from a thorough search of the references in these articles. Overall, 22 published articles met the inclusion criteria.

Second, efforts were made to identify unpublished ABST studies. This is a technique used to address publication bias (Frattaroli, 2006; Hawkins, Blanchard, Baldwin, & Fawcett, 2008). All primary authors of the already identified published ABST studies were contacted. A number of organisations were also contacted (and complied) with requests for unpublished data. This produced five unpublished pieces of research suitable for the meta-analysis (Cassidy & Persson, n.d.; Desrichard, n.d.; Horhota, n.d.; Lamont, 2011; Popham & Hess, in press). Finally, using ProQuest Dissertations and Theses, all theses published internationally since 1990 were searched. A further five unpublished studies were found which were not already included in the list of published articles (Cavanagh, 2011; Kominsky, 2003; Lambert, 2011; Rahhal, 1998; Stein, 2001). This search was terminated in February 2013. In sum, the search revealed 32 published and unpublished articles, including 37 experimental studies.

Statistical Considerations

Eighty two effect sizes were drawn from the 37 studies. Some studies included additional conditions or factors. Of these, four included two-by-two designs, manipulating ABST as one factor and then manipulating a second independent variable, such as regulatory focus or time pressure. (Cavanagh, 2011; Fritzsche et al., 2009; Gaillard et al., 2011; Hess et al., 2009). It was not possible to determine which level of the second independent variable was more in line with the other reviewed studies. Therefore, ABST effect sizes were calculated separately at each level of the second independent variable (see Appendix B, Table B.1). Relatedly, Abrams et al. (2008) included an imagined contact task to eliminate the effects of threat in a 3-level design (control, threat, threat + imagined contact). Only the first two conditions were used for the meta-analysis.

Retrieval and Independence of Effect Sizes

Multiple effect sizes obtained from different studies within an article were considered to be statistically independent. However, multiple effect sizes were sometimes obtained from individual studies whereby both control and nullification conditions were included in comparison with the threat condition. Effect sizes sharing participants (N) due to the inclusion of both baseline conditions (control and nullification) were considered to be independent tests based on the distinct comparison that they form with the threat condition.

In addition, some experiments included more than one type of dependent variable, each yielding its own effect size. Although all studies with multiple dependent variables measured them within the same session, the sequence of measurement is a potential confound, whereby effects may become weaker if measured later rather than earlier. For example, in Horton et al.'s (2010) study the ABST manipulation was followed by measures of walking speed, physical self-description, and recall performance. After that, measures of reaction time, grip strength, and flexibility were counterbalanced. In order to try to accommodate effects of differences in sequential measurement position of any particular dependent measure separate analyses were conducted for dependent measures that were recorded at different points (placements) in the sequence. Specifically, effect sizes from measures that were either the sole dependent variable or that were taken earliest in a sequence after the ABST manipulation (first placement), were distinguished from those that were from studies with multiple dependent variables and where the measure was either in the second, or in third or subsequent placements in the sequence. It is recognised that even this approach does not account for situations in which a series of performance measures is also preceded by or interspersed with other measures, such as evaluation apprehension (Chasteen et al., 2005), expected performance (Desrichard & Kopetz, 2005) or an IAT (Hess et al., 2003). The implications of the inclusion and placement of other types of dependent variable could be

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investigated once there is a larger set of studies available but is beyond the scope of the present analysis.

Effect size, N and degrees-of-freedom (df) were obtained for all tests of ABST and are summarised in Table B.1 (Appendix B). Positive effect sizes indicate that the performance outcomes were in line with stereotype threat predictions whereby threat reduced performance. The standard mean difference between conditions (d) was computed from means and standard deviations or from alternative effect sizes (t and F). Authors were contacted for additional information where necessary.

Coding Procedure

The first author coded sample characteristics (age and gender), dependent variable placement and whether the statistic was published in a European or North American journal. All other moderators were coded by the first and second authors and one independent coder, who was blind to the aims of the research. All variables coded showed high inter-rater agreement (Cohen's kappa or κ ; Cohen, 1960; Mean $\kappa = .95$). Any discrepancies in coding were discussed and final coding agreed upon.

Experimental manipulations of ABST. ABST manipulations that included a statement or evidence of factual difference in age-based performance were coded as *fact-based* (62%). All other manipulations were coded as *stereotype-based* ($\kappa = .90$). Manipulations in two studies highlighted differences in performance based on age but the information did not explicitly state that performance declines with age (Hess, Hinson, & Hodges, 2009; Fritzsche et al. 2009). These were categorised as fact-based because of their use of statements of factual differences.

Stereotyped performance domains. The following categories of performance domain are distinguished: *memory*; *cognitive*; *physical*; *skill acquisition* and *driving*. These are defined below. Studies were categorised into these domains by each coder ($\kappa = .98$;

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summarised in Table B.1, Appendix B). The majority of studies focused on *memory* performance, which was defined as measures of recall, recognition and cued memory for novel words, sentences, shapes and information (e.g., Chasteen et al., 2005; Kang & Chasteen, 2009; Cassidy & Persson, n.d.).

A second category of studies has focused on broader *cognitive* performance—tasks that require cognitive effort and other cognitive skills (Abrams et al., 2006; Abrams et al., 2008; Swift, Abrams, & Marques, 2013; Haslam et al., 2012; Horhota, n.d.; Hehman & Bugental, 2013; Popham & Hess, in press). For example, these studies measured performance on math tests (Abrams et al., 2008), a letter cancellation task (Popham & Hess, in press), a crossword task (Swift, et al., 2013), a block design task (Hehman & Bugental, 2013), a mental rotation task (Horhota, n.d.) and other mixed tests of cognitive ability that sometimes include a memory component (Abrams et al., 2006; Haslam et al., 2012).

Additionally, two studies, tested a performance domain that was ambiguously linked to the stereotype they sought to manipulate (Desrichard & Kopetz, 2005; Gaillard et al., 2011). Desrichard and Kopetz (2005, Study 1) manipulated the presence of age-based memory stereotypes and sought to capture the effect on a ‘running an errand’ task. Performance scores were based not just on memory but also the effectiveness of the strategy used. Gaillard et al. (2011) manipulated the salience of both poor driving skill and reduced cognitive efficiency age-stereotypes, the effects of which were measured on multiple-choice questions about driving. Both studies were classified as cognitive performance.

A third area of performance is *physical competence and motor skills*. Horton, Baker, Pearce and Deakin (2010) measured walking speed, flexibility and reaction time and Swift et al. (2012; also Lamont, 2011) measured handgrip strength and persistence.

Some dependent measures could not readily be categorised within these three domains. Fritzsche et al. (2009) required participants to learn to use a new computer-based

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library cataloguing system, and then tested these new skills. This study targeted stereotypes of age-related differences in skill-acquisition (not memory), so the study was classified as *skill-acquisition*. Second, studies focused on stereotypes of older adults' poor driving ability and driving performance (Joanisse et al., 2012; Lambert, 2012). These tasks required both cognitive and physical competence rather than just one performance domain. Therefore these tasks were categorised as *driving*.

Baseline conditions. Baseline conditions were coded either as a *control* condition which did not mention age, or as a *nullification* condition that explicitly challenged the stereotype, for example by stating that the task is not age-biased or that no age differences have previously been found (44% of effect sizes; $\kappa = .93$; see Table B.1, Appendix B for categorisation).

Age and gender. Where available, the percentage of participants that were female (*gender*) and the mean *age* of participants were recorded. Some studies gave only mean age/percentage female across conditions (e.g., across the threat, control and nullification conditions), in these instances this best estimate of the mean/percentage was used.

Region of study. This was classified according to whether the study was conducted in *North America* or *Europe*. When region was unspecified in the method section, it was classified according to the corresponding author's location ($\kappa = 1$). *Journal region* was also classified based on whether the journal was based in *North America* or *Europe*.

Meta-Analytic Procedure

Effect sizes (*d*), *N* and moderator values for each test of ABST were entered into SPSS (Version 18). The procedures and macros of Lipsey and Wilson (2001) were used to carry out transformations, meta-analyses and moderator analyses. A random effects model—which takes into account both the between-study and within-study variance when weighting effect sizes—was used due to methodological heterogeneity between the studies (Mullen,

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1989). Individual standardised mean difference scores were transformed to account for small sample size bias. Inverse variance weights, incorporating both within- and between-study variance (Tau-squared; τ^2) were calculated to take into consideration the precision of individual effect sizes. These weights were then used to carry out inverse variance weighted meta-analyses (Hedges & Olkin, 1985; Lipsey & Wilson, 2001).

For each meta-analysis, a mean effect size was calculated, along with upper and lower 95% confidence intervals [CI₉₅ lower and CI₉₅ upper] and homogeneity of variance. Homogeneity of variance (Cochran's Q) indicates whether effect sizes are significantly heterogeneous (beyond sampling error). Significant findings on this test would suggest that there are some real differences across studies that may be explained by moderator variables.

To model between study variability, mixed effects moderator analyses were conducted. For each categorical moderator a chi-square test is reported whereby Q_{between} and p show the size and significance of the variability in effect sizes between different levels of the moderator. For continuous moderators a meta-analytic regression was performed with all continuous variables entered into the same model. $Beta$ and p show the predictive value of the moderators in explaining variance in effect sizes. For each categorical moderator, separate meta-analyses were conducted at each level of the moderator (Table 6.3). Weighted mean d were interpreted according to Cohen's (1988) criterion stating that small, medium and large effect sizes correspond to $d = .2$, $d = .5$ and $d = .8$ respectively.

Results

Age-Based Stereotype Threat Effects

The first meta-analysis was used to establish the overall effect of ABST on performance measures. A compilation of all 82 effect sizes was not possible due to crossover in N where effect sizes were derived from the measurement of more than one dependent variable in a study. Consequently, separate analyses were conducted for each placement of

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dependent measures following the ABST manipulation; first placement (P1), second placement (P2) and third placement and beyond ($\geq P3$). Table 6.1 presents all the effect sizes in stem-and-leaf plots for each placement.

Table 6.1

Stem-and-Leaf Plot of all Effect Sizes (ds) for ABST by Dependent Variable Placement.

First		Second		Third and greater	
Stem	Leaf	Stem	Leaf	Stem	Leaf
-4.4	3	-4.4		-4.4	
-2.7		-2.7	7	-2.7	
-2.4	0	-2.4		-2.4	
-1.7		-1.7	4	-1.7	
-1.1	1	-1.1		-1.1	
-.6	2	-.6		-.6	
-.5	2	-.5		-.5	
-.4	2 9	-.4		-.4	
-.3	8	-.3	5 3	-.3	6
-.2	3	-.2		-.2	1
-.1	0 1 5	-.1	7	-.1	
-.0	1 2 4	-.0	2	-.0	3
.0	0 0 1 3 4 5	.0	0 8 9	.0	4 4 8
.1	0 4 6 7 8	.1	5 7	.1	9
.2	4 7	.2		.2	1 2
.3		.3		.3	
.4	4 8	.4	8	.4	
.5	2 2 3 4 5 6	.5		.5	
.6	3 5 6	.6		.6	
.7	0 1 5	.7		.7	
.8	2 3 6	.8	7	.8	
.9	0 2 5 8	.9	8	.9	
1.0	9	1.0	2	1.0	
1.1	3	1.1		1.1	0 2
1.6		1.6	3	1.6	
1.7		1.7	0	1.7	
2.4	9	2.4		2.4	
4.0		4.0	0	4.0	

Publication Bias

As identified by Rosenthal (1979), unattained unpublished studies may exist that represent a bias against the publication of non-significant results. Moderator analyses show that article status (published vs. not) significantly predicted variability in effect sizes ($Q_{\text{between}}(1) = 6.73, p < .01$). The effect size is significant in published research (mean $d = .42$), but not in unpublished research (mean $d = -.03$). This confirms that there is bias towards the publication of significant ABST results. Both published and unpublished work in this area has been included in all further analyses in order to better estimate the *true* effects.

Further tests were conducted on the combined published and unpublished studies to identify whether it is likely that additional unpublished studies still exist. A non-significant correlation between effect size and sample size ($r(51) = .04, p = .79$) and a non-significant result using Eggers's regression ($\beta = 5.23, p = .36$) suggest that our findings are not biased by the overrepresentation of smaller significant studies within the meta-analysis. A funnel plot (Figure 6.1) also shows no obvious publication bias based on its symmetry around the population effect size. The plot shows that studies with lower standard errors (an indicator of precision) show less variability in effect sizes, as with an unbiased sample. Therefore, assuming a complete sample of unpublished studies has been obtained, and given that these do not differ in sample size from the published studies, it seems reasonable to conclude that the most robust estimate of the overall meta-analytic effect size should include both published and unpublished studies.

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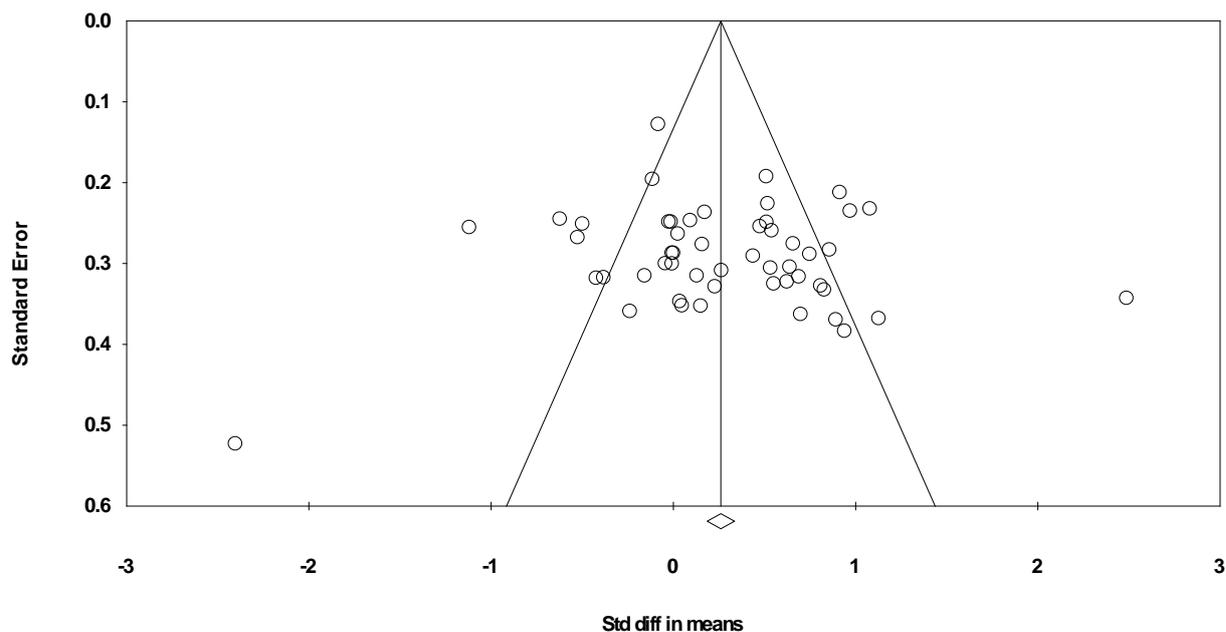


Figure 6.1. Funnel plot of P1 mean difference effect sizes ('Std diff in means') plotted against the standard error of the mean difference effect sizes ('Standard Error'). Diagonal lines show 95% confidence limits and a vertical line shows the population effect size.

Note: the two largest effect sizes (one positive and one negative) have not been included in the funnel plot due to their larger standard errors requiring a smaller display.

Moderators

Experimental manipulations of ABST. Stereotype-based manipulations revealed a significant mean d of .52. In contrast the mean d for fact-based manipulations was not significant (mean $d = .09$). Moderator analyses confirmed that threat manipulation type explained variation in observed effect sizes ($Q_{\text{between}}(1) = 6.46, p < .05$), demonstrating that stereotype-based threat manipulations produced significantly greater decrements in performance than fact-based manipulations (when contrasted with the baseline condition).

Stereotyped performance domains. Moderator analyses revealed significant variation in effect sizes based on performance domain ($Q_{\text{between}}(4) = 45.28, p < .001$). However, the number of effect sizes included in three of these categories was very small (physical $k = 3$; driving $k = 2$; skill acquisition $k = 2$) limiting our interpretation of these

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effects. Effect sizes for the two most commonly measured performance domains are significantly different ($Q_{\text{between}}(1) = 8.10, p < .005$). ABST effects are larger for cognitive tasks (mean $d = .68$) than for memory tasks (mean $d = .21$).

Despite the difference between memory and cognitive tasks, it seemed informative and statistically reasonable to contrast these with more motor/skill based tasks (physical, driving, skill acquisition). Moderator analyses revealed significant variation in effect sizes based on these two broad categories of performance domain ($Q_{\text{between}}(1) = 5.98, p < .05$). ABST effects are larger for cognitive and memory tasks ($d = .36$) than other tasks (mean $d = -.46$).

Baseline condition. Mean d for control effect sizes was significant at .39 and mean d for nullification effect sizes was not significant at .12. A moderator analysis showed that baseline condition could not explain variation in observed effect sizes ($Q_{\text{between}}(1) = 2.11, p = .15$), providing no support for the suggestion that nullifying vs. ignoring stereotypes of ageing might produce different effects.

Age and gender. Mean age and gender did not explain variance in d ($\beta = -.05, p = .72$ and $\beta = .18, p = .21$ respectively), contrary to hypotheses that the older and female participants would reveal larger ABST effects.

Region. The region of the study was significant ($Q_{\text{between}}(1) = 18.52, p < .001$). Mean d for European ABST studies was significant (mean $d = .72$), but the mean d for those conducted in North America was not (mean $d = -.06$). It was observed that 34% of the studies conducted in North America were stereotype-based, compared to 67% in Europe. Therefore, the effect of study region was explored separately for each manipulation type. The region of study moderated stereotype-based manipulations ($Q_{\text{between}}(1) = 11.26, p < .001$), with effects greater in Europe ($k = 10$; mean $d = .82$; 95% CI [.57, .93]) than North America

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($k = 13$; mean $d = .13$; 95% CI [-.18, .43]), but was not a significant moderator among fact-based manipulations ($Q_{\text{between}}(1) = 2.15, p = .14$).

Journal region. Journal region also accounted for variance in effect sizes ($Q_{\text{between}}(1) = 11.40, p < .001$). Mean d was significantly greater for articles published in European journals, ($k = 5$; mean $d = .94$; 95% CI [.35, 1]) than North American journals ($k = 30$; mean $d = .30$; 95% CI [.09, .49]). A higher proportion of stereotype-based studies published in European journals (67%) than in North American journals (40%) was also observed. Therefore, the effect of journal region was explored separately for each manipulation type. Journal region significantly moderated the effect size for stereotype-based manipulations ($Q_{\text{between}}(1) = 15.04, p < .001$), but not fact-based manipulations ($Q_{\text{between}}(1) = .41, p = .52$).

Based on these findings solely stereotype-based studies are now included in analyses ($k = 23$). Notably, all the published effect sizes from North American studies ($k = 7$) were published in North American journals. Six of the nine effect sizes obtained within Europe were also published in North American journals. The possibility that regional differences might be because European journals may have required larger effect sizes to meet their publication threshold was tested. It was found that journal region moderated effect sizes of studies conducted within Europe ($Q_{\text{between}}(1) = 9.15, p < .005$); European journals ($k = 3$; mean $d = .99$; 95% CI [.52, 1]), North American journals ($k = 6$; mean $d = .65$; 95% [.52, .75]). In contrast, region of study did not moderate effect sizes for studies published in North American journals, ($Q_{\text{between}}(1) = 2.06, p = .15$); European ($k = 6$; mean $d = .65$; 95% CI [.52, .75]), North American ($k = 7$; mean $d = .49$; 95% [.27, .67]). Thus, publication region predicts effect size magnitude such that European journals publish larger ABST effects. This could reflect either a self-selecting author bias or bias in European journals' publication criteria for larger effects.

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Table 6.3

Meta-Analytic Results for Hypothesized Moderators using only First Placement Effect Sizes.

<i>d</i> inclusion criteria	<i>k</i>	<i>d</i>	95% CI for <i>d</i>		τ^2	<i>Q</i> ^a
			Lower	Upper		
Published	35	.424***	.196	.609	.483	230.688***
Unpublished	18	-.029	-.233	.177	.124	47.376***
Fact-based manipulation	30	.086	-.123	.287	.239	105.382***
Stereotype-based manipulation	23	.520***	.248	.717	.542	202.783***
Memory	34	.210*	.020	.385	.242	140.252***
Cognitive	12	.681***	.399	.845	.420	68.733***
Physical	3	.193	-.221	.548	.071	4.124
Driving	2	-	-	-	-	-
Skill acquisition	2	-	-	-	-	-
Cognitive and memory	46	.355***	.179	.509	.342	248.967***
Other	7	-.462	-.860	.286	1	67.290***
Control comparison	31	.386**	.151	.580	.436	203.986***
Nullification comparison	22	.122	-.164	.388	.370	115.377***
Region of study- North America	38	.059	-.124	.237	.239	150.967***
Region of study- Europe	15	.723***	.484	.862	.480	99.516***
Journal region- North America	30	.300**	.087	.486	.290	136.036***
Journal region- Europe	5	.941*	.348	.996	2.336	71.653***

Note: *k* = number of effect sizes included; *d* = inverse variance weighted standard mean

difference of meta-analysed studies; τ^2 = tau-squared or between-studies variance; *Q* =

homogeneity of variance (Cochran's *Q*); ^aFor each *Q* test, *df* = *k* - 1. * *p* < .05, ***p* < .01, ***

p < .001, one-tailed.

Discussion

The present paper complements and extends previous stereotype threat evidence on gender and ethnicity by providing a more complete and accurate picture of stereotype threat effects on the third major stigmatised social category, age. It also complements Horton et al.'s (2008) stereotype priming meta-analysis.

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Using evidence from 32 articles (10 of which are unpublished) that provided 82 effect sizes, the overall finding is that stereotype threat negatively affects older people's performance. This effect is significant and robust, albeit small-to-medium (.28) and thus somewhat smaller than the .38 in Horton et al. (2008). The analyses also revealed that effect sizes (d) ranged from -4.43 to 5.52, indicating substantial heterogeneity across studies. An important contribution of the present analysis was therefore to explain why this heterogeneity exists, providing a number of new insights and raising further questions for ABST research and stereotype threat theory more broadly.

Are Stereotypes More Damaging than 'Facts'?

Across performance domains stereotype-based manipulations caused greater performance decrements than fact-based manipulations. The damaging effects of stereotype-based manipulations have significant societal implications given the prevalence of age stereotyping (Abrams et al., 2011; Levy & Banaji, 2002). According to Cuddy, Norton and Fiske (2005) older people are stereotyped as warm but less competent than their younger counterparts, this results in a paternalistic form of prejudice characterised by feelings of pity, but also admiration. It seems unlikely that pity results in explicitly hostile actions towards older adults, but it is likely to result in increased helping, and also exclusion within competence-based settings. Because ageism towards older people is widely accepted and endemic in subtle forms (Nelson, 2002), it may often be difficult to disambiguate the intention behind actions towards older adults. Older people may be constantly bombarded with cues to age stereotyping at the hands of often well-intentioned individuals. Future research should explore how these stereotype cues (e.g., patronising tones, offers of help, social exclusion etc.) may impact the performance and future intentions of older adults.

Stone and McWinnie (2008) suggest that effects of different threat manipulations may depend on the task domain. For instance, subtle manipulations, such as stereotype-based

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manipulations, create ambiguity about the presence of threat, which may negatively impact cognitive load and tasks reliant on working memory (Schmader et al., 2008). However, under some circumstances, if a threat is unambiguous it may induce a prevention focus which could lead to ineffective and disruptive performance strategies on tasks that rely on more automatic procedures (Beilock et al., 2006). Therefore, an important question for future research is whether fact-based manipulations may have stronger effects in other performance domains that are less dependent on working memory (e.g., physical tasks).

Stereotyped Performance Domains

It was explored whether ABST would impact performance domains differently based on the different skill sets required and the stereotypes targeted. There were significant effects of ABST on both memory and cognitive performance, with stronger ABST effects on the latter. This may be because ABST in the cognitive domain presents a greater stereotypic threat or it could be that the cognitive measures used are more sensitive or reliable than memory tasks, and thus reveal the threat effect more clearly. The overall implication of these findings however, is that ABST effects can significantly reduce both cognitive and memory performance. One ramification is that ABST might cause misleadingly poor results in clinical assessments of cognitive impairment, or work-place assessments of adult learning. Although the effects of ABST on the combined physical performance, driving and skill acquisition tasks were non-significant, our interpretation of this finding is tentative given the mixed results from the few studies included.

Baseline Conditions

ABST effects did not vary as a function of whether control and nullification conditions served as a baseline. However, it is notable that the direction of differences was counterintuitive – nullification having the weaker effect. At present, however, the evidence

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shows that creating a situation that is age stereotype ‘blind’ (control) is at least as effective as one that directly confronts age stereotypes (nullification) as a way to minimise ABST.

Age and Gender

Some previous research (Hess & Hinson, 2006; Hess, Hinson, & Hodges, 2009) suggests that ABST would have stronger effects at the start than later in old age, due to the initially increased salience and significance of stereotypes of ageing. Alternatively, the relevance of ABST might simply increase with age. Although both possibilities seem plausible, the present analysis is the first to test these possibilities meta-analytically, and revealed there were no effects of participant’s age. Moreover, although older women were expected to experience greater ABST effects due to their potential to identify with two negatively stereotyped ‘threatened’ groups, there was no support for that hypothesis either. As discussed below, these ‘null’ findings do not rule out the possibility that age and gender moderate ABST, but they confirm that such moderation does not arise within the age range of the available studies.

A number of other sample characteristics could plausibly affect ABST. For example, these might include level of education or the physical and psychological health of participants. Further, individual difference variables such as, psychological age, stigma consciousness (Hess, Hinson, & Hodges, 2009; Kang & Chasteen, 2009), domain identification (Hess, Hinson, & Hodges, 2009; Joannisse et al., 2012) and self-efficacy (Andreoletti & Lachman, 2004; Desrichard & Kopetz, 2005) may be relevant as moderators. Unfortunately, an insufficient number of available studies included measures of these variables to allow meaningful comparisons of effect sizes. Thus, further research is required to explore their implications.

Regional differences

ABST effect sizes were larger in studies conducted in Europe than for those conducted in North America. However, this difference in effect sizes based on study region was not apparent when looking at effect sizes published in North American Journals only. ABST effect sizes from studies published in European journals were found to be larger than those published in North American journals. This fact remained when looking at studies conducted in Europe alone. Thus, either through authors' self-selection or through editorial process there is a higher effect size threshold for ABST evidence published in European journals than in North American journals. It remains to be seen whether this difference is maintained when accounting for possible differences in journal characteristics such as the impact factor and the nature of the journal (e.g., specialist or general, social or health sciences). It also remains to be seen whether there is a true cultural difference in ABST. As yet, no direct comparison between these two geographical locations or others has been made within the same study. Yet it is known that age stereotyping does differ across cultures (Levy, Ashman, & Slade, 2009), and even within Europe (Abrams et al., 2011). Therefore future research will need to address the question of regional and cultural differences in ABST more directly.

Comparison of Stereotype Threats

The ABST effect of .28 in the current meta-analysis is in line with Nguyen and Ryan's (2008) findings for gender ($d = .21$) and race/ethnicity ($d = .32$). Yet, Nadler and Clarke's (2011) meta-analysis found larger effects among African Americans ($d = .47$), and Hispanic Americans ($d = .58$), as did Walton and Spencer (2009) when combining effect sizes for both women and ethnic minorities ($d = .48$). However, age and gender are not numerical minorities and they also cross-cut other category memberships. Therefore, lower

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average effect sizes may mask important variation due to other group memberships within levels of gender or age.

No effects of control versus nullification baselines on ABST were found, however, gender-based stereotype threat effects are greater when compared with nullification baselines, and ethnicity-based stereotype threat effects are greater when compared to control baselines (Nguyen & Ryan, 2008). These differences reinforce the point that differences in group characteristics can lead to differences in the experience of stereotype threat (Shapiro, 2011).

Three of the four previous stereotype threat meta-analyses discussed in this paper included unpublished research (Nadler & Clarke, 2011; Nguyen & Ryan, 2008; Walton & Spencer, 2009). Given the publication bias revealed in the present meta-analysis—whereby inclusion of unpublished research reduced the ABST effect size from .42 to .28—it is important that future meta-analyses also include unpublished research and that when scientific methods are rigorously adhered to, both smaller and larger effects justify publication.

Limitations and Recommendations for Future Research

This meta-analysis was limited to work with the ABST research that has been conducted to-date. This limited the scope of the meta-analysis in a number of ways. First, results should be viewed within the context in which they arose, formal test settings. While inferences can be made as to the implications of these findings for older people in everyday settings (e.g., in the workplace or when volunteering or playing sport), these everyday settings have not actually been tested.

Second, many would critique the conclusion that these studies provide evidence for ‘stereotype threat’ effects specifically as ‘threat’ itself was not considered as an outcome within this meta-analysis. This is due to the difficulty with measuring this abstract ‘threat’ both implicitly and explicitly (as noted in the theoretical chapters). It is unclear whether

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stereotype threat effects are being experienced rather than direct stereotype priming (Bargh & Pietromonaco, 1982). Exploration of interventions to ameliorate stereotype threat effects may be both practically beneficial and also illuminate its proposed mechanisms. For example, both intergenerational contact and imagined intergenerational contact have been found to moderate the effects of stereotype threat (Abrams et al., 2006; 2008). This appears to work through familiar mechanisms of intergroup contact (Pettigrew, 1998), which can counteract stereotypes and mean that intergroup comparisons do not give rise to anxiety. Future ABST research should focus on exploring these and other social processes that can off-set potential ABST in test contexts.

Recent evidence suggests that stereotype threat (e.g., Seibt & Förster, 2004) and more specifically, ABST (Barber & Mather, 2013a; 2013b; Hess, Emery, & Queen, 2009; Popham & Hess, 2013) may elicit a ‘prevention’ focus (Higgins, 1999), whereby the individual aims not to perform poorly (as opposed to striving to perform well). It seems possible that this effect may depend on how performance is measured. For example, under time constraint and based on hit rate, performance scores for free recall of word lists may be poorer for those with a prevention focus. In contrast, those with a prevention focus may do better if the testing context permits more time or opportunities for error correction. Consistent with this idea, tasks that draw on experience or knowledge appear to offer a basis for stereotype boost (performance enhancement) among older people (Swift et al., 2013).

Later Published Articles

Since the completion of the meta-analysis, an additional four relevant ABST articles have been published (Barber & Mather, 2013a; 2013b; Chapman, Sargent-Cox, Horswill, & Anstey, 2014; Eich, Murayama, Castel, & Knowlton, 2014). Further, the included article by Popham and Hess (in press) has been published. Both Barber and Mather (2013a; 2013b), and Eich, Murayama, Castel and Knowlton (2014), found that fact-based manipulations of ABST

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negatively impacted the explicit memory performance of older adults, but only in specific contexts. Barber and Mather (2013a; 2013b) found that regulatory focus moderated ABST effects, and Eich et al. (2014) only showed ABST effects among the early ageing group, aged 53-74 (compared to the later ageing group aged 75 to 98). Once again, research is suggesting that early older-aged adults are most vulnerable to ABST effects. These additional publications suggest that presenting factual differences between the performance of young and older people should not be discounted as a possible threat to older adults. However, it may be the case that ABST effects when using fact-based manipulations are less resilient in the face of moderating factors (such as average age of participants and task reward structure) than ABST effects following stereotype-based manipulations.

Included in the meta-analysis, Joannis et al. (2012) and Lambert (2012) both used fact-based manipulations of ABST, measured simulated driving, and found that their stereotype threat manipulations negatively impacted driving outcomes. Newly published, Chapman, Sargent-Cox, Horswill and Anstey (2014) also modelled their stereotype threat manipulation on the fact-based manipulations of Hess et al. (2003). Instead they measured hazard perception using a computer-based test, finding that driving confidence was lower in the stereotype threat condition compared to the nullification condition, but test performance was not. As was demonstrated through the meta-analysis, ABST effects may differ between different tasks, requiring different skill sets. This is the first test of ABST to use touch-screen technology with older participants, potentially posing a barrier or threat to all participants irrespective of condition.

Additionally, Eich et al. (2014) were unable to find any effect of ABST when measuring implicit memory. Contrary to the widely used tests of explicit memory in ABST studies (which requires conscious recollection of information), implicit memory tests do not test conscious recollection of events, but looks at how information that was encountered

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previously facilitates performance. The authors conclude that ABST can affect controlled retrieval of information which requires greater cognitive resources, but is less likely to impair implicit memory that utilises more automatic processes.

Conclusions

This article has provided the first comprehensive review, meta-analysis and evaluation of ABST research. There is clear evidence that older adults' memory ($d = .21$) and cognitive performance ($d = .68$) is negatively affected by ABST, and that these effects persist across gender and age groups (within later life). Moreover, it was established that vulnerability is greater when threat is induced by stereotypes ($d = .52$) rather than by 'facts' ($d = .09$), and when the dependent variable is more proximal to the manipulation. Surprisingly, ABST was reduced at least as much by simply not invoking stereotypes (control) as by directly informing people that stereotypes are incorrect (nullification). The analysis also revealed a publication bias ($d = .42$), and an intriguing regional difference between effect sizes published in European journals ($d = .94$) and North American ($d = .30$). Overall, this analysis helps to complete the picture of stereotype threat effects across the major social categories of gender, ethnicity, and now age. It also highlights that ABST is a significant problem confronting older people and that it will be valuable to explore ways to lift that burden. Further research is required to establish the extent of ABST, for example, in domains that require more vs. less working memory, and in less studied performance domains such as physical strength or driving. The bias against publishing non-significant findings demonstrated through this meta-analysis highlights the importance of including unpublished research within future meta-analyses of stereotype threat.

CHAPTER 7 –THE STEROTYPING UNCERTAINTY HYPOTHESIS

This chapter examines explanations for the apparent strength of stereotype-based or more subtle stereotype threat manipulations (Lamont, Swift, & Abrams, 2015; Nguyen & Ryan, 2008), proposing Stereotyping Uncertainty (SU) as a possible explanation. The SU hypothesis states that among stigmatised groups, uncertainty and ambiguity surrounding stereotype-based judgement may increase the likelihood of experiencing negative stereotype threat effects; this is due to the burden of uncertainty on cognitive resources. The current study tested the maths performance of 206 participants (47.6% male, $M_{age} = 33.51$, $SD_{age} = 11.39$), an area in which gender-based stereotype threat (GBST) effects among women are well established. Two conditions made it more or less clear that negative gender-based judgements were being made (blatant and subtle threat conditions), compared to a control and stereotype nullification condition. Among women, no differences in maths performance, working memory capacity, perceived gender-based judgement or SU were found between the experimental conditions and the control and nullification conditions. However, stereotype boost effects were found whereby women (irrespective of condition) who perceived greater gender-based judgement, also did better on the maths test. The high educational attainment and task motivation of the female sample are considered as explanations for this boost effect. Unexpectedly, men showed worse maths performance in the blatant threat condition, and when self-reported threat and uncertainty were high, replicating previous findings that positive stereotypes can cause ‘choking under pressure’. Overall, the study was unable to replicate previous GBST findings or provide support for the SU hypothesis.

Study 3. A Test of the Stereotyping Uncertainty Hypothesis

This chapter builds upon the meta-analysis findings that more subtle stereotype-based manipulations of age-based stereotype threat (ABST) amount to stronger stereotype threat

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effects than more blatant fact-based manipulations (Lamont et al., 2015), and proposes that this may be based upon the burden of uncertainty (Heine, Prolx & Vohs, 2006; Schmader, Johns & Forbes, 2008). In the *Stereotyping Uncertainty* (SU) hypothesis, it is proposed that the level of uncertainty and ambiguity surrounding stereotype-based judgement may moderate stereotype threat effects, whereby increased uncertainty accentuates negative outcomes. The current study sought to test this SU hypothesis.

Greater Effect of Stereotype-Based Manipulations

The ABST meta-analysis categorised manipulations based on whether they contained factual-statements of age-based differences in ability, or relied on threatening stereotypes about ability in later life. The meta-analysis found significantly greater ABST effects on performance when using stereotype-based manipulations ($d = .52$), compared to fact-based ($d = .09$).

Theoretical Explanations

Research has shown that ideomotor effects can result from implicit stereotype priming, whereby the activation of a stereotypic mental representation has a direct effect on behaviour, eliciting behavioural assimilation to the stereotype (Banaji, Hardin, & Rothman, 1993; Dijksterhuis & Bargh, 2000 for review). This type of stereotype assimilation has been found to occur when activating stereotypes without individuals' awareness (e.g., subliminally or through other forms of priming such as sentence-unscrambling tasks). Nguyen and Ryan (2008) use ideomotor effects as a possible explanation for the greater impact of more subtle gender-based stereotype threat (GBST) manipulations on performance outcomes. They suggest that those who receive subtle stereotype threat manipulations may lack awareness of stereotyping and therefore, assimilation to gender stereotypes is due to ideomotor effects.

Stereotype threat and stereotype priming are foundationally different. The latter is solely reliant on the mental activation and increased accessibility of stereotype-relevant

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schemas (whether self-stereotypes or other stereotypes, positive or negative). Whereas, stereotype threat effects rely on the individual feeling a heightened threat in a performance setting due to awareness that negative stereotypes could be applied to them. This may not be something individuals can clearly articulate, as with many emotions and motivations, but is nonetheless a distinct and more emotive mechanism than that of ideomotor effects. Therefore, adopting Nguyen and Ryan's (2008) account of subtle forms of stereotype threat would largely explain away stereotype threat effects as just automatic effects bypassing consciousness (Wheeler & Petty, 2001). Here instead an alternative explanation for why more subtle manipulations of ABST might have a greater impact on performance outcomes is offered, making use of motivation-based factors (Wheeler & Petty, 2001).

A second suggestion is that some stereotype cues are explicit enough to highlight that stereotypes may be relevant to the performance context, but subtle enough that individuals cannot be sure of the expectations being placed on them (Nguyen & Ryan, 2008). This ambiguity is hypothesised to increase the negative impact of stereotypes on performance, as outlined in a new hypothesis that will be described as the *Stereotyping Uncertainty (SU) hypothesis*.

The Stereotyping Uncertainty Hypothesis

Different stereotype threat manipulations provide different degrees of certainty that performance is being judged based on a stigmatised identity. Explicit or fact-based manipulations often provide greater certainty and outline specific stereotype-based expectations e.g., women typically do worse than men on this task. The SU hypothesis suggests that uncertainty about stereotype-based judgements will be more detrimental to performance in the stereotyped domain than absolute certainty that stereotype-based judgement is occurring and that expectations of one's group are negative. Put simply, those that are sure they will be judged based on negative stereotypes can take action to deal with

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their predicament. Those that have perceived some level of stereotype-relevance, but are not sure if stereotype-based judgement will occur, or the exact nature of expectations may be less able to formulate a plan for success in the stereotyped domain. Uncertainty acts as an additional situational demand.

The Experience of Uncertainty

It is well documented that humans are averse to and react negatively to uncertainty, as certainty allows us to predict and control our environment (e.g., Hirsh, Marr & Peterson, 2012; Hogg, 2000). The Entropy Model of Uncertainty (EMU; Hirsh et al., 2012) draws together a wide range of literature on the topic of dealing with uncertainty and disorder within our environment, transferring it to a model of behavioural uncertainty. The model hypothesises that *“As a system’s disorder and uncertainty increase, its ability to perform useful work is hampered by reduced accuracy in specifying the current state, the desired state, and the appropriate response for transforming the former into the latter.”* (Hirsh et al., 2012, p305). Likewise, being unsure of stereotype-based judgements means that there is uncertainty around the characteristics of the situation and so the behavioural affordance that it requires.

The Biopsychosocial model of challenge and threat states (BPS) describes the experience of uncertainty as a key situational ‘demand’ which increases the likelihood that a situation is perceived as a threat, rather than a challenge (Blascovich & Mendes, 2000). It is generally recognised within the psychology literature that uncertainty regarding the self is particularly threatening (e.g., Gao & Gudykunst, 1990; Hogg, Adelman & Blagg, 2010; Mendes, Blascovich, Hunter, Lickel, & Jost, 2007). The EMU proposes that when uncertainty becomes a threat to the individual and disrupts ‘higher-order goals’ (e.g., achieving meaning in life as opposed to lower-order goals that come under this, such as getting a job), this poses the greatest threat. Uncertainty surrounding stereotype-based judgements can be considered

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as higher-order and relevant to the self and therefore poses a threat to not only one's positive view of the self (Steele & Aronson, 1995), but also certainty about the self (Hogg, 2000; 2007).

Outcomes of Stereotyping Uncertainty

But how might SU negatively impact performance outcomes? It is proposed that the SU hypothesis fits within the current literature on mediators of stereotype threat, but uniquely accounts for the increased demands of more subtle cues to negative stereotypes. As outlined in the Integrated Process Model (IPM; Schmader et al., 2008), stereotype threat is expected to increase the experience of task-related anxiety, inefficient cardiovascular response, increased performance monitoring and ultimately reduce working memory capacity. In line with the proposed mediators of the IPM and consistent with the BPS model of challenge and threat states (Blascovich & Mendes, 2001) and EMU (Hirsh et al., 2012), it is argued that SU will further increase demands on working memory capacity. Varying uncertainty about stereotype-based judgement could account for inconsistent support for these mediators as found throughout the literature (Smith, 2004).

Fact-Based Manipulations and Stereotype Reactance

Drawing upon the idea of stereotype reactance (Brehm, 1966; Kray, Thompson, & Galinsky, 2001), research has shown that when negative stereotypes are explicitly highlighted, people respond by acting in a way counter to the stereotype. Kray, Thompson and Galinsky (2001) introduced a negotiation task by saying it was either, 1) diagnostic of ability and benefitted from rationality and assertiveness (traits typically associated with men), or, 2) additionally stated that these personality characteristics tend to vary across gender, between men and women. Negotiation performance (the sale price of a product being negotiated) was worse among men than women who received the second more explicit introduction, but no different when the first introduction was used. This improved

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performance was linked to the boldness with which women in the second scenario put forward their opening offers, as predicted by stereotype reactance. Findings from stereotype reactance research are in line with the predictions of the SU hypothesis. More blatant stereotype threat manipulations, particularly those using factual statements (e.g., ‘personality characteristics tend to vary across gender’) permit stereotype reactance.

Stereotype-Based Manipulations and Stereotyping Uncertainty

On the other hand, subtle stereotype-based manipulations may state that a test is ‘diagnostic of ability’ (Steele & Aronson, 1995), that the test is comparing the performance of the stereotyped target group and their outgroup (Swift et al., 2012), that it requires the skills ‘x, x, and x...’ using examples that the target group are stereotyped as lacking (Popham & Hess, 2013; Kray et al., 2001), or by placing an outgroup member in the performance context (e.g., white or male experimenter; Marx & Goff, 2005; Stone & McWhinnie, 2008). In none of these situations is the content of stereotypes explicitly outlined or facts about differences in performance made clear. However, it is clear that stereotype-based judgement is possible and made more likely due to these situational cues. The uncertainty of this context is expected to increase the likelihood of stereotype threat effects, as predicted by the SU hypothesis.

Stereotyping Uncertainty and Gender-Based Stereotype Threat

In the current study the SU hypothesis is tested using manipulations of GBST. This was done for a number of reasons. First, the SU hypothesis is expected to be applicable to other stigmatised groups whom suffer more at the hands of subtle stereotype-based manipulations of stereotype threat. Similar to the ABST meta-analysis, Nguyen and Ryan (2008) meta-analysed effect sizes from gender and race/ethnicity-based stereotype threat studies. Manipulations were categorised as either ‘blatant’, ‘moderately explicit’ or ‘indirect/subtle’, rather than stereotype or fact-based. Based on the information given in the

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paper, it can be gathered that all subtle manipulations fit within the stereotype-based category, while blatant manipulations are most likely to be fact-based (moderately explicit manipulations may be either stereotype or fact-based). Although the comparison across the types of stereotype threat is limited by different criteria for categorisation, GBST findings appear to be most in line with the ABST meta-analysis. Subtle manipulations of GBST produced the largest effect size ($d = .24$), then moderately explicit ($d = .18$), followed by blatant ($d = .17$). Instead, moderately explicit manipulations of race/ethnicity-based stereotype threat (RBST) produced the largest effect size ($d = .64$), then blatant ($d = .41$), followed by subtle ($d = .22$). Higher effect sizes for RBST are consistent with Nadler and Clarke (2011).

Secondly, the SU hypothesis is linked to working memory processes (Schmader, Johns, & Forbes, 2008) as SU is expected to place an additional burden on test-takers, depleting their cognitive resources for test completion. Taking heed of suggestions that working memory processes take a more central role in stereotype threat effects among younger adults (Barber & Mather, 2013a; Popham & Hess, 2013), it was expected that stereotyping uncertainty effects would be even more evident when tested in the instance of GBST. Finally, given that this theory is in its infancy, it was deemed less resource intensive to test GBST than ABST.

The Current Study

The aim of the current study was to test the SU hypothesis for the first time in the context of GBST. Negative GBST effects on maths performance have been widely found using many variations in manipulation type and showing stronger GBST for more subtle manipulations, as with ABST (Nguyen & Ryan, 2008). The first test of the SU hypothesis was therefore based on stereotypes that maths prowess and careers in the area of maths are incongruent with the female identity (Diekman, Brown, Johnston, & Clarke, 2010). This

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study asked both men and women to complete a maths test having been given different introductions to the test. These introductions aimed to vary the extent to which women could be sure of negative gender-based stereotyping on the part of the experimenter. The study was either posed as looking at gender differences in maths performance (subtle threat condition), as examining whether stereotypes of women (blatant threat condition) or men (nullification condition) as worse at maths are correct, or no introduction was given (control condition).

It was hypothesised that the maths performance and working memory capacity of female participants assigned to the subtle threat condition would be lower, and perceived gender-based judgement and SU higher, compared to the control and nullification conditions. Based on the SU hypothesis it was hypothesised that the female participants assigned to the blatant threat condition would not show lower maths scores, working memory capacity or higher SU, but would show higher perceived gender-based judgement compared to the control and nullification conditions. In addition, perceived gender-based judgement and SU were expected to predict maths performance. Men were expected to show little variation in their reporting of perceived gender-based judgement and SU across conditions, and consequently little variation in performance outcomes.

Method

Sample and Design

Amazon's Mechanical Turk (MTurk) was used to collect the studies' 217 US-based participants. Ten univariate outliers scoring more than three standard deviations below the mean on the performance measures were found (examining maths performance, reading span performance and reading span sentence judgements). Such low scores suggest lack of engagement or effort. Multivariate outlier analyses using Mahalanobis distance confirmed seven of these and revealed one further outlier on self-report measures. Analyses from here on exclude these outliers and so, $N = 206$ (47.6% male, $M_{age} = 33.51$, $SD_{age} = 11.39$).

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Participants were randomly assigned to one of three introductory paragraphs or a control condition (with no introduction), but otherwise were taken through the same study (Table 7.1). Sample size per condition was comparable to that used in many previous GBST studies, as reviewed by Nguyen and Ryan (2008).

Table 7.1

Distribution of Random Assignment to Stereotype Threat Condition Split by Gender

	Nullification	Control	Subtle threat	Blatant threat	Total
Male	22	27	24	25	98
Female	24	34	23	27	108
Total	46	61	47	52	206

Procedure

It was explained to MTurk participants that “In this ‘math assessment’ we are developing a new set of mathematical problems for use in future research”. Participants gave their consent to participate and created a unique participant code which involved indicating their gender. Participants answered pre-manipulation domain identification questions, were presented with one of the four manipulations (embedded in ‘study aims’) and were then given instructions for the completion of the maths assessment. Participants were told that there would be 15 questions and 15 minutes to complete them in any order and without the use of a calculator. The maths assessment page automatically timed out after 15 minutes. A reading span test immediately followed the maths assessment and then the post-task questionnaire was delivered including measures of perceived gender-based judgement, SU, anxiety, self-uncertainty and task motivation, a manipulation check and demographic questions. Participants were debriefed in writing upon completion and it was made clear that the reported ‘views of academics’ were fictional and should not be considered accurate.

Experimental Manipulations

Experimental manipulations were presented in the ‘Study Aims’ and participants were informed that they would be questioned on these later in the study as the study attention check (such attention checks are common place in MTurk studies). Although previous stereotype threat manipulations have often used factual information to present a threat (e.g., ‘gender differences in maths performance have been found’ or ‘women have shown to be worse than men’), in this study, only stereotype-based manipulations were used. This type of manipulation is arguably more in line with the theory of stereotype threat, allowing a more accurate measurement of stereotype threat effects (as suggested in Lamont et al., 2015). These introductions aimed to present negative gender-based judgement to varying degrees, enabling the SU hypothesis to be tested, and to do this at a conscious level so that test results are unlikely to be accounted to stereotype priming. One of four manipulations were presented (through Qualtrics’ randomisation function); Subtle Threat, Blatant Threat, Nullification or Control.

In the ‘*Control*’ condition, no ‘study aims’ were presented to participants prior to the maths assessment. Participants in all three experimental conditions were initially told that: “The math problems in this study are designed to evaluate the likelihood of an individual’s success in a mathematical field.” The ‘*Subtle Threat*’ manipulation then stated:

“Specifically, this study is examining the differences between men and women in this test. As you may know already, there has been some controversy over whether there are gender differences in math ability. We would like to explore this using a new type of test.”

The subtle threat manipulation did not state the direction of stereotyped gender differences and so is in line with many of the previously used manipulations within GBST literature (e.g., Brown & Pinel, 2003; Cadinu, Maass, Rosabianca & Kiesner, 2005; Elizaga

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& Markman, 2008; Ford, Ferguson, Brooks & Hagadone, 2004; Keller & Dauenheimer, 2003; Lesko & Corpus, 2006; O'Brien & Crandall, 2003; Schmader & Johns, 2003).

Conversely, in the '*Blatant Threat*' condition, the stereotypical direction of this gender comparison was stated. Again, in line with many previously used GBST manipulations (e.g., Cadinu, Maass, Frigerio, Impagliazzo & Latinotti, 2003; Keller, 2002; Keller & Bless, 2008; McIntyre, Paulson & Lord, 2003; Rydell, McConnell & Beilock, 2009; Rydell, Rydell & Boucher, 2010; Schmader & Johns, 2003; Smith & White, 2002; Weger, Hooper, Meier & Hoptrow, 2012):

"Specifically, this study is examining the differences between men and women in this test. As you may know already, there has been some controversy over whether there are gender differences in math ability. A recent survey found that over 90% of the academic staff from several Universities believed that men outperform women in mathematics. This pattern of answers was not affected by respondents' subject area, gender or age. We would like to explore the accuracy of these perceptions using a new type of test."

The '*Nullification*' manipulation aimed to nullify any worries that participants might have about stereotype-based judgement by suggesting that stereotypes are now in favour of women:

"Specifically, this study is examining the differences between men and women in this test. As you may know already, there has been some controversy over whether there are gender differences in math ability. A recent survey found that over 90% of the academic staff from several Universities believed that women outperform men in mathematics. This pattern of answers was not affected by respondents' subject area, gender or age. We would like to explore the accuracy of these perceptions using a new type of test."

Measures

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Domain identification. Domain identification was measured before participants read the manipulation using two statements (“I think that I am good at tasks that require the use of maths” and “It is very important to me that I am good at maths”). These items were highly correlated ($r = .68, p < .001; \alpha = .76$) and so combined (mean score) to form an aggregate domain identification score (items taken from Lesko & Corpus, 2006; 7-point scales from 1 = *strongly disagree*, to 7 = *strongly agree*). Higher scores indicate greater identification with maths.

Maths assessment. Fifteen maths problems were taken from practice tests for numerical reasoning, seen as typical of psychometric tests used within employment settings (Walmsley, 2008). Problems were a mixture of free-response and multiple choice questions and covered the areas of arithmetic, percentages/fractions, number sequences and contextual mathematical problems. Overall scores were calculated by giving one point for each question answered correctly (scores ranging from 0-15).

Working memory capacity. To measure working memory capacity immediately after the maths assessment, an automated reading span task was created (Unsworth, Heitz, Schrock & Engle, 2005). This task was chosen over an operation span tasks because of fears that it would seem too similar to a maths test (and so within the remit of negative stereotypes about women). Using this test of working memory capacity the testhoped to identify cognitive depletion following the maths assessment. Reading span tasks have been widely used as a measure of working memory (e.g., Conway et al., 2005; Daneman & Carpenter, 1980) and variations of the reading span task have been used since its creation by Daneman and Carpenter (1980). In this study a version resembling that of Kane and colleagues’ (2004) was used in a shortened and automated form.

In each trial, participants were presented with a sentence which they had to judge as ‘sensical’ (e.g., ‘The new radio in the office was so good that they never got any work done’)

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or 'non-sensical' (e.g., 'The new radio in the office was so good that they never got any word done'); and were then shown a 'to be remembered' consonant (displayed for two seconds). This sequence would happen anything between three and seven times before they were asked to recall the letters presented in that trial. There was a practice trial (with just three letters) and then five further trials (one trial of each size). Sentences ranged from 10 to 14 words ($M_{\text{length}} = 11.96$) and were made non-sensical by changing just one word in a sensical version of the sentence. Thirteen non-sensical and twelve sensical sentences were used.

Of interest was the number of letters recalled correctly, and absolute scores were created for each individual (as explained by Conway, Cowan, Bunting, Therriault & Minkoff, 2002) as well as basic scores of letters recalled correctly. Absolute scores give credit only to those trials in which all letters were recalled correctly e.g., if a trial of length '6' was recalled correctly, 6 points would be given. If only five or three of the letters were recalled, zero points would be given. A percentage score for correct sentence judgement inaccuracy was also created (as in Unsworth et al., 2005). The following measures were all included as part of the post-assessment questionnaire.

Perceived gender-based judgement. Previous research has measured 'stereotype threat' through agreement with five statements asking about gender-based judgement in a particular domain. This measure was also used in the present study (7-point scale from 1 = *not at all*, to 7 = *very much*; Chasteen, Bhattacharyya, Horhota, Tam, & Hasher, 2005; Steele & Aronson, 1995). The item, "The test may have been easier for people of my gender", usually included in this scale was not included as it is more indicative of stereotype endorsement than perceived gender-based judgement. Items included were "Based on my gender, people often underestimate my maths abilities", "I was expected to do poorly in this experiment because of my gender", "In maths-related tasks, people often face biased evaluations based on gender", "Some people feel I have less maths ability because of my

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gender” and “My gender does not affect people’s perceptions of my maths capabilities”. Aggregated (mean score with the last item reverse-scored), these items formed a reliable measure (Cronbach’s $\alpha = .87$). Higher scores indicate greater perceived gender-based judgement.

Stereotyping uncertainty. Using the same 7-point scale, participants were asked to indicate how certain they were about the response they had given for each of the five gender-based judgement items, e.g., how certain they were of the rating they gave for “My gender does not affect people’s perceptions of my maths capabilities” (as in Reid & Hogg, 2005). All responses were reverse scored and an overall mean SU score was computed (Cronbach’s $\alpha = .85$), whereby higher scores show greater uncertainty. However, it must be remembered when looking at results that an overall certainty score of seven could indicate both certainty that gender-based judgement is occurring, or that it is not.

Anxiety. Based on a measure used by Osborne (2001), participants rated to what extent they felt each of the following whilst carrying out the maths assessment: Tense, Under pressure, Under strain, Nervous, Jittery, Uneasy, Calm, Afraid of not doing well and Uncomfortable. A 5-point scale was used (as in Ford, Ferguson, Brooks & Hagadone, 2004; 1 = *very slightly or not at all*, 2 = *a little*, 3 = *moderately*, 4 = *quite a bit*, 5 = *extremely*). Cronbach’s alpha for these nine items (after reverse scoring ‘calm’) was .93 and an aggregate (mean) anxiety score was computed with higher scores indicating greater anxiety.

Self-uncertainty. Using the question “How uncertain did this task make you feel about yourself?” (taken from Hogg, Meehan & Farquharson, 2010; 7-point scales from 1 = *strongly disagree*, to 7 = *strongly agree*), feelings of self-uncertainty were assessed. As opposed to measuring uncertainty about gender stereotyping, this question assesses feelings of uncertainty about oneself as a possible outcome of experiencing SU.

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Task motivation. Items assessing motivation to do well (“I wanted to do well in the maths problems just given to me”) and participant effort (“I put a lot of effort into the maths problems”); both from 1 = *strongly disagree*, to 7 = *strongly agree*) were strongly correlated ($r = .71, p < .001$). An overall measure of task motivation was formed from the mean of these two items with higher scores indicating greater task motivation.

Manipulation check. A fairly strict test of recall of the study aims was carried out whereby participants were first asked to recall if the studies aims were to look at; a) the effects of gender on math performance; b) the effects of age on math performance or c) none of the above. If they responded ‘a’ to the above question, they were further questioned on the exact propositions given at the beginning. They read: “At the beginning of this study, the information was given that: A recent survey found that % of the academic staff from several Universities believed that men outperform women in mathematics. Please select from the responses below to either fill in the ‘...’ in this sentence or make it in-line with what you were told in the aims”, and were given the options: a) *Over 90%*; b) *Over 90% of the academic staff from several universities believed that women outperform men in mathematics (so the other way around)*; or c) *There was no mention of a ‘recent survey’*.

Demographics. Demographics taken included, employment status, gender (1 = male, 2 = female), age, race and the highest level at which they had studied maths (in any capacity). Employment status was turned into a dichotomous variable (0= *unemployed*, 1=*studying/working/volunteering*). Highest level of maths studied was converted into equivalent years based on the American system, with 0 = *never studied mathematics*, 5 = *elementary school (grades 1-5)*, 8 = *middle school (grades 6-8)*, 12 = *high school (grades 9-12)*, 16 = *Bachelors (typically 4 years)* and plus two for any additional postgraduate course including mathematics.

Results

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Preliminary Analyses

Univariate analyses of variance (ANOVA) were conducted to determine whether the random assignment of participants to condition had been successful. Analyses showed that there were no significant differences in age ($F(3, 202) = .17, p = .92, \eta_p^2 = .003$), maths experience ($F(3, 202) = .52, p = .67, \eta_p^2 = .01$) or domain identification ($F(3, 202) = .68, p = .57, \eta_p^2 = .01$) between conditions. In order to compare the effects of condition on men and women, similar baseline levels of domain identification, maths experience and age were expected for both sexes. ANOVA revealed that gender did not significantly predict age ($F(1, 204) = .23, p = .63, \eta_p^2 = .001$) or maths experience ($F(1, 204) = .01, p = .94, \eta_p^2 = .00$), but did however predict domain identification ($F(1, 204) = 4.47, p = .04, \eta_p^2 = .02$). Pairwise comparisons show higher baseline levels of domain identification among men ($M = 5.40; SE = .12$) than women ($M = 5.05; SE = .12$; mean difference = .36, $p = .04$). Having established that all variables other than domain identification were unrelated to condition and the gender of participants, correlational analyses were then conducted to check if these same variables were related to the proposed mediators and dependent variables.

Regression analyses with age, maths experience and domain identification entered as predictors showed that none of these variables significantly predicted reading span absolute scores or perceived gender-based judgement ($p > .05$). However, domain identification predicted overall maths scores ($\beta = .15; t(202) = 2.17, p = .03$) and SU ($\beta = -.16; t(202) = -2.30, p = .02$), showing that as domain identification increased, maths scores increased and SU decreased. Based on these findings, domain identification was covaried out of further analyses. Appendix C (Table C.1) shows correlations between the studies main variables.

Manipulation Check

It was found that 94.5% of participants in the experimental conditions got the first manipulation check correct, showing that participants recognised the study purpose was to

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look at gender differences in maths performance. Further, 78.3% of all participants correctly selected the exact wording they were given for the study aims from three options (this percentage showed little variation between conditions). These checks indicate that the majority of participants were receptive to the condition manipulations.

Stereotype Threat Effects on Maths Performance

It was first examined whether GBST effects were visible, as indicated by lower maths scores for women in the subtle threat condition than in both the control and nullification conditions. This same pattern was not expected to be significant for the blatant threat condition (when compared to the control and nullification conditions) and the performance of male participants was not expected to differ between conditions. A 2 (gender) x 4 (condition) between-participants analysis of covariance (ANCOVA) was conducted, whereby maths performance was the dependent variable and domain identification a covariate. Analyses yielded a marginal main effect of gender ($F(1, 197) = 2.82, p = .09, \eta_p^2 = .01$), a non-significant main effect of condition ($F(3, 197) = 1.08, p = .36, \eta_p^2 = .02$), and a significant interaction between gender and condition ($F(3, 197) = 2.75, p = .04, \eta_p^2 = .04$; see Figure 7.1).

Pairwise comparisons reveal that overall, men ($M = 10.43, SE = .26$) score marginally higher than women on the maths test ($M = 9.82, SE = .25$; mean difference = .62; $p = .09$). Simple main effects analyses further show that for women there are no significant differences in maths performance between conditions ($p > .05$). However, men show significantly worse performance in the blatant threat condition ($M = 9.13, SE = .52$) compared to the subtle threat condition ($M = 11.41, SE = .53$; mean difference = -2.27; $p = .002$), control condition ($M = 10.62, SE = .50$; mean difference = -1.48; $p = .04$) and marginally worse than the nullification condition ($M = 10.57, SE = .55$; mean difference = -1.44; $p = .06$). The data does not show worse performance among women in the subtle threat condition, but conversely shows that

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male participants in the blatant threat condition are underperforming compared to men in all other conditions.

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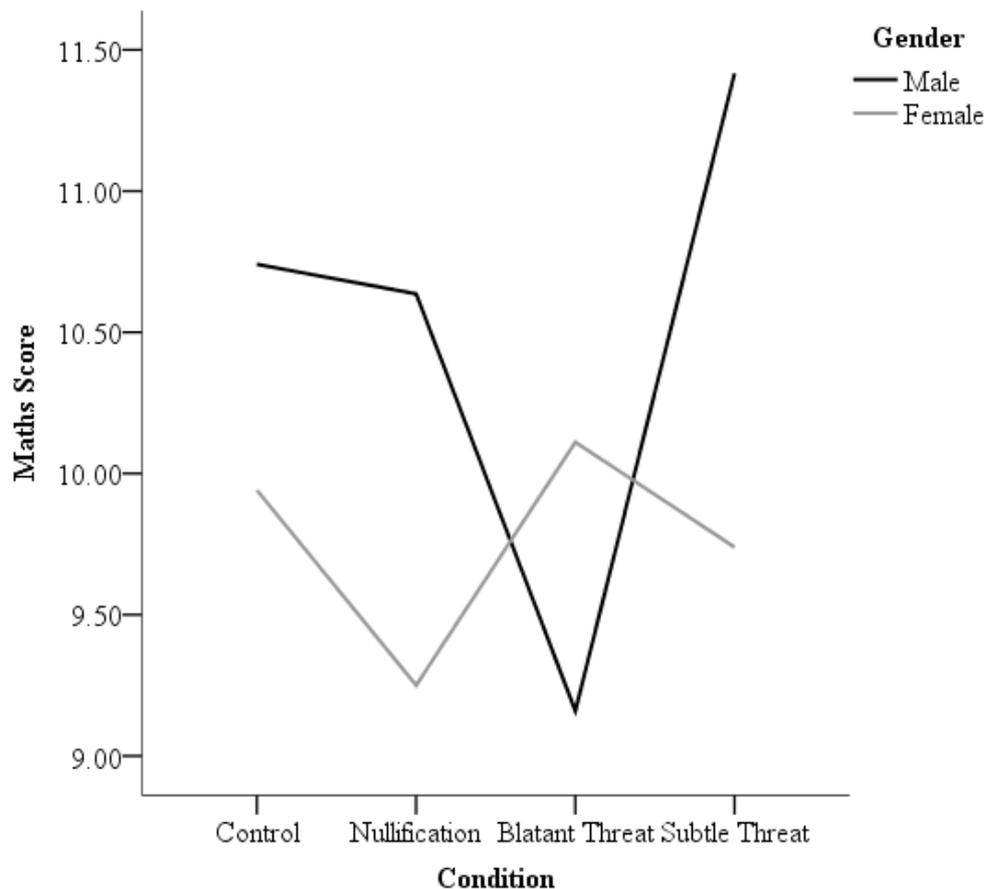


Figure 7.1. Effect of gender and stereotype threat condition on maths performance.

It is possible that the task was easy enough that women in the more threatening conditions could expend extra effort to deal with stereotype threat, preventing any decrements in performance. Therefore, time spent on the task, task motivation and post-task working memory capacity were examined as indicators of effort. A 2 (gender) x 4 (condition) between-participants multivariate analysis of covariance (MANCOVA) was conducted, whereby time spent on the maths test (out of the appointed 15 minutes), task motivation and working memory capacity were dependent variables and domain identification a covariate. Using Pillai's trace (Field, 2012), there was a significant effect of gender on the outcome variables ($V = .04$, $F(3, 195) = 2.69$, $p = .05$), but a non-significant effect of condition ($V = .07$, $F(9, 591) = 1.58$, $p = .12$) and their interaction ($V = .03$, $F(9,$

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591) = .55, $p = .84$). Separate univariate ANOVAs on the three outcome variables reveal a significant main effect of gender on task motivation ($F(1, 197) = 5.83, p = .02, \eta_p^2 = .03$), but not on working memory capacity ($F(1, 197) = 1.61, p = .21, \eta_p^2 = .01$) or time spent on the task ($F(1, 197) = .95, p = .33, \eta_p^2 = .01$). Pairwise comparisons reveal that women report significantly higher task motivation ($M = 6.32, SE = .09$) than men ($M = 6.00, SE = .09$; mean difference = .31, $p = .02$). It does not appear that condition altered task motivation or that working memory capacity was affected by condition among women. However, task motivation was generally more elevated for women across conditions.

Stereotype Threat Condition, Perceived Gender-Based Judgement and Stereotyping Uncertainty

In addition, the prediction of the SU hypothesis is that among women, perceived gender-based judgement would be highest in the blatant threat condition, whereas SU would be highest in the subtle threat condition. Men were expected to show little variation in their reporting of stereotype threat and stereotyping uncertainty between conditions. To test these predictions, a 2 (gender) x 4 (condition) between-participants MANCOVA was conducted, whereby perceived gender-based judgement and SU were dependent variables and domain identification a covariate. Using Pillai's trace, there was a significant effect of gender on the outcome variables ($V = .43, F(2, 196) = 73.89, p < .001$), a marginal effect of condition ($V = .06, F(6, 394) = 2.06, p = .06$) and a non-significant interaction ($V = .04, F(6, 394) = 1.37, p = .22$). Separate univariate ANOVAs on the two outcome variables reveal a significant main effect of gender on perceived gender-based judgement ($F(1, 197) = 127.41, p < .001, \eta_p^2 = .39$) and SU ($F(1, 197) = 36.65, p < .001, \eta_p^2 = .16$). Pairwise comparisons reveal that women perceive significantly higher gender-based judgement ($M = 3.97, SE = .17$) than men

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($M = 2.07$, $SE = .19$; mean difference = 1.90, $p < .001$), and report higher SU ($M = 2.90$, $SE = .13$) than men ($M = 1.94$, $SE = .15$; mean difference = .96, $p < .001$).

The planned analyses could not support the stereotype threat and SU hypotheses, which predicted that women in the subtle threat condition would be most likely to report high SU alongside gender-based judgement, and worse maths performance. In the data, women tended to show consistently lower maths performance, higher perceived gender-based judgement and SU than men, and higher task motivation, irrespective of condition. Unexpectedly, the condition manipulations did account for variation in maths performance among men. Male participants underperformed in the blatant threat condition compared to the other conditions.

Additional Test of the Stereotyping Uncertainty Hypothesis

In line with stereotype threat theory, only stereotype-based manipulations were included in this study (Lamont et al., 2015), excluding fact-based manipulations which are less in line with operationalisations of ‘stereotype threat’. Threat condition may therefore have failed to predict performance outcomes due to insufficient variation in perceived gender-based judgement and SU between conditions. Therefore, further analyses were conducted, independent of condition, to examine whether SU moderates the effects of perceived gender-based judgement on performance outcomes. Analyses were conducted using PROCESS (a macro for SPSS), and the procedures of Hayes (2012; 2013) were followed. The procedure specified 5000 bootstrap samples and 95% confidence intervals (CI). Bootstrap confidence intervals were used throughout to assess indirect effects. It is assumed that the sampling distribution of the statistic, and therefore the lower and upper 95% bootstrap CI, should be entirely above (or below) zero to be able to conclude that the indirect effect is positive (or negative).

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Moderators. First, a multiplicative moderation analysis (model 3; Hayes, 2012) tested whether gender (M) and SU (W) moderated the relationship between perceived gender-based judgement (X) and maths performance (Y; domain identification as a covariate). The model was significant ($F(8, 197) = 4.18, p < .001$), explaining 15% of the variance in maths scores. Gender ($B = 3.31, SE = 3.00, t = 1.10, p = .27$) was not, but perceived gender-based judgement ($B = 3.75, SE = 1.86, t = 2.01, p = .05$) and SU were ($B = 6.59, SE = 2.05, t = 3.22, p = .002$) significant independent predictors of maths performance, as was the covariate, domain identification ($B = .35, SE = .16, t = 2.22, p = .03$). There were also significant two-way interactions between perceived gender-based judgement and uncertainty ($B = -2.59, SE = .82, t = -3.17, p = .002$), gender and uncertainty ($B = -3.58, SE = 1.30, t = -2.74, p = .007$), and a three-way interaction between perceived gender-based judgement, gender and uncertainty ($B = 1.36, SE = .44, t = 3.06, p = .003$).

A second model, excluding gender, was conducted in PROCESS to examine the simple main effects underpinning the first two-way interaction (model 1; Hayes, 2012). It was examined whether SU (W) moderated the relationship between perceived gender-based judgement (X) and maths performance (Y; domain identification as a covariate). The model was no longer significant ($F(4, 201) = 2.02, p = .09; R^2 = .04$), neither were the main or interaction effects. A third model instead excluded perceived gender-based judgement to examine whether SU (W) moderated the relationship between gender (X) and maths performance (Y; domain identification as a covariate; model 1; Hayes, 2012). The model was not significant ($F(4, 201) = 2.02, p = .09; R^2 = .04$).

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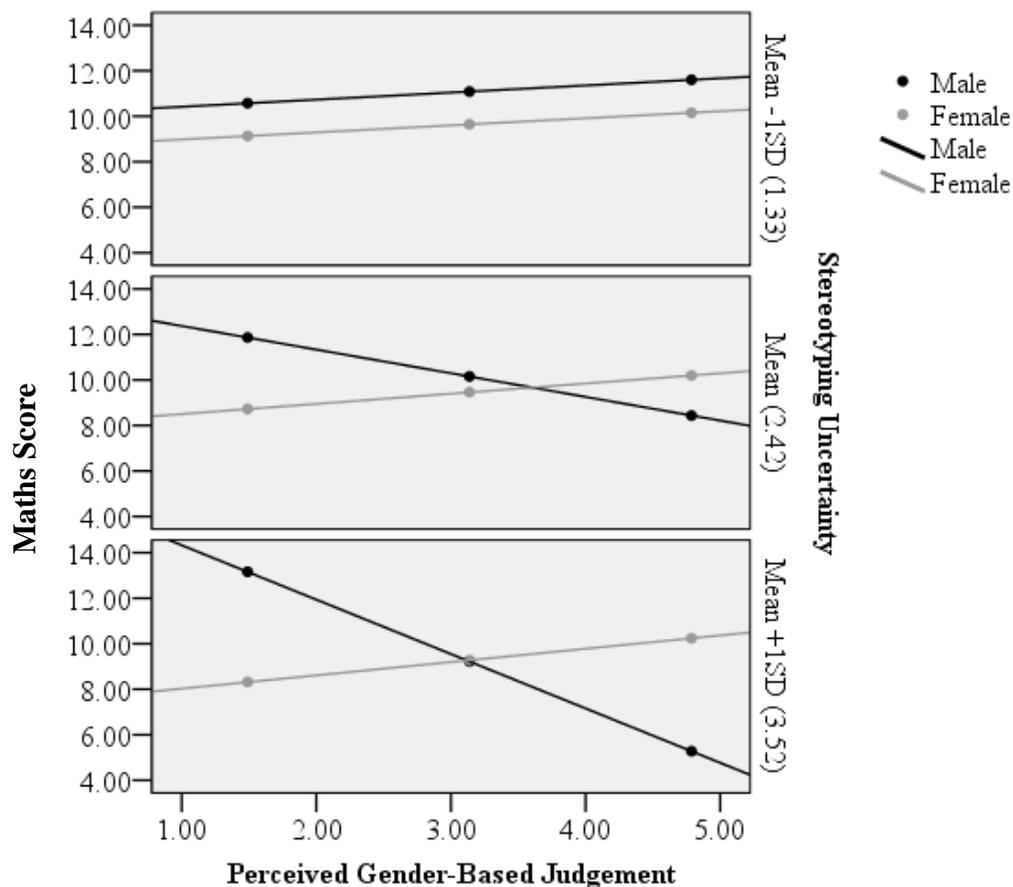


Figure 7.2. The effects of gender, perceived gender-based judgement and stereotyping uncertainty on participant maths scores.

Finally, the three-way interaction between perceived gender-based judgement, gender and uncertainty was examined. The Johnson-Newman technique was applied in PROCESS to examine the regions of significance of this interaction as recommended by Hayes (2012; Figure 7.2). The interaction between gender and perceived gender-based judgement transitions from significant to non-significant when uncertainty ratings go below 1.97 (possible scores ranged from 1 to 7). This shows that when participants were certain about gender-based judgement, neither gender nor level of perceived gender-based judgement predicted their maths score. However, the maths scores of participants with average or higher levels of uncertainty were moderated by their gender and level of perceived gender-based

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judgement. Specifically, among male participants with higher levels of SU, higher perceived gender-based judgement led to worse maths performance. These results show the predicted negative effects of high perceived gender-based judgement accompanied by high SU on maths performance, but for men as opposed to women.

Predictors of Men's Maths Performance

Mediators. Moderated mediation analyses (model 8; Hayes, 2012) tested whether the established relationship between gender-based judgement (X) and men's maths performance (Y), moderated by SU (W) was mediated by working memory capacity (M_1 ; domain identification as a covariate). Analyses show that the indirect pathway between perceived gender-based judgement and maths performance through working memory capacity was non-significant at low ($B = .002$, $SE = .12$, 95% CI [-.22, .27]), average ($B = .006$, $SE = .09$, 95% CI [-.18, .20]) and high levels of SU ($B = .01$, $SE = .12$, 95% CI [-.20, .33]). However, correlations indicate that self-uncertainty and anxiety are negatively associated with maths performance and both are plausible mediators between perceived gender-based judgement and performance outcomes. Therefore, the moderated mediation model was also conducted with self-uncertainty (M_2) and anxiety (M_3) as mediators.

Analyses show that the indirect pathway between perceived gender-based judgement and maths performance through self-uncertainty was again non-significant at low ($B = -.23$, $SE = .36$, 95% CI [-1.08, .39]), average ($B = -.26$, $SE = .22$, 95% CI [-.77, .12]) and high levels of SU ($B = -.28$, $SE = .34$, 95% CI [-1.09, .28]). Instead, the indirect pathway between perceived gender-based judgement and maths performance through anxiety was significant at high levels of SU ($B = -.31$, $SE = .19$, 95% CI [-.77, -.01]) and non-significant at low ($B = -.23$, $SE = .22$, 95% CI [-.78, .13]) and average levels ($B = -.27$, $SE = .17$, 95% CI [-.67, .01]).

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These findings suggest that at high levels of SU, perceived gender-based judgement negatively impacts men's maths performance through increased anxiety.

Blatant threat, anxiety and self-uncertainty. Given this finding, it was further hypothesised that men's underperformance in the blatant threat condition might be due to increased anxiety. To test this hypothesis, three dummy coded variables were created, comparing the blatant threat condition to each of the other three conditions. As reported earlier (within an ANOVA), when entered as predictors of maths performance in a regression, the three dummy variables are significant or marginal (Model 1, Table 7.2). When anxiety is included as a predictor in this model, it is significant and reduces the significance of the dummy variables as predictors of maths performance (Model 2; Table 7.2). This suggests that increased anxiety may account for men's depleted performance in the blatant threat condition.

Table 7.2

Regression Models Predicting Maths Scores

Dummy variable	Model 1	Model 2 (including anxiety; $t = -3.75; p = .00$)
Control vs. blatant threat	$t = 2.01 (p = .05)$	$t = 1.46 (p = .15)$
Nullification vs. blatant threat	$t = 1.79 (p = .08)$	$t = 1.53 (p = .13)$
Subtle threat vs. blatant threat	$t = 2.79 (p = .01)$	$t = 2.37 (p = .02)$

Predictors of Women's Maths Performance

To try and better understand what instead was predicting maths performance for women, correlations between maths performance and all other study variables were examined. Higher maths performance among women was associated with higher perceived gender-based judgement ($r = .30, p = .002$) and higher working memory capacity ($r = .26, p =$

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.007). Notably, this latter relationship is only marginal for men ($r = .18, p = .08$). Based on these correlations, perceived gender-based judgement and working memory capacity were expected to predict maths performance among women. A simple mediation model (model 4; Hayes, 2012) testing the indirect effect of perceived gender-based judgement (X) on maths performance (Y) through working memory capacity (M) and controlling for domain identification was significant for women ($B = .09, SE = .06, 95\% CI [.01, .24]$). This simple mediation unexpectedly shows that women reporting greater perceived gender-based judgement show better maths performance through higher working memory capacity (Figure 7.3). As a comparison, the same model was tested for men, but was non-significant ($p > .05$).

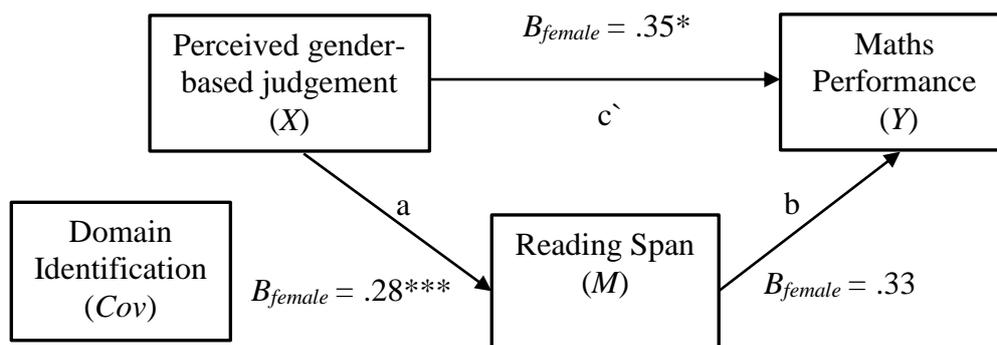


Figure 7.3 Mediation analysis, Hayes (2012) model 4. Note: * $p < .05$, ** $p < .01$, *** $p < .001$.

Discussion

The current study first hypothesised that female participants would experience stereotype threat effects on maths performance, replicating findings widely documented in the literature (Nguyen & Ryan, 2008). Based on the theoretical predictions of the SU hypothesis, the study also expected uncertainty around stereotyped judgements to moderate GBST effects on maths performance among women. The SU hypothesis suggests that greater

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uncertainty around stereotyping would predict worse performance outcomes and deplete working memory capacity. Male participants were also tested under the same conditions as a comparison group.

Female Stereotype Challenge

The study was unable to support these hypotheses. Women showed no variation in maths performance or other outcomes based on the condition they were randomly assigned to. A power analysis was conducted to explore whether the study had sufficient power to detect a typical effect of GBST. Nguyen and Ryan (2008) suggest that effect sizes for GBST may range from $d = .24$ ($F = .12$; for subtle manipulations) to $d = .17$ ($F = .09$; for moderately explicit manipulations). Using GPower it was calculated that the current sample size had insufficient power to detect the upper end (.27), and the lower end of these effect sizes (.16; see Appendix C for statistics). Therefore, the possibility that a small-to-medium effect of the subtle threat condition was present but the test failed to detect such an effect due to insufficient power cannot be ruled out.

Women did however show marginally lower maths scores and higher levels of perceived gender-based judgement, SU and task motivation than men, irrespective of condition. No differences in years of maths experience were found between men and women to account for performance differences. However, rather than concluding that women in the study were simply worse at maths, there have been suggestions within the stereotype threat literature that negative stereotypes are chronically accessible for some stigmatised groups in performance settings (von Hippel et al., 2005). It has also been repeatedly found that framing a performance task as diagnostic of ability can induce stereotype threat effects among women (e.g., Gonzales, Blanton, & Williams, 2002) or simply calling it a maths test (as opposed to a problem solving test etc.; e.g., Johns, Schmader, & Martens, 2005). Therefore, it is possible

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that our study introduction, given to participants in all conditions and describing the study as including a maths test, may have made gender-based judgement salient to female participants.

Although women overall report greater perceived gender-based judgement, higher levels of perceived gender-based judgement was actually found to predict better maths performance through higher working memory capacity. It should be noted that although the measure of perceived gender-based judgement has been used in previous research as a measure of ‘stereotype threat’ (Chasteen et al., 2005; Steele & Aronson, 1995), this is based on the assumption that the only plausible response to gender-based judgement is to feel threatened. However, none of the items explicitly measure feelings of threat. Therefore, in acknowledging gender-based judgement, women could be reacting to this as a threat, or instead as a challenge. The analyses suggest that this may be the case in the current study and in previous research showing stereotype challenge (or ‘boost’ as referred to here) effects among female engineers placed in stereotype threatening situations (Crisp, Bache, & Maitner, 2009).

One suggestion from Crisp, Bache and Maitner (2009) is that women may build up a kind of resilience to stereotype threat through repeated experience. The participants used in the current study may fit the profile of women more likely to experience a stereotype challenge as opposed to a stereotype threat. It is likely that the participants face frequent comparisons with both male and female task takers due to their frequent use of Amazon’s Mechanical Turk. Female participants also appeared to be highly identified with the domain ($M = 5.04$, $SD = 1.32$) and highly educated, having an average of 14.77 years of education ($SD = 2.14$), equivalent to degree level. Finally, they were self-selecting and chose to participate in this particular task based on its description as a ‘maths assessment’. All of these factors may have led to stereotype challenge effects among women who were motivated by

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perceived gender-based judgement. The test may have also provided an optimal environment for stereotype challenge effects, whereby the test was not overly difficult (average scores of 10.12 out of 15) and the time limit fairly unrestrictive (average time spent on the task was 11.81 minutes out of 15). This presents the opportunity for those that are more motivated, such as women who on average showed greater task motivation than men, to make efforts to disconfirm negative expectations.

Men Choking Under Pressure

Unexpectedly, male participants did show differences in performance based on condition. Men underperformed in the blatant threat condition compared to the other conditions. Men who were presented with positive expectations, that men outperform women in maths tasks, underperformed compared to participants in the other conditions. This could be put down to complacency in the face of positive stereotyping. However, the time that male participants spent on the task in the blatant threat condition, their self-reported effort and their working memory capacity did not differ significantly from male participants in other conditions.

Alternatively, this drop in performance among men in the blatant threat condition is consistent with ‘choking under pressure’, whereby people underperform when the pressure of positive expectations are placed upon them, including positive stereotypes (Cheryan & Bodenhausen, 2000; Smith & Johnson, 2006). Previous research has evidenced that positive stereotypes about a group could either lead to a ‘stereotype boost’ (Walton & Cohen, 2003; Smith & White, 2002) whereby people are elevated by positive expectations, or ‘choking under pressure’ (Beilock & Carr, 2001), whereby positive expectations place too great a burden on the individual and performance is harmed. Smith and Johnson (2006) found that men low in domain identification showed worse performance when positive stereotypes of

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men in maths were presented compared to those in a stereotype nullification condition. Men highly identified with maths did not show this difference. In contrast to Smith and Johnson (2006) the current study found that men may choke under pressure even when they are highly identified with the performance domain ($M = 5.40, SD = 1.10$).⁶

This suggestion of ‘choking under pressure’ is supported by the finding that men who were high in SU showed a negative association between perceived stereotype threat and maths scores through increased anxiety. Both high perceived gender-based judgement and SU among men appears to be creating an unmanageable anxiety which then negatively impacts their performance outcomes. This may explain performance decrements in the blatant threat condition where positive gender-based expectations are high. Overall, the men in the study appeared to be more affected by stereotype-based judgement than the women (even positive judgement), suggesting that they had not built up any kind of resilience as suggested about the women.

Limitations and Future Research

The first limitation of this study appears to be the self-selected female sample used as participants, whom were highly identified and motivated in the area of maths and had a reasonable level of education in the area. Due to this, women in this study appeared to experience stereotype challenge effects (as opposed to stereotype threat), whereby perceived gender-based judgement improved, rather than damaged performance. It was therefore not possible to test the SU hypothesis in the context of stereotype threat. Further, the study was underpowered by its small sample, which although comparable to previous stereotype threat

⁶ Domain identification scores were median split and a 2 (domain identification: low versus high) x 4 (condition: control, subtle threat, blatant threat, nullification) between-participants ANCOVA was conducted. Maths performance was the dependent variable. Analyses yielded a marginal main effect of condition ($F(1, 90) = 2.46, p = .07, \eta_p^2 = .08$), but non-significant main effects of domain identification ($F(1, 90) = .33, p = .57, \eta_p^2 = .004$), and their interaction ($F(3, 90) = .80, p = .50, \eta_p^2 = .03$). Pairwise comparisons reveal that men performed worse in the blatant threat condition ($M = 9.24, SD = .57$) compared to the subtle threat condition ($M = 11.43, SD = .59$; mean difference = -2.19; $p < .01$), and marginally worse than the control condition ($M = 10.65, SD = .56$; mean difference = -1.41; $p = .08$).

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studies has limited the conclusions that can be drawn from the study. Despite this, findings that male participants' levels of SU did moderate the effects of perceived gender-based judgement on maths performance suggest that the concept may have some utility. However, based on these inconclusive findings, it is difficult to conclude whether SU is likely to explain the findings of the ABST meta-analysis in Chapter 6 of this thesis or not. Given more resources and taking into consideration the limitations of the current study, it would be beneficial to test the SU hypothesis once again among older adults.

The study was largely reliant on self-reported measures, including anxiety and SU. Previous research has found that self-reports of anxiety are not always predictive of direct measures of anxiety (Johns, Inzlicht, & Schmader, 2008) and it is suggested that this is part of peoples attempts to regulate negative emotion. This may also apply to self-reported SU. Future research should explore how SU might be examined through alternative means.

Conclusions

The current study explored for the first time whether SU might be implicated as exacerbating the negative threat that stereotypes can pose on performance outcomes. It was expected that highlighting gender-based judgement on a difficult maths task would negatively impact women's performance, but primarily when SU was high. It was hypothesised that this would be reflected in reduced working memory capacity as well as worse maths performance. However, using GBST and self-reports of SU, this study was unable to support the predictions of both stereotype threat theory and the SU hypothesis. Instead, male participants were the only ones to be negatively affected by perceived gender-based judgement and SU, showing signs of 'choking' under the pressure of positive expectations. Women alternatively showed signs of better performance when perceived gender-based judgement was high, suggesting stereotype challenge effects. This study cannot support the SU hypothesis, but it

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also cannot be discounted until further research examines the theory among less maths-identified women who do experience stereotype threat or in the context of ABST.

CHAPTER 8– EVERYDAY CUES TO AGE-BASED STEROTYPE THREAT

This study extends age-based stereotype threat (ABST) research by exploring the extent to which typical everyday settings (the presence of a younger adult and receiving help from a younger adult) might act as cues to ABST. Older participants (aged 50+; N = 269) performed a demanding maths test online, believing they were either performing the task alone (control condition), being observed by a younger/older person (young and older conditions), or being observed by a younger/older adult who then gives them help (young help and older help conditions). Although threat-based concerns, anxiety and reductions in general self-efficacy were significantly higher in the young conditions than the older conditions (not moderated by help), this was not reflected in worse performance outcomes. In fact, performance was significantly worse among those watched by an older adult compared to a younger adult (again not moderated by help). It could therefore not be concluded that the presence of a younger observer or an offer of help affects older adults' test performance through stereotype threat. The limitations of this study and further research opportunities are discussed.

Study 4. Testing Younger Adults and Help as Cues to Age-Based Stereotype Threat

The limited application of ABST research in every-day contexts is a major limitation to its usefulness and application by relevant groups, such as employers, health care professionals and policy makers. Researchers need to further extrapolate whether ABST occurs within different applied settings; what cues ABST in these settings; in what performance areas ABST affects older people (whether formal testing or informal evaluative contexts); and what individual or situational factors reduce older adults' susceptibility to

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ABST. The current study extends research in this area by exploring two possible everyday cues to ABST: the presence of younger adults and the giving of help to older adults.

Stereotype-Based Cues to Age-Based Stereotype Threat

Lamont, Swift and Abrams' (2015) meta-analysis distinguished between fact-based and stereotype-based manipulations of ABST. Fact-based manipulations are those that explicitly refer to 'facts' (whether true or fabricated) about performance differences based on age. Fact-based manipulations represent 57% of manipulations used within published and unpublished ABST research (first placement performance measures; Lamont, Swift, & Abrams, 2015). In contrast, stereotype-based manipulations rely on situational cues to age stereotypes. These manipulations do not include statements of fact concerning older adults' abilities and are more in line with stereotype threat theory. Comparing the two types of ABST manipulation meta-analytically for the first time, in Study 2 of this thesis it was found that greater performance decrements on stereotyped tasks when using stereotype-based manipulations. Given the clearer alignment of stereotype-based manipulations with the concept of stereotype threat, and the significant impact that stereotype-based manipulations have on performance, this ABST methodology was the focus of the current study.

A review of the ABST literature also reveals that current tests of ABST have utilised only a handful of different methods to create stereotype-based cues to ABST. Predominantly, studies have cued ABST by framing the task as measuring skills that relate to negative stereotypes; for example, by emphasising that the task is diagnostic of memory ability (Chasteen et al., 2005; Desrichard & Kopetz, 2005; Rahhal et al., 2001). Other studies have stated that performance outcomes between young and old are being compared, or that both young and old were taking part (Swift, Lamont, & Abrams, 2012; Mazerolle et al., 2012). Alternatively, Hehman and Bugental (2012) cued ABST by framing the task as requiring

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stereotypically young skills (e.g., ‘fast responses and current knowledge—for example, knowledge about current technology’). Finally and more explicitly, studies have cued ABST by stating how older people are negatively stereotyped in society (Abrams et al., 2006; 2008; Swift, Abrams, & Marques, 2013). The current study therefore sought to extend this limited research by exploring how everyday interactions with younger adults might induce ABST.

Younger People as Cues to Age-Based Stereotype Threat

The Stereotype Content Model (SCM) has repeatedly shown that older people are stereotyped as possessing high warmth, but low competence (Abrams, Eilola, & Swift, 2009; Cuddy, Norton & Fiske, 2005; Fiske, Cuddy, Glick & Xu, 2002). Abrams, Eilola and Swift (2009) examined data from over 6000 British respondents and compared the stereotyping of older people (those over 70) and younger people (those under 30). They report that while older people were rated more highly along warmth dimensions, younger people were rated more highly for competence. Thus, ABST is essentially the threat of confirming stereotypes of lesser competence compared to the young.

On this basis, the presence of a younger adult in a performance context is one of the most obvious potential cues to ABST. Within the ABST literature, only Kang and Chasteen (2009) have tested whether the presence of a young confederate might cue ABST, finding a strong negative effect of their ‘threat’ condition on memory recall performance. However, this was used alongside multiple other cues to ABST, including asking those in the threat condition to state their age before the test and emphasising the memory component of the test. Therefore, the threat of a young person’s presence cannot be deduced. Multiple ABST studies have however demonstrated that older people underperform when they believe that their performance will be compared to that of younger participants (Swift et al., 2012; Mazerolle et al., 2012). This research is indicative that younger people present a stereotype

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threat to older people when in competition. It is less clear if the presence of a young person would be a threat to older people if there was no evidence of competition.

The supposition that a younger person may cue ABST in performance settings is in line with wider stereotype threat research. Marx and Goff (2005) found that Black participants completing a verbal test administered by a Black experimenter performed as well as White participants. However, when the test was administered by a White experimenter, Black participants showed reduced performance compared to White participants. Black participants also reported greater threat-based concerns when the test was administered by a White experimenter (as opposed to a Black experimenter). Additionally, Stone and McWhinnie (2008) found gender-based stereotype threat effects among women on a golf-putting task. Women showed less accuracy, but no difference in the number of strokes needed when putting in the presence of a male experimenter as opposed to a female experimenter. Other gender-based stereotype threat research has indicated that women's performance on stereotype-relevant tests can be damaged in contexts where they are a numerical minority or the only woman (Inzlicht & Ben-Zeev, 2000; Sekaquaptewa & Thompson, 2003). Similar research has yet to be conducted with ABST.

Help as a Cue to Age-Based Stereotype Threat

The SCM has additionally categorised and tested the emotions expressed toward groups based on different combinations of warmth and competence (Fiske et al., 2002). It has been shown that the stereotyping of older people as friendlier but less competent than younger people leads to a kind of paternalistic prejudice, provoking feelings of both admiration and pity (Cuddy et al., 2005; Fiske, et al., 2002). Cuddy, Norton and Fiske (2005) highlight how these emotions lead to discriminatory behaviours such as increased helping and exclusion. The perceived incompetence and pitying of some groups is unlikely to produce a

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helping response from others if they are perceived as responsible for their own plight (e.g., obese people or those with illnesses seen as self-inflicted). However, for older people who are rarely viewed as responsible for their supposed ‘incompetence’ and who are seen as warm and friendly, stereotyping is more likely to lead to helping behaviours. This is similar to the experience of those with physical or mentally disabilities (Cuddy et al., 2005).

Later life has been described by some as the ‘second childhood’ referring not to freedom from work, but rather the increase in reliance on others, as with children (Baltes, 1996). It is recognised that dependency—receiving support from others—can be beneficial by ensuring needs are met (Baltes, 1996). However, the stereotyping of older people may lead some to offer help when there is no obvious need. Increased helping is particularly interesting as it may not seem overtly hostile and so will be accepted and wide-spread within society. Nonetheless, in kindly helping an older person by giving up a seat, doing something for them rather than showing them how to do it or by speaking more slowly to them, it may indicate to them that stereotypes of older people as less competent than younger people are being applied. This may cue ABST. Stereotype threat theory has been examined as a psychosocial factor that can increase dependent behaviours among older people (Coudin & Alexopolous, 2010), but research has yet to examine whether increased helping of older people can induce ABST.

The Current Study

In exploring everyday cues to ABST, the current study draws upon evidence from the SCM showing that older people are stereotyped as friendlier but less competent than younger adults (Abrams et al., 2009; Cuddy et al., 2005). Given that the competencies of older people are devalued when in comparison with younger people, the study first tested whether the presence of a younger person during a performance test would act as a cue to ABST. The

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study aimed to examine the minimal conditions under which a younger adult might present a threat to older adults, and so the scenario is non-competitive and non-hierarchical. The presence of a younger adult is expected to make age identity and stereotypes salient and highlight the potential for age comparison. Additionally, stereotypes of older people as doddering but dear are likely to lead to subtle discriminatory behaviours such as increased helping. Therefore, the second aim of the study was to examine whether the giving of help by a younger (or older) person might cue ABST. Both contexts are highly relevant to every-day performance settings for older people who are likely to work alongside and interact with younger people, but not necessarily in a competitive environment.

Using an online scenario, the performance of older people on two difficult problem solving tasks (taken from US SAT) was tested. In a control condition, older people were not aware of any other participants in the study and performed the problem solving task alone. In two further conditions, a 21 year old online participant was introduced, and it was stated that the two participants had been randomly assigned to roles. The role of the young participant was to watch the genuine participant perform the problem solving task and comment if they wished. This other participant and their comments were computer generated. In the 'young' condition, the fictional participant made no comments on the task, but in the 'young help' condition, two attempts at helping the older participant were given. It was hypothesised that in both these experimental conditions, older adults' performance on the problem solving task would be impaired due to ABST. As a comparison, these two conditions were replicated, with the other participant's age being defined as 56.

As well as test performance, self-reported threat-based concerns and anxiety were measured after the test, and self-efficacy both before and after to look at changes over time. It was predicted that in line with performance decrements, threat-based concerns and anxiety

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would be increased in both young experimental conditions, and self-efficacy would also decrease in these two conditions. In line with previous research, intergenerational contact was measured as a likely moderator of ABST effects (Abrams et al., 2006; 2008).

Method

Sample and Design

This study was created and administered through online platforms (Qualtrics and Amazon's Mechanical Turk), allowing people to take part on the basis that they passed the initial pre-screen. The pre-screen involved a number of demographic questions, including participant age, gender, country of birth etc. Participants were unaware that they were sent through to the main test based on whether they reported that their age was over 50 years. This age cut-off was chosen so that the study might explore the potential for ABST to affect older people still in the workplace, whereby 50 is at the upper end of the working age spectrum. The ABST cues used in this study are prevalent and particularly relevant in the work setting. The average age of the 269 participants that took part in the study (252 remaining after the manipulation checks) was 57.39 years ($SD = 5.56$; age range of 50 to 76). This shows a tendency towards the early older-aged or even late middle-aged end of the spectrum. Indeed, participants self-categorised on average (median) as late middle-aged.

There were more female (61.4%) than male (38.6%) participants, 94% were born in the United States of America, and they were overall well educated—12.4% had done up to or less than high school, 69.6% had been to college for anything from 1 to 4 years, and 18% had achieved a masters, doctoral or professional degree beyond college. Participants were randomly assigned to one of five conditions (*young*, *older*, *young help*, *older help* or *control*).

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Procedure and Experimental Manipulations

Participants were invited to take part in the study ‘Problem Solving’ and it was explained that ‘We are interested in people's performance on, approach to and evaluations of a number of problem solving tasks’ and that ‘The study may involve brief communication with another on-line participant (depending on who else is currently taking part in the study). You will then be asked either to do two problem solving tasks yourself or view someone else doing them’. Consent was then given. To begin the study a baseline of GSE was taken, participants answered domain identification questions and then Qualtrics randomly assigned participants to one of four experimental conditions or the control condition.

In both the *young condition* and *young help condition* participants believed that they had an initial interaction with another participant, ‘Sam 21’. To create this situation, participants were first asked to create an ‘online name’ using their first name or nick-name, plus their age (e.g., 30 year old Robert could be Bobby30). The screen then displayed the following information (including pauses of varying and appropriate length):

‘The number of people currently taking part in this study is... [PAUSE]...3... [PAUSE].... You have been paired with... [PAUSE]...Sam21... [PAUSE]...Sam21 says... [PAUSE]... Hello [NAME INSERTED], I have been asked to tell you a bit about myself, so here goes...my name’s Sam and I am 21 years old. I am on vacation at the moment and so thought I would try out mTurk. I like going to the movies and spending time with friends and family... [PAUSE]... Now please tell Sam21 a little bit about yourself. Use the message box below and then press “send”. ... [PAUSE]...Sam21 is reading, please wait...’

All conversation between the participant and Sam21 appeared in a conversation box with an MSN-like symbol next to it. Having completed introductions, participants in the experimental conditions were told that they were randomly assigned to ‘roles’, with the

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participant asked to carry out two problem solving tests and to keep an eye on the message box during test one. Participants also saw instructions to the made-up Sam21 to ‘watch the tests being completed (you will be shown the questions all together) and you may comment using the message box where you see appropriate. We will later ask you about the tests’.

For the *young* condition, the message box remained blank throughout the course of the first test. However, in the *young help* condition, text appeared in the message box on questions two and five. This text details that Sam21 thought the participant might ‘struggle’ or ‘need help’ and then gives a clue to the completion of the question. During the second problem solving test, those in the young and young help conditions were told that ‘Sam21 will still be an observer but there will be no messaging options during this test’.

The *older* and *older help* conditions were identical to the *young* and *young help* conditions respectively; however, the other online participant was instead described as ‘Sam56’. Those in the third condition—the *control condition*—went straight to the problem solving tasks without any prior staged interaction. In accordance with this, throughout the tests they were given no information about the presence of other participants and the MSN-style box was not displayed on their screen. Any additional information and clues presented within the young and older help conditions was also given to those in the control and young and older conditions more formally as part of the question.

Following the tests, the manipulation checks were carried out for those in the experimental conditions. All participants then completed the measures of anxiety, general self-efficacy, stereotype threat, intergenerational contact, and finally, demographic questions. These included gender, age, age self-categorisation, perceived age group, country of origin, ethnicity and level of education. In the debriefing, participants were told that Sam21/Sam56 was not a real participant, but automated responding.

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Measures

General self-efficacy. Chen, Gully and Eden's (2001) New General Self-Efficacy (GSE) Scale was used to measure "one's belief in one's overall competence to effect requisite performances across a wide variety of achievement situations" (Chen, Gully & Eden, 2001, p. 63). This unidimensional scale contains items such as 'when facing difficult tasks, I am certain that I will accomplish them' and 'Compared to other people, I can do most tasks very well' which participants rate their agreement with on a scale from 1 (*strongly disagree*) to 7 (*strongly agree*). From this eight item scale, four items were used (Cronbach's $\alpha = .93$) at the beginning and four at the end of the study (Cronbach's $\alpha = .95$). A difference score was created by deducted post-task mean scores from baseline mean scores, whereby a positive score indicates a decrease in GSE across the two time-points.

Domain identification. Identification with the domain of 'problem solving' was measured using three items adapted (to refer to 'problem solving') from previous research (Keller, 2007). Participants stated their agreement on the same 7-point scale with the items 'Being good at problem solving is important to me', 'I think I am good at tasks that require the use of problem solving' and 'I like tasks that involve problem solving'. Mean scores for domain identification were created, whereby higher scores indicate higher identification with the domain of problem solving (Cronbach's $\alpha = .86$).

Problem solving tasks. All problem solving questions were taken from the Maths sections of the Official SAT Practice Test 2013-14 and scoring sheets (College Board, 2013). These challenging problems are designed to assess the academic readiness for college of people in the US. Two problem solving tests were presented to participants and questions in both tests got progressively harder. The first test included five SAT questions, one from each

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of their five levels of difficulty. The second test presented ten SAT questions, two from each of the five levels of difficulty.

Participants were not permitted to use the internet or a calculator during the tests. Although participants were not given a time limit for completion of the problems, they were informed that they would be scored based on both accuracy and speed. In accordance with this the proportion of errors (*PE*) and mean response time (*RT*; average number of seconds spent on each question) were calculated across both tests. There was an inverse relationship between *PE* and *RT* ($r = -.32; p < .001$), showing that as responses are made more quickly, errors increase. To account for the speed-accuracy trade-off, analyses examining *PE* as a dependent variable always include *RT* as a covariate.

Manipulation checks. The manipulation check consisted of the questions ‘how old was the other participant?’ (age options or ‘don’t know’ selected), ‘During TEST ONE, did the other participant make any comments?’ (‘Yes’ or ‘No’), and ‘During TEST ONE, did the other participant offer you any help?’ (‘Yes’ or ‘No’).

Anxiety. Anxiety was measured using eleven items (adapted from Abrams et al., 2006)—‘under pressure’, ‘tense’, ‘nervous’, ‘jittery’, ‘uneasy’, ‘afraid of not doing well’, ‘uncomfortable’, ‘helpless’ and reverse-scored ‘confident’, ‘in control’ and ‘calm’. All items were rated on a 7-point scale (1 = *not at all*, to 7 = *very much*) showing the extent to which participants experienced each emotion during the tests. An overall anxiety score was computed for each participant, whereby a higher mean represents greater anxiety (Cronbach’s $\alpha = .94$).

Threat-based concerns. Following on from Swift, Abrams and Marques (2013), two items were administered to measure participants’ self-reported concerns around being judged on the basis of their age during the test. The items ‘Were you worried that your ability to

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perform well on the test was affected by your age?’ and ‘Were you worried that if you performed poorly on the test, your poor performance would be attributed to your age?’ were again rated on a 7-point scale (1 = *not at all*, to 7 = *very much*). A mean score was computed from these two items which correlated highly ($r = .75; p < .001$). Higher scores indicate greater concern about being judged by age. This measure was used instead of a more general measure of perceived age-based judgement (as in Chapter 3; Chasteen, Bhattacharyya, Horhota, Tam, & Hasher, 2005; Steele & Aronson, 1995) due to its inclusion of the word ‘worried’. This was seen as a closer measure of stereotype threat as opposed to stereotype challenge.

Intergenerational contact. Both the quantity and quality of prior contact with those ‘under the age of 30’ and ‘from your own age group’ was measured using contact items adapted from Voci and Hewstone (2003). The items for quantity of contact were: ‘How many adults [under the age of 30/from your own age group] do you know?’ (0, 1-3, 4-6, 7-9, 10-12, 13-15, 16-18, 19-21, 22-24, 25+), ‘How frequently do you have contact with adults [under the age of 30/from your own age group]?’ (5-point scale, from 1 = *never*, to 5 = *very frequently*). Items for quantity of contact were highly correlated for both ‘under the age of 30’ ($r = .58; p < .001$) and ‘from your own age group’ ($r = .37; p < .001$). A composite quantity score was created by dividing responses for the first quantity question by two and taking the mean of both items (possible range of values from 0.5 to 5).

To measure quality of contact, participants were asked ‘When you meet adults [under the age of 30/from your own age group], in general do you find the contact...’, ‘pleasant’, ‘cooperative’ and ‘superficial’ (5-point scale, from 1 = *not at all*, to 5 = *very much*). The scale for quality of contact was inadequately reliable in reference to both groups (Cronbach’s $\alpha = .69$ and $\alpha = .43$ respectively). In creating a mean score for quality (possible range of

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values from 1 to 5), the item ‘superficial’ was removed due to its inconsistency with the other two items which correlate highly ($r = .75$; $p < .001$ for under 30s, and $r = .71$; $p < .001$ for own age group). So that the quality and quantity of contact could be considered simultaneously, the two were multiplied to form an overall score, consistent with prior research (Brown, Maras, Masser, Vivian & Hewstone, 2001; Voci & Hewstone, 2003). The combination of contact quality and quantity measures with those under the age of 30 formed the intergenerational contact variable (possible range of values from 0.5 to 25).

Age self-categorisation. A measure of which age group participants identify with was taken from the European Social Survey (Abrams, Lima & Coudin, 2006). The item stated ‘please tell me which letter best describes the age group you see yourself as belonging to’. Options from A to J were then given as a spectrum from very young to very old. A, B and C were given the titles ‘young’, D, E and F were given the title ‘middle’, and G, H, J the title ‘old’.

Results

All PE and RT scores were screened for outliers (at ± 3 SDs) and the RTs of six participants were Winsorised as outliers. Four participants expressed doubts about the reality of the study set-up (i.e. that Sam21/56 was a real person), one participant had missing performance data and six participants were identified as multivariate outliers. These eleven participants were excluded from analyses.

Manipulation Check

A manipulation check was used to determine whether those in the experimental conditions were paying attention and could recall the age of their fellow participant. All participants in the young conditions correctly identified the age of the other participant as in their 20’s, and all but one participant in the older conditions reported the other participant as

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in their 50s or 60s. In addition, all but five participants in the help conditions correctly identified that they were offered help or given comments by the other participant. The six respondents that responded incorrectly to the manipulation checks were excluded from analyses. Following these checks, 252 participants remained (Table 8.1).

Table 8.1

Distribution of Participants between Stereotype Threat Conditions

	Older	Young	Control	Total
No help	50	55	51	156
Help	43	53	-	96
Total	93	108	51	252

Preliminary Analyses

A number of one-way analyses of variance (ANOVAs), whereby condition was the independent variable, revealed that age $F(4, 246) = .55, p = .70, \eta_p^2 = .01$, education $F(4, 245) = 1.39, p = .24, \eta_p^2 = .02$, gender $F(4, 246) = .98, p = .42, \eta_p^2 = .02$ and domain identification $F(4, 247) = .74, p = .57, \eta_p^2 = .01$ did not differ significantly between conditions. This suggests that random allocation to conditions was successful. Bivariate relationships among the variables (Appendix D, Table D.1) show that gender (*male* = 1, *female* = 2), education and domain identification were significantly correlated with test performance. Gender was positively associated with PE, whereby women show higher PE (see Appendix D, Table D.1). Higher education and domain identification were only modestly correlated with each other, but both predicted lower PE and higher RT. Due to these findings, gender, education and domain identification were included in further analyses as covariates (if not already in analyses as predictors). Gender was also positively correlated with greater self-reported anxiety, reductions in GSE and age-related threat-based concerns.

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In addition, higher education was associated with lower self-reported anxiety and higher quantity of contact with the young.

This study included a 2 (age of observer: young versus older) x 2 (help: help given versus not given) between-participants design, but also measured baseline performance with no observer present. As the design is not fully crossed, analyses were conducted in two stages. First, the control condition was excluded from analyses and 2 (age of observer: young versus older) x 2 (help: help given versus not given) between participants analyses of covariance (ANCOVA) were used to examine which experimental setting is most detrimental to performance outcomes and self-efficacy, and elicits anxiety and threat-based concerns. The stereotype threat hypothesis would predict that negative outcomes should be higher when the observer is younger and gives help. Second, dummy variables comparing each of the experimental conditions to the control condition were entered into hierarchical multiple regression analyses. Results indicate which (if any) of the experimental conditions represent a significant departure from baseline (control condition) levels of outcomes. Both the young and young help conditions were expected to increase negative outcomes significantly when compared to baseline, and potentially the older help condition.

Threat-Based Concerns

First, the control condition was excluded from analyses and an observer age (older versus young) x help (no help given versus help given) between participants ANCOVA conducted (gender, domain identification and education were included as covariates). There was a significant main effect of observer age, $F(1, 192) = 7.01, p = .01, \eta^2 = .04$, but not of help, $F(1, 192) = 1.18, p = .28, \eta^2 = .01$ or their interaction, $F(1, 192) = 1.08, p = .30, \eta^2 = .01$. Domain identification $F(1, 192) = 5.02, p = .03, \eta^2 = .03$, and gender $F(1, 192) = 4.00, p = .05, \eta^2 = .02$ were significant covariates. Pairwise comparisons reveal that those in the

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young observer conditions reported significantly higher threat-based concerns ($M = 3.26$, $SE = .19$) than those in the older observer conditions ($M = 2.54$, $SE = .20$; mean difference = $.73$, $p = .01$; Figure 8.1).

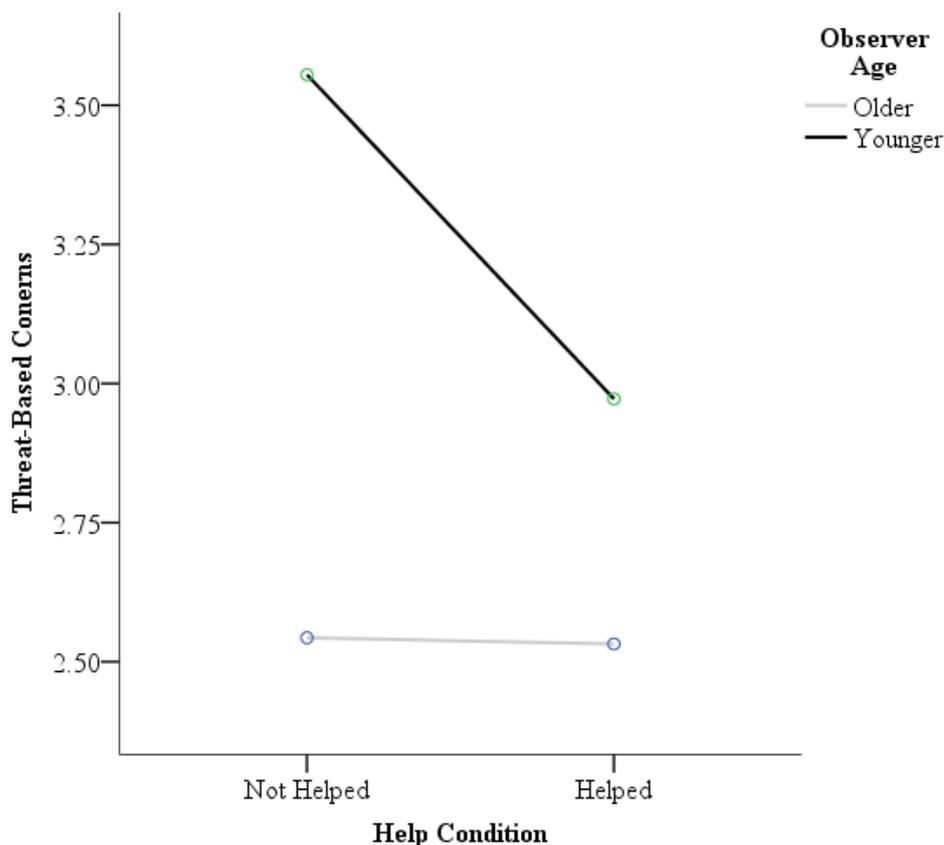


Figure 8.1. The effect of observer age (young versus older) and help condition (no help versus help) on threat-based concerns.

Using the full data set, condition dummy variables were then entered into a hierarchical multiple regression. This analysis examined whether the increase in threat-based concerns of participants in the young observer conditions (and other conditions) represents a significant departure from normal levels (control condition). Gender, education and domain identification were entered into the first block of the regression, explaining 5.4% of variance in threat-based concerns, $F(3, 246) = 4.67$, $p = .003$. A second block, including the four

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dummy variables, produced a significant increase in variance explained, $R^2_{\text{change}} = .04$ ($p = .02$) and accounted for 9.7% of variance in threat-based concerns $F(7, 242) = 3.73, p = .001$. Domain identification $\beta = -.15, t(249) = -2.34, p = .02$, gender $\beta = .16, t(249) = 2.61, p = .01$ and the dummy variable ‘control versus young’ $\beta = .22, t(249) = 2.78, p = .01$ were all significant predictors of threat-based concerns. All other predictors were non-significant ($p > .05$). Therefore, participants with lower domain identification and women were more likely to report threat-based concerns, but also those in the young condition (but not the young help condition) when compared to baseline.

Anxiety and General Self-Efficacy

Separate ANCOVA were also conducted to look at the impact of observer age and help on participants’ self-reported anxiety and change in GSE. For anxiety, neither the main effect of observer age, $F(1, 192) = .01, p = .91, \eta^2 = .00$, nor that of help were significant $F(1, 192) = .04, p = .84, \eta^2 = .00$, and their interaction was only marginal $F(1, 192) = 3.44, p = .07, \eta^2 = .02$. All covariates were significant ($p < .01$). Using the full data set, condition dummy variables were then entered into a hierarchical multiple regression. The first block of the regression including gender, education and domain identification explained 16.9% of variance in anxiety, $F(3, 246) = 17.82, p < .001$. A second block including the four dummy variables did not produce a significant increase in variance explained, $R^2_{\text{change}} = .02$ ($p = .16$), accounting for 17.8% of variance in anxiety $F(7, 242) = 8.68, p < .001$. Domain identification $\beta = -.21, t(249) = -3.54, p < .001$, gender $\beta = .29, t(249) = 4.96, p < .001$ and education $\beta = -.16, t(249) = -2.77, p = .01$ were all significant predictors of Anxiety. The dummy variable ‘control versus young’ was significant $\beta = .16, t(249) = 2.22, p = .03$ and the dummy variable ‘control versus older help’ was marginal $\beta = .13, t(249) = 1.87, p = .06$. All other predictors were non-significant ($p > .05$). Overall, participants with lower domain

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identification, lower education and women reported greater anxiety during the test.

Additionally, those in the young condition (and those in the older help condition marginally) showed higher anxiety compared to baseline.

For GSE, the ANCOVA showed a significant main effect of observer age, $F(1, 192) = 5.16, p = .02, \eta^2 = .03$, a marginal effect of help $F(1, 192) = 2.96, p = .09, \eta^2 = .02$, and a non-significant interaction $F(1, 192) = .24, p = .62, \eta^2 = .00$. Gender was the only significant covariate $F(1, 192) = 8.51, p = .004, \eta^2 = .04$. Pairwise comparisons reveal that those in the young observer conditions reported a larger reduction in GSE ($M = .75, SE = .09$) than those in the older observer conditions ($M = .44, SE = .10$; mean difference = $.31, p = .02$).

Using the full data set, condition dummy variables were again entered into a hierarchical multiple regression. The first block of the regression including gender, education and domain identification explained 5.2% of variance in GSE, $F(3, 246) = 5.51, p = .001$. A second block including the four dummy variables produced a significant increase in variance explained, $R^2_{\text{change}} = .05 (p = .02)$, accounting for 8.2% of variance in anxiety $F(7, 242) = 4.17, p < .001$. Gender $\beta = .22, t(249) = 3.51, p = .001$ and the dummy variable 'control versus young' were significant $\beta = .23, t(249) = 2.98, p = .003$ predictors. All other predictors were non-significant ($p > .05$). Overall, women reported the largest change in GSE from pre to post test and those in the young condition showed a larger change compared to baseline.

Test Performance

An ANCOVA was then performed on PE, with test RT as an additional covariate. The main effect of observer age was again significant, $F(1, 191) = 7.42, p = .01, \eta^2 = .04$, but that of help $F(1, 191) = 1.16, p = .28, \eta^2 = .01$, and their interaction were not $F(1, 191) = 2.03, p = .16, \eta^2 = .01$. All covariates were significant ($p < .01$). Pairwise comparisons reveal that those in the young observer conditions had significantly lower PE ($M = .52, SE = .02$) than

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those in the older observer conditions ($M = .60$, $SE = .02$; mean difference = $.08$, $p = .01$; Figure 8.2).

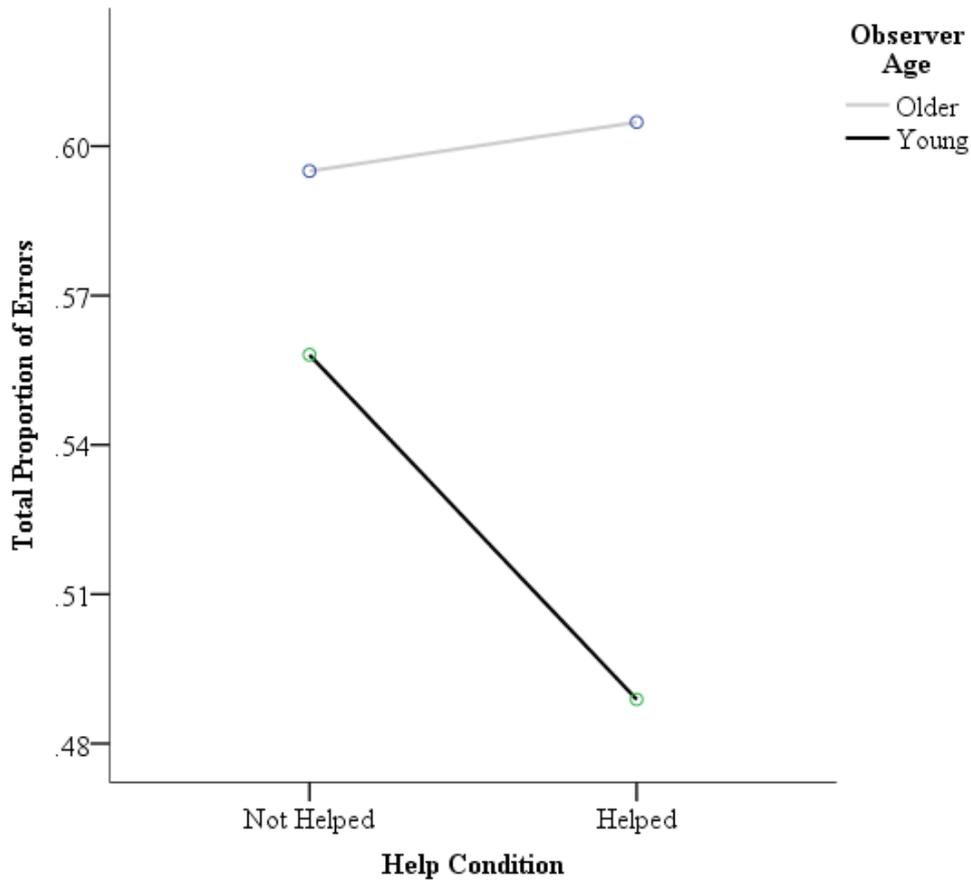


Figure 8.2. The effect of observer age (young versus older) and help condition (no help versus help) on total proportion of errors.

Using the full data set, condition dummy variables were then entered into a hierarchical multiple regression. Gender, education, domain identification and RT were entered into the first block of the regression, explaining 30.6% of variance in PE, $F(4, 245) = 27.07$, $p < .001$. A second block, including the four dummy variables, produced a significant increase in variance explained, $R^2_{\text{change}} = .03$ ($p = .02$) and accounted for 33.9% of variance in PE $F(8, 241) = 15.44$, $p < .001$. Domain identification $\beta = -.14$, $t(249) = -2.50$, $p = .01$,

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gender $\beta = .26$, $t(249) = 4.78$, $p < .001$, education $\beta = -.34$, $t(249) = -6.12$, $p < .001$ and RT $\beta = -.18$, $t(249) = -3.21$, $p = .002$ were all significant predictors of PE. As was the dummy variable ‘control versus older help’ $\beta = .13$, $t(249) = 2.04$, $p = .04$, while the dummy variable ‘control versus older’ was marginal $\beta = .12$, $t(249) = 1.77$, $p = .08$. All other predictors were non-significant ($p > .05$). This reveals that participants with lower domain identification, lower education, quicker response times and women had higher PE. Additionally, those in the older help condition (and those in the older condition marginally) showed higher PE compared to baseline.

A second ANCOVA performed on RT shows a significant main effect of observer age $F(1, 192) = 5.79$, $p = .02$, $\eta^2 = .03$, but not of help $F(1, 192) = .04$, $p = .84$, $\eta^2 = .00$, or their interaction $F(1, 192) = 2.03$, $p = .16$, $\eta^2 = .01$. Domain identification and education were significant covariates ($p < .01$). Pairwise comparisons reveal that those in the young observer conditions spent significantly longer completing the tests ($M = 68.05$, $SE = 2.70$) than those in the older observer conditions ($M = 58.44$, $SE = 2.92$; mean difference = 9.61, $p = .02$). Using the full data set, condition dummy variables were then entered into a hierarchical multiple regression. Gender, education and domain identification were entered into the first block of the regression, explaining 8.7% of variance in RT, $F(3, 246) = 8.87$, $p < .001$. A second block, including the four dummy variables, did not produce a significant increase in variance explained, $R^2_{\text{change}} = .02$ ($p = .18$; $R^2 = .10$; $F(7, 242) = 4.74$, $p < .001$). Domain identification $\beta = .20$, $t(249) = 3.19$, $p = .002$ and education $\beta = .21$, $t(249) = 3.39$, $p = .001$ were the only significant predictors of RT. This suggests that RTs did not differ significantly from baseline in any of the experimental conditions.

Anxiety as a Mediator

Previous research has hypothesised that anxiety might partially mediate the relationship between cues to ABST and worse performance outcomes. Despite finding no support for ABST, it was of interest to examine whether anxiety can explain performance decrements among those in the older observer conditions. To test this hypothesis, mediator analyses were conducted using PROCESS (model 4; 5000 bootstraps; Hayes, 2012). The model tested the effect of age of observer (X) on PE (Y), through anxiety (M), covarying out domain identification, education, gender and RT (Figure 8.3). Analyses revealed a non-significant effect of age of observer on anxiety (path a; $B = .03, SE=.21, t = .15, p = .88$), but the effect of anxiety on PE (path b; $B = .05, SE=.01, t = 4.95, p < .001$) and the direct effect of age of observer on PE were significant (path c' ; $B = -.08, SE=.03, t = -2.90, p = .004$). The indirect effect of age of observer on PE through anxiety was non-significant (path c_1 ; 95% CI $[-.02, -.02]$; $B = .00, SE=.01, z = .15, p = .88$).

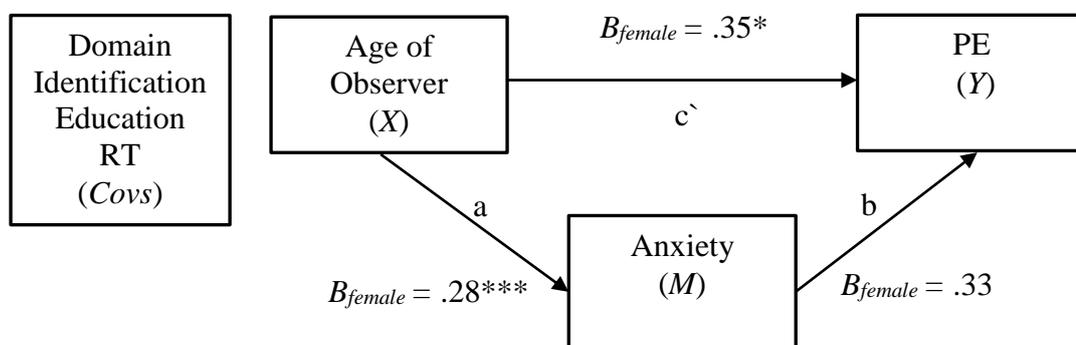


Figure 8.3 Mediation analysis, Hayes (2012) model 4. Note: * $p < .05$, ** $p < .01$, *** $p < .001$.

These findings offer no support for anxiety as a mediator between the age of observer and PE, suggesting that higher anxiety is not the reason for underperformance in the older

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observer conditions. Finally, it was expected that more positive previous intergenerational contact would reduce negative outcomes (threat-based concerns, anxiety, reductions in GSE and increased PE) among participants in the young and help conditions. This hypothesis was not tested as worse performance was not found in the young observer conditions.

Discussion

The first hypothesis, that threat-based concerns would be increased among older people in the presence of a younger observer was confirmed. Threat-based concerns were higher among participants watched by a younger adult compared to those watched by an older adult, and this was not moderated by whether the observer gave help or not. This increase in threat-based concerns among those in the young condition (but not young help) was significantly higher than baseline levels of threat-based concerns. Anxiety and change in GSE were similarly higher in the young condition compared to baseline.

Second, the hypothesis that the pattern of findings for threat-based concerns would then be mirrored in increased PE was not confirmed. Post-hoc power analysis using GPower revealed that based on a d of .52 (translated as an $F = .26$), as found among stereotype-based manipulations in the meta-analysis of Study 2, the current study had sufficient statistical power (.88) to detect an effect of condition (statistics in Appendix D). In fact PE were found to be significantly higher among those watched by an older adult compared to a younger adult. Again this was not moderated by whether the observer gave help or not. This increase in PE was significantly higher than baseline levels of PE. Throughout, women showed more negative outcomes compared to men and lower education and domain identification also predicted worse outcomes.

It is curious that those in the younger conditions report feeling threatened by age comparison but do not then underperform compared to baseline. What might be protecting

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those in the young observer conditions from the negative effects of stereotype threat? In contrast, those in the older conditions do not report feeling threatened by age comparison (due to a similar aged observer) and yet underperformed compared to those watched by a younger observer or not observed. Further, what might be causing older adults to underperform in the presence of an older observer if not stereotype threat?

One explanation is that the setting was not adequate to provoke stereotype threat. Research shows that older people are typically judged as less competent than younger people (Abrams et al., 2009; Cuddy et al., 2005; Fiske et al., 2002) and Study 1 of this thesis confirmed that older people are aware and self-conscious about stereotypes of decreased cognitive and physical function in later life. However, it may be the case that the ‘problem solving task’ was not sufficiently relevant to negative stereotypes about older adults’ competencies. The problem solving tasks may have been seen as a cognitive domain for which older people have increased ‘experience’ and ‘wisdom’ to complete. However, a study by Swift et al. (2013) found that although older people (75+) were rated by respondents as better at completing crossword puzzles than younger people (aged 25), a negative comparison with younger people still negatively impacted their performance in this positively stereotyped domain. They reason that comparison with younger people may highlight the low status of older people causing threat on tasks in which they are usually favoured.

Additionally, the average age of study participants was 57.39 (on average self-categorising as late middle-aged) as the study aimed to test the impact that ABST might have on older working-age individuals. Study 1 in this thesis and wider research generally suggests that people consider old age to start around the age of 60 (Sweiry & Willits, 2012). This age group may not have considered old age stereotypes as relevant to them and therefore the presence of a younger observer may not have posed a threat to performance.

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Despite both these explanations being plausible, they cannot account for the higher reporting of both threat-based concerns and anxiety in the young conditions compared to the older conditions. It appears that the young conditions were sufficient to provoke ABST, but this did not then impact performance outcomes. This cannot be accounted to participants in the young observer conditions spending longer on the tasks (their RT did not differ significantly from baseline) and so it is unclear why ABST effects were not found.

The opposite effect found among participants in the older observer conditions also cannot be easily explained using the measures in this study. Results suggest that worse performance outcomes in the older observer conditions are not linked to increased anxiety. This may suggest that worse performance in the older observer conditions is not due to negative emotion, but instead, participants may themselves apply age stereotypes to the older observer and become complacent in their presence. Or alternatively, this may be a demonstration of stereotype priming effects, whereby old age primes (in this case an older adult) lead to automatic assimilation to the stereotypes associated with that group (Levy, 2009; O'Brien & Hummert, 2006).

Limitations and Recommendations for Future Research

The present study confirms the hypothesis that the presence of a younger adult can cause older people to feel increased anxiety and stereotype threat, but this did not affect performance outcomes. The sampling of participants and testing settings may have been problematic. The participants were self-selected through interest in the task on Amazon's Mechanical Turk which may show a certain level of confidence in performing such tasks. Further, the online setting may have provided an opportunity for participants to distance themselves from the potential threat of the age comparison. Although the current study did not show stereotype threat effects among older people being observed or helped by younger

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people, further tests are needed before discounting these as cues to ABST. Future research might examine whether this is also the case in face-to-face contexts where evaluative pressures may be greater, or in competitive or cooperative contexts. Alternatively, different effects may be found in more applied contexts where the consequences of poor performance are more real, such as during interview processes, sports competitions or health and social care settings.

More significantly, the study unexpectedly showed that being observed by someone of a similar age may be most detrimental to performance outcomes. Future research should explore whether this is a basic stereotype priming effect or whether the presence of similar aged adults can cause complacency. It would be of interest to explore the effect of similar or mixed age groups or the minority status of younger/older people on workplace productivity.

Conclusions

In everyday settings such as the workplace, cues to ABST may come in many forms. The current study tested whether the presence of a younger person or the giving of help to older people act as cues to ABST. The presence of a younger person was found to increase anxiety and threat-based concerns among older test-takers; however this did not negatively impact performance outcomes. This is reassuring for intergenerational interactions within the workplace. However, further research should shed light on whether this is also the case when younger and older people work together in cooperative, competitive and group-based settings. A more concerning finding was that the presence of an older adult observing the older test-taker did result in worse performance. These findings open-up a number of avenues for exploring intergenerational relations within the workplace.

**CHAPTER 9—THE IMPLICATIONS OF AGEISM FOR HEALTH AND WELL-
BEING**

This study sought to replicate and extend previous findings that perceived ageism is linked to worse subjective health and well-being in later life (e.g., Luo et al., 2012; Vogt Yuan, 2007). An Active Ageing survey (co-designed with Hannah Swift and Dominic Abrams) of 1048 older people (aged 55 to 101) found that older people who reported more experiences of ageism also reported reduced subjective health and well-being. The study tested this hypothesis for the first time examining whether those who feel threatened by negative attitudes toward older adults—as opposed to striving to challenge them—are more likely to experience worse subjective health and well-being. Indeed, a mediation analysis including both threat and challenge as mediators showed only the path through threat to be significant. This study suggests that responses to ageism may determine its impact on health and well-being, whereby feeling threatened is more detrimental than challenging ageism.

Study 5. Implications of Ageism for Health and Well-Being

It has been suggested that age discrimination has negative repercussions for psychological well-being and physical health in later life. However, limited research has demonstrated the link between perceived age discrimination and psychological well-being (Garstka, Schmitt, Branscombe, & Hummert, 2004; Luo, Xu, Granberg, & Wentworth, 2012; Redman & Snape, 2006; van den Heuvel & van Santvoort, 2011; Vogt Yuan, 2007), and even less has demonstrated the same link with physical health (Luo et al., 2012; van den Heuvel & van Santvoort, 2011; Vauclair et al., 2014). The extent of this research is summarised in Table 9.1, demonstrating that only a very small number of studies have addressed this research question. Although favourable sample sizes have been used in previous research

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(often using national or international data), results were not always specific to older people (Grastka et al., 2004; Vogt Yuan, 2007) or were found in relation to a specific group of older people (Redman & Snape, 2006).

Table 9.1

Previous Studies Examining the Relationship Between Perceived Ageism and Health and Well-Being.

Study	N of older adults	Outcome
Garstka, Schmitt, Branscombe and Hummert (2004)	60 older people (aged 64-91; $M_{\text{age}} = 75$) 59 younger adults (aged 17-10; $M_{\text{age}} = 18.8$)	well-being (measured self-esteem and life satisfaction)
Redman and Snape (2006)	393 adults (all police officers) (aged 19 to 57; $M_{\text{age}} = 38.94$)	Life satisfaction
van den Heuvel and van Santvoort (2011)	14,364 ($M_{\text{age}} = 72$, $SD_{\text{age}} = 7.1$)	Life satisfaction and subjective health
Vogt Yuan (2007)	2,766 adults (aged 25-74)	Psychological distress and positive well-being
Vauclair et al., 2014	7,819 adults ($M_{\text{age}} = 76.86$, $SD_{\text{age}} = 5.41$)	Subjective health

Note: In all studies the predictor was perceived ageism and outcome variables differed (as specified). N = sample size, M = mean, SD = standard deviation.

In the wider literature, other forms of discrimination (e.g., race or gender-based) have been linked to worse psychological and physical health (Pascoe & Smart Richman, 2009) and US research shows that stereotype priming, negative self-stereotyping and negative expectations about ageing among older adults are associated with worse health outcomes (e.g., Levy, Hausdorff, Hencke, & Wei, 2000; Levy, Slade, & Gill, 2006). The current study sought to replicate and build upon these findings and gain a better understanding of how

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responses to ageism might impact upon psychological well-being and physical health in later life.

Threat vs. Challenge Responses and Health Outcomes

Responses to ageism are often discussed as threatening (to positive social identities) and as negatively impacting health. However, as is highlighted by the Biopsychosocial (BPS) Model of Challenge and Threat States (Blascovich & Mendes, 2000), situations that present a threat to some may be viewed as a challenge by others. The BPS model states that when people perceive that the demands of a situation outweigh the resources they possess, they are likely to show a threat response. However, others may perceive that their resources outweigh the demands of a situation and show a challenge response. Although the BPS framework is typically applied to cognitive and physical performance contexts, here it is proposed that it could also be used to understand the pressures of dealing with age prejudice. Some people may feel that age prejudice presents a threat to their positive social identity which they are unlikely to overcome. This may be the case for a 50 year-old in a company full of similarly qualified 20-somethings, being aware of negative attitudes to ageing and perceptions of older adults' competence. While others may see ageism as something that is challengeable, as may be the case for this same 50 year-old if they were to be more highly qualified than the 20-somethings or to have a good working relationship with them, for example.

Previous research has examined how these different 'threat' and 'challenge' responses affect physiological, motivational and emotional states, and the impact these responses have on performance outcomes (Jones, Meijen, McCarthy & Sheffield, 2009). This literature (reviewed below) is informative for the current research question: how might challenge and threat responses to perceived ageism differ in their impact on the health and well-being of older adults?

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As outlined in the theoretical chapters, perceived ageism may negatively impact health outcomes for older people by eliciting a negative stress response and increasing the likelihood of stress-related illness. Challenge and threat responses are most reliably distinguished through examining cardiovascular responses (Blascovich & Mendes, 2000; Blascovich, Mendes, Tomaka, Salomon & Seery, 2003). Whereas challenge responses are characterised by heightened sympathetic-adrenomedullary (SAM) activation, threat responses are characterised by heightened SAM and pituitary-adrenocortical (PAC) activation. The challenge physiological response is more adaptive, ensuring efficient cardiac activity and the mobilisation of energy to aid performance. The additional activation of the PAC axis among those experiencing threat leads to increased cardiac activity without a decrease in systematic vascular resistance, potentially resulting in increased blood pressure (Blascovich & Mendes, 2000; Jones et al., 2009). This distinction in physiological response has been reliably found across studies (e.g., Blascovich et al., 2003; Tomaka, Blascovich, Kelsey, & Leitten, 1993), including studies showing responses to stereotyping.

Previous research has shown that responses to prejudice or threats to social identity can be more characteristic of threat responses, as measured through physiological response (e.g., Derks, Scheepers, Van Laar, & Ellemers, 2011; Scheepers, 2009; Vick, Seery, Blascovich, & Weisbuch, 2008). For example, Derks, Scheepers, Van Laar, and Ellemers (2011) examined cardiovascular responses of women indicating challenge (vs. threat) during a car-parking task. These women had been presented with the negative stereotype of women's driving ability. Both gender identification and affirmation of participants' group or individual identity altered cardiovascular responses to the task, showing variability in cardiovascular challenge/threat responses. Likewise, individual or situational factors may determine whether older people appraise perceived ageism as a challenge or threat. This in

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turn may lead to more or less ‘healthy’ physiological response. It is hypothesised therefore that the physiological component of threat responses is more likely to have negative consequences for older adults’ health outcomes than challenge responses.

Less consistently, research suggests that challenge and threat responses also elicit different emotions and different appraisals of emotions as helpful or unhelpful (Jones et al., 2009; Lazarus & Folkman, 1984; Skinner & Brewer, 2004). Threat appraisals are typically associated with greater anxiety and lower coping expectancies than challenge appraisals (for review see Skinner & Brewer, 2004). More positive emotions experienced in a challenging situation might be hope and anticipation of overcoming difficulties, and the expectation of positive feedback or sense of personal achievement. For example, Tomaka, Blascovich, Kelsey and Leitten (1993) found that participants who appraised a mental arithmetic task as a threat were more likely to report that it was stressful than those appraising it as a challenge. It is hypothesised that negative emotion and stress resulting from threat responses to perceived age discrimination will be more likely to use up cognitive reserves through emotion regulation, thought suppression, self-monitoring etc. (Inzlicht & Kang, 2010). This ego-depletion is regarded as more likely among those experiencing threat than challenge, and is expected to inhibit self-control, thereby increasing negative health behaviours among older adults.

Research linking challenge/threat states to performance outcomes has also supported the suggestion that a challenge response is preferable (e.g., Blascovich, Seery, Mugridge, Norris, & Weisbuch, 2004, Chalabaev et al., 2009; Mendes, Major, McCoy & Blascovich, 2008; Moore, Vine, Wilson & Freeman, 2012; Turner, Jones, Sheffield & Cross, 2012). It is therefore expected that those who perceive age discrimination as a threat are more likely to experience performance decrements (as seen within the stereotype threat literature), which in

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turn may affect engagement in positive health behaviours related to these performance areas, such as physical and social activity.

Overall, it is therefore predicted that a maladaptive physiological response, negative emotion and performance decrements are more likely to result from threat responses than challenge responses. These outcomes would have implications for health and well-being in the long-term. It was therefore the aim of this study to examine for the first time whether reactions to age prejudice—threat vs. challenge responses—are differently associated with health and well-being in later life.

The Current Study

First, the study sought to confirm previous findings that perceived ageism is negatively associated with subjective health and well-being in later life, building upon the very limited research in this area to date which includes five studies, not all focusing on older people alone (e.g., Luo et al., 2012; van den Heuvel & van Santvoort, 2011; Vauclair et al., 2014). The primary aim however, was to examine whether this relationship is mediated by threat responses. It is expected that those who perceive ageism will show both increased threat and challenge responses, and that threat, but not challenge will mediate between perceived ageism and depleted subjective health and well-being. Challenge responses are seen as a more adaptive response to ageism, and expected to have fewer negative consequences for health and well-being. These analyses are important for understanding the psychosocial determinants of health outcomes and how they can be improved in later life.

Method

The ‘Active Ageing Survey’ was designed by the author in collaboration with Hannah Swift and Dominic Abrams at the University of Kent on behalf of Canterbury City Council and in partnership with 16 other local organisations. All of these organisations shared an aim

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of improving well-being in later life (e.g., AgeUK, Kent Police, Kent Fire and Rescue, People United, Canterbury and District Pensioners Forum and Active Life Ltd.). The survey sought to assess the current situation of older people in the local community and evaluate how they might be enabled to optimise opportunities for health, participation and security. In designing the survey, items were included examining respondents perceptions of prejudice towards older adults, and whether this provoked feelings of threat or desires to challenge negative stereotypes.

Sample Characteristics

One thousand and forty eight respondents completed the survey, recruited through the survey's partner organisations. Respondents ranged from age 55 to 101 ($M = 70.63$, $SD = 9.33$), were 63% female and 94.3% White British. Only 18.7% of respondents were still in paid employment (part or full-time) and this percentage reduced rapidly with age (e.g., 47.5% of 55-64 year olds, 13.8% of 65-74 year olds and 4.4% of 75-84 year olds).

Measures

Table 9.2 shows all items included in analyses. All constructs were measured using single items, apart from perceived ageism and subjective well-being.

Perceived ageism. A mean score of two items examining perceived ageism was created. This was permissible based on a strong correlation between the two items ($r = .57$, $p < .001$). Higher scores indicate greater perceived ageism.

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Table 9.2

Demographic, Lifestyle and Age Stereotyping Questions from the Active Ageing Survey

(2013)

Label	Question	Coding
Age	What is your age?	Years (1-120)
Gender	Are you...	0 = Male 1 = Female (none identified as 'transgender')
Perceived ageism 1	In the past year, how often has anyone shown prejudice against you or treated you unfairly because of your age?	1 = Never 2 = Rarely 3 = Sometimes 4 = Often 5 = Always
Perceived ageism 2	Do you agree or disagree with the following statement...I have been negatively affected by ageism and people's attitudes about older people	1 = Strongly disagree
Threat response	Do you agree or disagree with the following statement...I feel threatened by people's attitudes about older people	2 = Disagree 3 = Neither 4 = Agree 5 = Strongly agree
Challenge response	Do you agree or disagree with the following statement...I want to challenge people's attitudes about older people	
Subjective well-being-Happiness	Taking all things together how happy would you say you are?	1 = Very unhappy 2 = Unhappy 3 = Neither happy nor unhappy 4 = Happy 5 = Very happy
Subjective well-being-Life satisfaction	In general, how satisfied or dissatisfied are you with your life as a whole nowadays?	1 = Very dissatisfied 2 = Dissatisfied 3 = Neutral 4 = Satisfied 5 = Very satisfied
Subjective health	How is your health in general, would you say it is...	1 = Very bad 2 = Bad 3 = Fair 4 = Good 5 = Very good

Subjective health and well-being. The combination of happiness and life satisfaction scores have previously been used as an indicator of subjective well-being (e.g., Diener, 1994; Swift et al., 2014). In the current analyses, subjective health was also of interest and based on its strong correlation with happiness ($r = .49, p < .001$) and life satisfaction ($r = .38, p < .001$), and principal components analyses (PCA), it was included in the score to form an overall measure of subjective health and well-being. PCA showed that happiness, life satisfaction and subjective health loaded onto a single factor, explaining 68.26% of the variance and with an eigenvalue of 2.05. Factor loadings were all greater than 0.52. A mean score was created using the three items. Higher mean scores represent higher subjective health and well-being

Results

Preliminary analyses were conducted to examine relationships between variables of interest (Table 9.3). Respondent gender was significantly correlated with a number of self-report measures. Women were more likely to report having experienced ageism, threat and challenge, but also reported worse subjective health and well-being. Older age was also associated with lower challenge responses and reports of worse health and well-being. Due to these significant correlations, age and gender were included in analyses as covariates.

The main hypothesis was that threat responses would be a significant mediator of the relationship between perceived ageism and worse subjective health and well-being, but challenge responses would not, or would be to a lesser extent. Correlations show that threat was associated with greater perceived ageism and worse subjective health and well-being. However, challenge responses were also associated with greater perceived ageism and worse subjective health and well-being (to a lesser extent). To test this hypothesis further, multiple mediation analyses were run.

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Table 9.3

Pearson's Correlations, Means and Standard Deviations among Main Variables.

	2.	3.	4.	5.	6.	M	SD
1. Age	.04	.03	.04	-.08*	-.12***	70.63	9.33
2. Gender	-	.10**	.12***	.20***	-.09**	-	-
3. Perceived ageism	-	-	.69***	.40***	-.34***	1.90	.76
4. Threat response	-	-	-	.39***	-.32***	2.10	.88
5. Challenge response	-	-	-	-	-.12***	2.97	1.01
6. Subjective health and well-being	-	-	-	-	-	4.06	.67

Note: * $p < .05$, ** $p < .01$, *** $p < .001$.

Mediation Analyses

Parallel multiple mediator analyses were conducted using PROCESS, a macro for SPSS (model 4; 5000 bootstraps; Hayes, 2012). Parallel multiple mediator analyses allow for multiple mediators to be tested simultaneously, accounting for shared variance between them. As recommended by Hayes (2013), the statistical significance of indirect pathways is inferred using bootstrap confidence intervals which are less reliant on assumptions of a normally distributed sampling distribution. Confidence intervals not including zero are considered to show significant mediation. However, inferential statistics acquired through the normal theory approach which also tests the significance of indirect pathways are reported for comparison.

The mediation model tested the effect of ageism (X) on subjective health and well-being (Y), through threat (M_1) and challenge (M_2), covarying out age and gender (Figure 9.1). Analyses revealed a significant effect of ageism on threat (path a_1 ; $B = .78$, $SE = .03$, $t = 22.61$, $p < .001$) and challenge (path a_2 ; $B = .51$, $SE = .04$, $t = 12.24$, $p < .001$). The effect of threat on subjective health and well-being was significant (path b_1 ; $B = -.12$, $SE = .04$, $t = -2.91$, $p = .004$), but the effect of challenge was not (path b_2 ; $B = .03$, $SE = .02$, $t = 1.26$, $p = .21$). The

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direct effect of ageism on subjective health and well-being was also significant (path c' ; $B = -.22$, $SE = .04$, $t = -4.98$, $p < .001$).

Confirming the hypothesis, the indirect effect of ageism on subjective health and well-being through threat was significant (path c_1 ; 95% CI $[-.16, -.03]$; $B = -.09$, $SE = .03$, $z = -2.88$, $p = .004$). However, the indirect effect of ageism on subjective health and well-being through challenge was not (path c_2 ; 95% CI $[-.01, .04]$; $B = .01$, $SE = .01$, $z = 1.25$, $p = .21$). The bootstrap confidence intervals for pairwise comparisons between the indirect effect through challenge and threat did not contain zero (95% CI $[-.18, -.04]$), indicating that the indirect pathways are statistically different from one another.

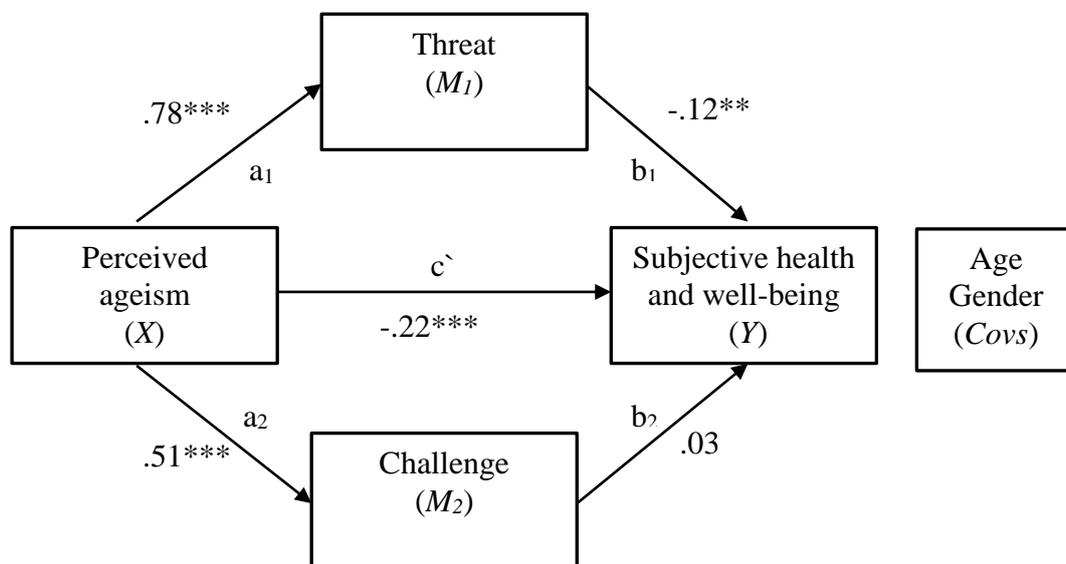


Figure 9.1. Mediation analysis, Hayes (2012) model 4. Note: * $p < .05$, ** $p < .01$, *** $p < .001$. Standardised B coefficients presented in figure.

Overall, analyses demonstrate that there was a direct effect of perceived ageism on subjective health and well-being, but also that this effect was partially mediated by threat, but not challenge responses.

Discussion

Analyses of the Active Ageing Survey data revealed a negative association between perceived ageism, and subjective health and well-being. Previous research demonstrating similar effects amounts to just five studies, and so the current study is a valuable replication of these previous findings (Garstka, Schmitt, Branscombe, & Hummert, 2004; Redman & Snape, 2006; van den Heuvel & van Santvoort, 2011; Vauclair et al., 2014; Vogt Yuan, 2007). It was additionally examined whether those who felt threatened by ageism—as opposed to striving to challenge it—would be more likely to report worse health and well-being. These findings were confirmed, whereby those that perceived ageism were more likely to report both threat and challenge responses (as would be expected), however those that reported feeling more challenged by ageism, did not also report worse subjective health and well-being. However, those that reported feeling more threatened by ageism did report worse subjective health and well-being. This is the first study to implicate threat responses to perceived ageism as more likely to be associated with worse health and well-being in later life than challenge responses. There may therefore be a benefit in encouraging challenge responses to widely held age stereotyping, rather than threat responses.

These analyses contribute to our understanding of the psychosocial determinants of health and well-being outcomes. Implicating perceived ageism as a predictor of worse subjective health and well-being leads us to draw the same conclusion as much of the gerontology literature: negative attitudes to ageing need to be challenged. But more specifically, the findings of this study suggest that we need to challenge older adults' own attitudes and responses towards ageism, as an aspect of self-perceptions of ageing. A more spirited attitude towards ageism might prevent it from negatively impacting people's

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experience of health, happiness and satisfaction in later life. But how might challenge responses to ageism be encouraged?

Wolff, Warner, Ziegelmann and Wurm (2014) found that age-specific components in interventions to promote physical activity among older people that encourage reappraisal of attitudes to ageing are potentially beneficial. In a randomised control trial, older participants (mean age of 70) were either given an intervention to promote physical activity (e.g., info on the benefits of physical activity, goalsetting, past success etc.), given both the physical activity intervention and a ‘views-on-ageing’ intervention, or given no intervention at all. The ‘views-on-ageing’ intervention included information about positive aspects of ageing and common misconceptions, the benefits of positive views of ageing, and training in a technique to identify and replace negative views on ageing with neutral or positive thoughts. Attitudes to ageing and physical activity were then measured over a 10-month period. As hoped, the views-on-ageing component had a positive effect on levels of physical activity, through changing views on ageing.

Although this example study discussed ‘views on ageing’, rather than ‘responses to ageism’, it is likely that the two are interlinked. Endorsement of more negative and stereotypical views of ageing among older people is unlikely to lead them to challenge ageism and see it as something that can be overcome. This kind of intervention (Sarkisian, Prohaska, Davis, & Weiner, 2007; Wolff et al., 2014) that challenges negative views on ageing could therefore be beneficial in reducing negative responses to ageism as well as negative views on ageing.

Additionally, responses to ageism may be altered by encouraging intergenerational contact. As with reducing age-based stereotype threat, intergenerational contact is often considered as having the potential to breakdown intergroup boundaries, reduce intergroup

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anxieties and overall lessen the threat that younger adults may present (Abrams et al., 2006; 2008). It must also be recognised that older adults' response to ageism may be strongly engrained through the internalisation of age stereotypes across the lifespan (Levy, 2009; Levy et al., 2009) and tendencies to adopt approach or avoidance goals (Elliot & Church, 1997). This may place limits on the ability to encourage challenge responses to ageism.

Limitations and Recommendations for Future Research

The study provides further evidence that ageism may be linked to health and well-being in later life. However, there were a number of limitations in using this survey data to address the research question, mainly due to its non-experimental design and use of subjective measures. First, the study could not confidently test causality due to its correlational design. There are alternative sequences of these variables that are theoretically plausible. For instance, it is possible that older people experiencing more health problems in later life will be more likely to perceive ageism as a threat due to people treating them differently because of their illness and feeling less able to counter negative perceptions. It is likely that both of these explanations hold some truth and that health decline and the threat of ageism in later life are closely linked. An experimental or longitudinal study would be necessary to confidently link threat responses to ageism to worse health outcomes.

It is further recognised that the study would have been improved by including objective measures of health and psychological well-being. Nonetheless, our subjective experiences are important and not dissimilar to objective outcomes. For example, a previous review of 27 studies has shown that self-rated health is a strong predictor of mortality (Idler & Benyamini, 1997). Lee (2000) further showed that this finding remains among older people (sample of 7527 adults aged 70+), whereby subjective health predicted both functional decline and mortality (Lee, 2000). Further, threat and challenge responses are typically not

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self-reported, instead they are indexed using physiological indicators which can show second-upon-second variability depending upon cues to demands and resources of a pressured setting (Blascovich & Mendes, 2000). Research in this area would typically compute a participant's average response across a couple of minutes to index challenge/threat responses. Likewise, the current study sought to index respondents' 'typical' challenge/threat response in settings of age-based judgement. Relying on participants' insight into their own emotions and willingness to report these is not ideal. There may be a reluctance to report negative emotion or an inability to understand our own motivational states (Blascovich et al., 2004). Future research could more reliably measure physiological indicators of threat and challenge in response to ageism over multiple time-points, taking the mean as participants' default response.

Finally, the current study was unable to address the question: through what mechanisms might threat responses to ageism damage health and well-being in later life? Intuitively, it has been proposed that perceived ageism might affect health behaviours, resulting in worse health outcomes. Dealing with ageism might cause ego-depletion, leading to reduced self-control and an increase in negative health behaviours (Inzlicht et al., 2006; Pascoe & Smart Richman, 2009). Additionally, awareness of negative age stereotypes and experiencing stereotype threat may lead older people to disengage with healthy behaviours such as physical exercise and social activities (Davies et al., 2002; Major et al., 1998). It is within the scope of future research to test these hypotheses.

Conclusions

Using survey data from 1048 older people (aged 55 to 101) this final study demonstrates that perceived ageism is associated with worse subjective health and well-being. Further, recognition was given to the occurrence of different responses to perceived

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ageism, and the data revealed that threat responses were more strongly linked to these negative outcomes than challenge responses. This research is both insightful and practical in demonstrating that individual responses to perceived ageism may determine negative impact on health and well-being. It is expected that this is due to the impact of perceived ageism and threat responses on positive health behaviours. Future research should explore the potential to alter both responses to ageism and to promote positive health behaviours, providing avenues for mitigating the negative impact of psychosocial determinants of health and well-being.

CHAPTER 10- DISCUSSION

This chapter briefly recaps the theoretical questions that led to the empirical work in this thesis. A summary of the five studies is provided and their key contributions to this area of research are highlighted. The implications of these findings for older people within the workplace, within health and social care, and more generally in activity and learning are discussed. Policy, organisational change, education and individual change are all discussed as areas that have the potential to reduce negative outcomes arising from age stereotyping. Finally, a number of overarching limitations of this research area are considered and concluding thoughts shared.

A Narrative of the Theoretical Chapters

In opening, Chapter 1 reviewed both historic and contemporary research in the area of attitudes to ageing. While it was evident that a number of sub-topics in this area would benefit from more comprehensive and up-to-date research, this thesis makes contributions to a growing literature which asks the question: How might being aware of negative attitudes to ageing impact upon the emotions, motivations and behaviours of older adults? Using social identity theory (Tajfel & Turner, 1979) as a foundation, Chapter 2 outlined how negative attitudes to ageing are a potential threat to the positive social identities of older people. In particular, ageism toward older people was discussed as having wider scope than other forms of prejudice. This was explained in terms of, 1) the unique way in which people internalise age stereotypes at a young age until they become self-relevant, 2) the potential for everyone to fall victim to ageism rather than a minority (or even a majority), and 3) due to the paternalistic form it often takes, whereby positive attitudes, feelings and actions toward older people may mask unequal treatment and more negative aspects of ageism.

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Chapter 3 delved further into the implications of this by introducing stereotype threat effects, a type of social identity threat. Stereotype threat effects occur when negative stereotypes are in some way made salient and an individual feels at risk of confirming these stereotypes through their actions. This threat ironically makes them more likely to act in line with the negative stereotype (Steele & Aronson, 1995). As well as providing an overview of the theory, the chapter comprehensively reviewed age-based stereotype threat (ABST) research. This encompasses a number of small-scale, largely experimental studies testing whether making negative age stereotypes salient leads older people to underperform on stereotype relevant tasks. There is now a substantial body of research in this area and a range of performance outcomes, moderators and mediators have been measured. However, Chapter 3 showed that little has been done to draw this literature together and there are sometimes contradictory findings that seem difficult to make sense of. As well as the review in Chapter 3, Chapter 6 presented a meta-analysis of ABST effects (Study 2).

Chapter 3 highlighted two dominant models explaining the mechanisms of stereotype threat and assessed whether ABST research provides support for these models. The ‘Stereotyped Task Engagement Process Model’ places greater emphasis on regulatory processes (Smith, 2004), while the ‘Integrated Process Model’ emphasises working memory processes (Schmader, Johns & Forbes, 2008). More recent research has argued that regulatory processes may be more relevant than working memory processes in the case of ABST, due to improved emotion regulation in later life (e.g., Barber & Mather, 2013a; Popham & Hess, 2013). However, research evidence could not provide consistent support for either model. As well as lack of clarity as to ABST mechanisms, both implicit and explicit measures of threat-based concerns were deemed problematic by this review. Researchers may have to accept that it is often difficult to tap into motivational processes that are both too

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complex to capture using implicit measures and too susceptible to socially desirable responding to reliably measure explicitly. Despite such difficulties, Study 3 (Chapter 7) sought to test an extension of these dominant theories of the mechanisms of ABST, the ‘stereotyping uncertainty hypothesis’.

The review highlighted the limited reach of ABST research and questioned the applicability of ABST research to the everyday experiences of older adults. While older people may face some formal test settings and tests that may be introduced in a way that makes them seem age-biased, it is unclear what factors may cue ABST and what domains may be susceptible to ABST effects in more informal settings. Therefore, Study 4 (Chapter 8) offered further theoretical extensions to stereotype threat theory by testing two novel everyday cues to ABST, the presence of a younger observer and the offer of help from a younger observer.

Lastly, Chapter 3 used the biopsychosocial (BPS) model of challenge and threat states to model the many moderators of ABST examined within the research literature (Blascovich & Mendes, 2000). It was argued that while some individuals might experience a stereotype threat, others may perceive a setting as a stereotype challenge. This would be dependent on a number of moderating factors that either alter the more general balance of demands and resources in a performance setting (e.g., task difficulty, domain identification and self-efficacy) or more specifically alter the salience of stereotypes in that setting (e.g., age, intergenerational contact and stigma consciousness). Stereotype threat research often assumes just one reaction to negative stereotypes (a threat response), however the various factors that moderate stereotype threat effects show that some people are able to overcome and challenge negative stigmatisation. This diversity in response was drawn upon throughout the thesis, but

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particularly in Study 5 (Chapter 9) which examines differing responses to ageism (challenge vs. threat).

Chapter 4, the last of the theoretical chapters, reviewed the association between older adults' perceptions of ageism, and health and well-being in later life. Limited research has examined this association and has only speculated as to how perceiving ageism might impact health and well-being. These explanations include heightened stress response impacting cardiovascular health, reduced self-control affecting health-related behaviours and once again, performance decrements resulting from ABST. Study 5 (Chapter 9) extended this promising area of research which highlights the potential longer-term implications of age stereotyping and ageism for older people.

The Empirical Chapters and their Theoretical Contribution

A total of five studies employing both surveys and experimental methodology, and primary and meta-analysis, formed the empirical chapters of this thesis. The studies addressed research questions highlighted within the theoretical chapters, informing not only theory and future research, but providing talking points for policy and practice.

Age Self-Consciousness and Awareness of Age-Based Judgement

The ABST literature is based upon the assumption that older people are aware that others stereotype them negatively due to their age and that this is threatening to them. Despite many studies alluding to this, Study 1 of this thesis (Chapter 5) was the first piece of research to examine age self-consciousness (self-consciousness about one's age and others judging you based on this), as well as unpicking perceptions of age-based judgement (how you believe others stereotype your age group) and the contexts in which this is of greatest concern. This survey of 105 adults (aged 18 to 83) provided a rich set of both qualitative and quantitative data showing the prevalence of age self-consciousness and the variety of

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stereotypes and settings in which age-based judgement is perceived. Its main conclusions and contributions to theory are outlined here.

People are conscious of their age and how others judge them based on age. Age self-consciousness was defined as being generally self-conscious about one's age and feeling that others notice your age, judge you and compare you to others based on it. Study 1 revealed that age self-consciousness was more common than gender self-consciousness. It was also more common than race self-consciousness, however, the worth of this finding given the racial homogeneity (predominantly White) of the sample was questioned. When examining the age self-consciousness of different age groups, late older-aged respondents (aged 70+) were actually the least self-conscious. However, this also applied to gender self-consciousness, suggesting a general bias in responding. Additionally, late older-aged respondents showed equal propensity to other age groups to describe stereotypes held about their age group. They produced a wide and vivid range of stereotypes that they believed others applied to their age group, showing commonalities when thematically analysed.

Age-based judgement is less likely to pose a threat in early life. The stereotypes listed by younger adults (aged 18-31) largely reflected negatively upon their behaviours and character (e.g., irresponsible, antisocial, naïve) rather than their competence. Stereotypes of inexperience were an exception to this. Moreover, it was argued that these stereotypes are quickly superseded by stereotypes of the middle-aged (aged 32 to 59) who were most conscious of stereotypes of achievement and responsibility (e.g., parent/family/settled, work/career focused, responsible/reliable). These stereotypes are neutral and prescriptive, rather than attributing negative competencies. This may be more likely to result in a stereotype challenge than a stereotype threat for younger adults, as demonstrated by Hehman

and Bugental (2013). It is therefore expected that while age self-consciousness is high among the young, it may be less likely to affect their competencies through ABST effects.

Unfavourable views of ageing are of concern as early as middle-age. While the early older-aged group were the first to highlight being stereotyped as incompetent in a wide range of areas, middle-aged adults already thought that they were viewed as boring, old-fashioned, out of touch with the modern world and past their best. This showed the extent of our negative views of ageing, that even on the approach to old age people are concerned about its negative connotations and not being as young as they once were. It is possible that ABST might affect the middle-aged based on these stereotypes, particularly as the majority of this age group will be at work (a context in which competencies are key). Although some ABST research has examined threat effects among older people with a very low mean age (e.g., O'Brien & Hummert, 2006, mean age of participants = 54), this has often been done in conjunction with stereotypes specific to older age groups (e.g., ABST effects on memory tasks in O'Brien & Hummert, 2006). Instead, stereotypes of being past-it or out of touch with the modern world etc. may be more likely to impact performance on tasks involving innovation and technology or have longer-term impact on engagement in areas such as training and career development.

Older people are principally conscious of stereotypes of incompetence and burden. Negative stereotypes of competencies among both the early and late older-age groups were found to span a comprehensive list of life domains, including work, social activities, hobbies and the cognitive and physical domains more broadly. This showed the potential for negative stereotypes to affect older people beyond the very few settings examined to date. Future research might examine ABST among older people in the workplace, in health and social care and when using technology or during training/learning

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(as with Fritzsche, DeRouin & Salas, 2009). Linked to stereotypes of incompetence, increasingly into late older-age, respondents believed that they were stereotyped as a burden, both on the economy and more generally. It is unclear how this stereotype which questions older adults' ability to be useful in any capacity might affect emotions, motivations and behaviours. Marques, Lima, Abrams and Swift (2014) found that implicitly priming negative age stereotypical words led to reduced will-to-live among older adults. Explicit awareness of stereotypes of economic burden may have a similar effect on longer-term behaviours and outcomes for older adults.

As 'old age' gets longer, so does the diversity in old age stereotypes. When fitting the free-response stereotypes to the stereotype content model's (SCM; Fiske, Cuddy, Glick & Xu, 2002) categories of warmth and competence, it was evident that while early older-aged adults (60-69) thought they were stereotyped as warm but incompetent, late older-aged adults believed they were viewed as lacking both warmth and competence. This contrasted with young and middle-aged adults who were more likely to report stereotypes of competence than incompetence, but showed less variation in warmth and lacking warmth stereotypes. This supports the move away from examining 'older adults' as a whole when looking at social identities within our society.

Due to the unique malleability of age categories and the increasing number of years covered by this general 'old age' label, research should instead move towards examining how people self-categorise their age group. For example, participants in Study 1 gave the 'name' of their age group so that similarities and changes in these self-descriptions could be examined and provide an indication of where age group boundaries should be placed. Instead, Study 4 continued to use the spectrum of very young to very old, but asked participants to place themselves in one of nine age groups in-between these end points. Using similar

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measures of age self-categorisation, researchers can better understand how age as a social identity affects the individual.

Age-Based Stereotype Threat Effects

Chapter 6 (Study 2) presented a meta-analysis of 22 published and 10 unpublished articles, including 82 effect sizes ($N = 3882$) and investigating ABST effects on older people's performance in a number of domains as well as examining factors that may moderate these effects. Studies 3 and 4 (Chapters 7 and 8; $N = 206$ and 252 respectively) were experimental studies designed to extend ABST research and address research questions arising directly from the meta-analysis. The combined contributions of these three studies to the stereotype threat literature are discussed in this section.

ABST research shows publication bias, but with a new twist. In the ABST meta-analysis (Study 2), as is often expected, published research produced a larger effect size (mean $d = .42$) when meta-analysed than unpublished research (mean $d = -.03$). In addition to this common publication bias, it was found that ABST effect sizes were larger when published in European Journals than North American Journals. This was not explained by regional differences in the size of ABST effects. One can only speculate why this might be, perhaps due to bias in author self-selection of research to be published or differences in journals standards for publication.

There is evidence for a small-to-medium effect of ABST. The inclusion of unpublished research within the meta-analysis meant that this meta-analysis was the first to comprehensively examine ABST effects (as had previously been done within the gender-based and race-based stereotype threat literature). Overall, there was a small-to-medium effect (mean $d = .28$), supporting the stereotype threat hypotheses that stereotypes may harm performance outcomes.

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This threat really is a ‘stereotype’ threat. In critique of the ABST research reviewed, it was highlighted that many of the manipulations of ABST do not present ‘stereotypes’ at all, instead they infer that there are factual differences in performance between the young and old. To get a better picture of whether stereotypes really do have the ability to threaten performance outcomes, manipulations using factual statements (mean $d = .09$) were compared to those relying upon the salience of age stereotypes (mean $d = .52$). Far from invalidating ABST effects, this analysis provided further support for the negative impact that age stereotypes, even those made salient in the most subtle ways, can have on performance outcomes.

ABST effects are not equal across performance domains. This was the first stereotype threat meta-analysis to examine performance domain as a moderator of ABST effects. Due to the infrequency with which some domains have been measured (e.g., physical performance, driving and skill acquisition) it was not possible to make a comparison between all domains. However, two widely measured domains—cognitive tasks (mean $d = .68$) and memory tasks (mean $d = .21$)—were differently impacted by ABST. Therefore it is likely that other domains will also vary in how they are impacted by salient age stereotypes. This may be explained by the propensity for different tests to pick-up performance differences, but it is also likely to be due to the varying saliency and strength of some age stereotypes.

Testing the stereotyping uncertainty hypothesis- The jury’s out. Chapter 7 proposed a theoretical extension of stereotype threat theory to explain why in the case of both ABST and gender-based stereotype threat (GBST), more subtle stereotype-based manipulations have greater negative outcomes for task performance. The newly proposed stereotyping uncertainty (SU) hypothesis stated that uncertainty and ambiguity surrounding stereotype-based judgement would increase the likelihood of experiencing negative

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stereotype threat effects due to the burden of uncertainty on cognitive resources. The SU hypothesis was tested in Study 3 in the area of GBST, but was unable to reproduce GBST effects and therefore support the assumptions of the SU hypothesis. This may have been due to insufficient power within the study based on a low number of participants in each condition. However, limitations were also noted surrounding the sample of participant used, the strength of the manipulations and the sensitivity and reliability of the measure of SU. Therefore, future research should seek to re-test this hypothesis bearing in mind the limitations of the experimental setting in Study 3.

Testing every-day cues to ABST. It was highlighted that much of the ABST research uses cues to ABST that are unlikely to be experienced on a day-to-day basis by older people (often directly linked to test instructions). This was highlighted as a limitation. Study 4 (Chapter 8) therefore began to address this research gap by testing whether the presence of a younger observer and/or the offer of help from an observer might cue ABST. This was tested among adults completing a problem-solving task in an online setting (mean age = 57.39). Once again (and despite sufficient power), the study was unable to support hypotheses and although participants observed by a younger adult reported greater threat-based concerns, they did not show reduced performance on a problem solving task when compared to baseline and older observer conditions. Research might explore the potential for ABST in settings where intergenerational interactions that are more competitive, face-to-face, or in work settings. There are many more settings in which ABST might affect older adults, as highlighted by Study 1, and so research should seek to establish when and where ABST effects might be most common in the everyday lives of older adults.

Perceived Ageism, and Health and Well-Being

Finally, Study 5 analysed data from a survey of 1048 older people aged 55+, with the aim of making inferences about the implications of perceiving ageism for health and well-being in later life.

Perceiving ageism is associated with worse health and well-being in later life.

Analyses confirmed previous research findings, that perceiving ageism is associated with worse subjective health and well-being in later life (e.g., Vogt Yuan, 2007). This highlights the importance of considering psychosocial factors when seeking to improve health and well-being in later years.

Older adults' response to ageism may determine health and well-being. It was noted that this line of research has not previously paid attention to the diversity in responses to prejudice and discrimination. As recognised in the theoretical chapters, a number of factors moderate threat responses to negative stereotyping and so some people may perceive a negative stereotype threat while others display more positive stereotype challenge responses. Study 5 therefore examined challenge and threat responses to perceived ageism and using mediation analyses tested which type of response was more strongly associated with negative health and well-being in later life. As expected, threat responses (but not challenge) mediated this relationship between perceived ageism and worse subjective health and well-being. Although this cross-sectional study could not infer cause and effect, it did highlight the relationship between more positive and resistant responses to ageism and better health and well-being in later life.

Implications

Much research highlights the ageist and unequal treatment of older adults, but the current thesis goes beyond this to explore how older people may be disadvantaged by their

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own awareness of and reaction towards age stereotypes and ageism. Drawing upon the key theoretical contributions of this research, a number of potential implications for older people are now examined in more depth, focusing on three key areas: the workplace, health and social care, and activity and learning in later life.

Age in the Workplace

The workplace is one of the key areas in which performance decrements due to ABST may have the greatest consequence. At present, those aged 50+ only form 29.7% of all those in work, but this proportion is increasing as a greater number of older people are delaying retirement or choosing to work in retirement. Since the default retirement age was abolished in 2011, more than a quarter of a million more people have chosen to continue to work over the age of 65 (Department for Work and Pensions, 2014). As longevity increases, many older people may want to or need to work for longer due to insufficient retirement incomes (Department for Work and Pensions, 2012; House of Lords, 2013). As well as individual need, there is a societal need for changes in working patterns in later life as dependency ratios within the UK are projected to decrease from 3.21 people of working age compared to those of state pension age in 2010, to 2.0 in 2051. To address this, the government are incrementally increasing the state pension age to encourage later retirement and under this legislation expect the dependency ratio to instead reduce to 2.9 by 2051 (Office for National Statistics, 2012b). Additionally, older people make a huge contribution to our society through unpaid work such as volunteering and caring responsibilities (House of Lords, 2013). It is therefore important that age stereotypes do not deter older workers in a paid or voluntary capacity, or give younger workers an unfair advantage.

Despite a dearth of ABST research specific to the employment context (often due to ethical and practical impossibility), the ABST meta-analysis in this thesis has shown that

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ABST can impact the cognitive and memory performance of older adults, which has clear implications for the workplace. A number of formal test settings exist within employment, including exams for licensure, personnel selection, performance monitoring and training (Sackett, Schmitt, Ellingson, & Kabin, 2001). Many other tasks within the workplace are informal tests of ability, viewed and evaluated by others, all of which may be biased by ABST. Moreover, experiencing ABST and its effects in the workplace may impact upon the longer-term intentions and well-being of older employees. Von Hippel and colleagues have examined how age related threat-based concerns correlate with a number of outcomes in the workplace (von Hippel, Kalokerinos, & Henry, 2013). Using participants from two work contexts, it was found that higher self-reported stereotype threat among older employees was associated with lower job satisfaction, organisational commitment and work mental health. In both work contexts, lower commitment and job satisfaction predicted increased interest in resigning, but in only one sample was it associated with intentions to retire. A second study surveying younger employees also confirmed that these results were unique to older employees. Both organisational and interpersonal cues to ABST within the workplace should be explored to reduce the possibility that ABST might unfairly disadvantage older workers or lead them to exit the workforce.

Age, Health and Social Care

The research meta-analysed within Study 2 included demonstrations of ABST effects on tests relevant to assessment in clinical settings, including grip strength which is recognised as an indicator of frailty (Swift, Lamont, & Abrams, 2012), clinical tests used in dementia assessment (Haslam, Morton, Haslam, & Varnes, 2012) and memory and cognitive testing more widely. While it is recognised that these types of tests are rarely used in isolation as

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measures of medical and support needs, bias in such tests may contribute towards less accurate assessment of the support needs of older adults.

In particular, ABST could be linked to the concept of learned helplessness, which states that ‘exposure to uncontrollable events interferes with the organism's tendency to perceive contingent relationships between its behavior and outcomes’ (Maier & Seligman, 1976; p3). Being aware of negative stereotypes of ageing may reduce a person’s perceived ability to control and determine their own outcomes. When they experience underperformance due to ABST, this may further reinforce this sense of helplessness, thereby increasing dependency.

Coudin and Alexopolous (2010) found that when completing a 3D puzzle task under time constraint, older participants in the threat condition asked for help more than those in both the control and nullification conditions. This increase in help-seeking behaviour was presented as a demonstration of increased helplessness and dependency. It is recognised that dependency can be beneficial to the well-being of individuals by ensuring needs are met that otherwise would be neglected (Baltes, 1996). However, the levels of dependency an individual displays may not always be based on the actual need of that individual (determined by their physical and mental deterioration); rather psychosocial factors such as stereotype threat are suggested to play a role in determining how dependent an individual becomes on others (Solomon, 1982). The findings of Study 5 of this thesis could also be considered a demonstration of this. Perceived ageism is linked to negative health and well-being in later life. This could be viewed as a kind of learned helplessness, whereby efforts to help oneself are seen as futile when exposed to negative views of ageing.

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Age, Activity and Learning

Study 1 found that older people are aware of being stereotyped as lacking competence in an expanse of both cognitive and physical domains. This may increase threat during new (or old) activities and reduce the likelihood of engagement in tasks that are taxing or challenging. This is a direct threat to what is often termed ‘Active Ageing’ or the continued participation of older people in the “social, economic, cultural, spiritual and civic affairs” of a society (World Health Organisation, 2002; p12). Study 5 also shows that perceiving ageism is associated with worse health, a key determinant of whether an individual has more positive or negative experiences in later life and is able to engage in a number of positive physical, cognitive and social activities.

In particular, learning new skills can be particularly challenging and is relevant to stereotypes of older people as less able to learn and develop new skills. Within the workplace, learning and development is important for employee productivity, but also employer satisfaction. Outside of the workplace, learning to use new technologies specifically can benefit older people in a wide range of areas. First, digital literacy can ensure older people more easily find appropriate services and other opportunities for social engagement, enabling them to pinpoint and assess their options (e.g., the Government’s digital transformation). Second, assistive technologies are increasingly being used to support older people with disabilities. Third, many older adults, as with the younger generation, are reaping the benefits of using social media to form and maintain social contacts (Jopling, 2015). Beyond this, life-long learning presents wider benefits related to social interaction, well-being and life satisfaction (Thone-Geyer, 2014).

Testing the hypothesis that the acquisition of new skills may be threatened by age stereotypes, Fritzsche, DeRouin and Salas (2009) examined whether ABST might affect older

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people performance when learning to use a computerised library cataloguing system. In contrast to the predictions of stereotype threat theory, they found better performance among those who were told that “previous research has shown that there are age-related differences in training outcomes” compared to a stereotype nullification condition. Although this study does not support the notion that ABST effects occur during learning, it should be noted that all participants were part of an adult continuous learning programme and so may be a more motivated group of individuals tested in a safe ‘adult-learning’ environment. These individuals may have been more likely to perceive a stereotype challenge than a stereotype threat. The implications of ABST for later life learning and engagement with technology require further exploration within research.

Policy and Practice

Policies to challenge our society’s pervasive and negative views of ageing are often discussed by politicians and organisations concerned with ageing. However, policy changes do not necessarily equate to attitudinal change, and so need to be accompanied by organisational and personal changes. Recommendations are made in a few key areas as demonstration of this.

Attitudinal Change

Recent years have seen growing political interest and positive changes toward outlawing discrimination based on age within the workplace and more widely. The European Employment Directive on Equal Treatment (Directive 2000/78/EC), established in 2000, stated that “any direct or indirect discrimination based on religion or belief, disability, age or sexual orientation as regards the areas covered by this Directive should be prohibited throughout the Community” (EUR-Lex, 2000: 2). The Employment Equality (Age) Regulations 2006 were confirmation that the UK would embrace the European Directive and

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formally prohibited employers from discriminating based on age. The Equality Act 2010 then consolidated laws on discrimination in employment, education and training for people with ‘protected characteristics’, e.g., disabilities, religious beliefs, race. Finally, in 2011, the UK Government removed the Default Retirement Age (DRA), whereby employers could force their employees to retire at the age of 65. Laws and directives such as these are a positive step forward and in the longer-run may lead to changes in cultural acceptance of age discrimination. Moreover, Lord Filkin stated that “It’s quite clear that when you get to 65, you’re not ‘old’ unless you are very unlucky” (House of Lords, 2013b). By this he was arguing that policies and practices need to shift from this mind-set that age can be used as an accurate marker of ability and need.

Negative attitudes to ageing do not just appear in later years, they are adopted at an early age and manifest as negative attitudes towards an outgroup before becoming self-relevant when individuals reach later life. Therefore, more practically, government might introduce a kind-of ‘ageing education’ whereby from a young age, children are supported to develop healthy views of ageing (Crawford, 2015). By targeting these negative views at an early age ageism may be reduced, but this may also improve the next generations’ own experience of ageing. Crawford (2015) recommends a number of learning outcomes for education on ageing around appreciating diversity between and within age groups, as well as understanding the important contributions that people of all ages make to society. Changes to the school setting are encouraged (e.g., pictures of people from all age groups and open discussion about ageing), as is the promotion of positive intergenerational contact.

Other key players in the formation and maintenance of negative attitudes are media and advertising. Unfortunately it is commonly accepted that youthfulness sells and so this leads to an underrepresentation of older people in the media, but not necessarily a more

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negative portrayal (Martin, Williams, & O'Neill, 2009; White, Morrell, Luke, & Young, 2012). Moreover, there is also the assumption that young people are the key buyers and so many new products are tailored to and become associated with the young. This contributes to the exclusion of older people from particular goods and services. If chosen, media has the potential to shape our attitudes to ageing for the better.

Changes in the Workplace

The work context is where much concern around ageism and ABST is focused. Age discrimination legislation tries to prevent discrimination based on age within the workplace. However, organisational and interpersonal cues to ABST should also be considered as avenues for change within the workplace. That is, factors that make negative age stereotypes salient in performance contexts. Organisational cues from as early as the employee recruitment stages may disadvantage older adults, for example, age-typing in job adverts (using stereotypically young descriptions or pictures; Kulik, 2014) and the age demographic of the interview panel may indicate organisational preferences for younger employees (whether intentional or not), eliciting a stereotype threat. If at all possible, such biases should be avoided within recruitment. In employment, the demographic composition of a workplace has also been considered as a cue to stereotype threat for stigmatised individuals; for example, through the 'solo-status' of stigmatised individuals (being the only member of a particular social group; Sekaquaptewa & Thompson, 2003) and/or the comparative status of these individuals to their colleagues (Kulik, 2014). Workplace diversity and the promotion of equal opportunities for different groups should not only be considered in terms of gender and race, but also age.

Interpersonally, prejudiced attitudes within an organisation may damage the performance and advancement of stigmatised groups. Logel et al. (2009) found that female

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undergraduate students who interacted with more sexist males, subsequently performed worse on an engineering test. However, it is recognised that efforts might be better placed targeting organisational structure with the hope that this will have a knock-on effect on prejudiced attitudes which can often take time to remould (Kulik, 2014).

Awareness in Health and Social Care

Much of what can be done within health and social care to reduce negative outcomes from age stereotyping will be dependent upon the actions of staff. Medical professionals would benefit from an awareness of psychosocial influences, such as ABST, on medical assessments and through this could seek to minimise the salience of age and age stereotypes. For example, when conducting cognitive tests as an assessment of dementia (such as the Mini-Mental State Examination and Addenbrooke's Cognitive Examination), medical professionals will draw their conclusions about diagnosis and severity of cognitive impairment from both these tests and other sources such as brain scans and personal histories. As noted by Haslam and colleagues (2012) in the context of age self-categorisation (rather than ABST), patient's expectations around ageing and the salience of being 'old' could also be considered when examining cognitive test scores. In particular, greater decrements may be found on tasks that align with patients' expectations of age or dementia-related cognitive decline.

As well as being mindful of this phenomenon, medical professionals may seek to reduce age salience during medical assessment. This may take the form of asking all questions related to age, decline with age or reflections of their younger self after testing, rather than before. Additionally, medical professionals should consider whether their actions convey age stereotyping, such as slowed, dumbed-down or patronising speech, over-helping or unjustified assumptions about health and activity that stem from age stereotypes.

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Promotion of Active Ageing

Ensuring age stereotypes do not affect the potential for older people more broadly to lead active and fulfilled lives will be reliant on wider interventions to affect attitudes to ageing. As noted earlier, policy, education, media and advertising play a large role in the promotion of positive attitudes to ageing and the promotion of active ageing, including engagement with work and positive health behaviours. Increased opportunities for participation in later life will also be beneficial, such as government support for flexible working, intergenerational programmes, council-funded opportunities for health, leisure and education etc. As older people are seen more in the same domains as younger adults, using technology, in the workplace, enjoying music, culture and fitness etc., it will challenge perceptions of ageing and create cultural change.

It will also be important for older people themselves to challenge stereotypes rather than see them as a threat. Teaching older people about ageism and stereotype threat may enable them to take on this challenge perspective. For example, Johns, Schmader and Martens (2005) found that female participants did not underperform on a maths test when they were told that gender stereotypes can make women anxious on tests and that the stereotypes do not reflect actual ability. They did underperform relative to men when this preamble was not given. This type of intervention has yet to be tested on older adults.

Research Limitations

Within each empirical chapter, various study limitations have been noted. Here, three overarching limitations to this area of research are outlined.

Stereotype Threat vs. Stereotype Priming

Although the meta-analysis within this thesis supports a negative effect (size small-to-medium) of salient age stereotypes on older adults' performance, it is unclear whether this

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arises from ‘threat’. Without confirming the presence of threat-based concerns or other stereotype threat specific mechanisms (e.g., anxiety, reduced motivation, cognitive depletion), it is unclear whether stereotype threat effects are being experienced rather than direct stereotype priming (Bargh & Pietromonaco, 1982). Indeed, as highlighted in the theoretical chapters, the ABST studies that have measured threat-based concerns and mediators often produce mixed findings. Nonetheless, the negative outcomes of stereotype salience are very real and so further research that produces reductions in these negative outcomes may provide more definitive evidence of the exact mechanisms that are behind ABST effects.

Applied Research

Steele and Aronson (1995) refer to stereotype threat as a ‘threat in the air’, meaning a potential threat that may become apparent in any situation in which the stereotype is relevant. The studies included in the present meta-analysis all used an experimental design, testing performance within a controlled setting. These studies are relevant to test-like situations that may arise at consequential times in the lives of older adults, for example, within employment selection, further education, or the medical/care/support setting. However, research should further consider the chronic effects of ABST. Over time older people may become sensitized to cues that their cognitive and physical capabilities will be noticed and evaluated in many settings, such that they implicitly pose test-like conditions. For example, these may arise in the workplace, or when asked to look after grandchildren, or when taking part in group-based activities. An important question therefore is whether ABST affects older adults’ ability to ‘perform’ outside of formal test-based settings. Some research has begun to recognise this need for testing ABST in more varied settings (von Hippel et al., 2013), and to explore a

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wider range of performance outcomes, for example, dependent behaviours (Coudin & Alexopolous, 2010) and learning outcomes (Fritzsche et al., 2009).

Long-Term Impact of Age Stereotypes

Although Study 5 demonstrates cross-sectionally that there is a positive relationship between perceived ageism and health and well-being, this causal relationship has not been tested. Much of the discussion also draws upon the potential longer-term implications of experiencing ABST effects, but notes the lack of research testing this long-term impact. While other stereotype threat research has supported (again often cross-sectionally) the assumption that stigmatised individuals may avoid the negative experience of stereotype threat by disengaging from important activities (Osborne, 1997; Carstensen, Isaacowitz, & Charles, 1999), ABST research has yet to robustly test this. Von Hippel and colleagues' (2013) research comes closest to this by demonstrating that self-reported stereotype threat is linked to workplace turn-over intentions. There is much room for extended research in this area.

Concluding Thoughts

In this thesis the concepts of age self-consciousness and perceived age-based judgement were operationalised and measured, affirming concern around age stereotyping and its impact on the emotions, motivations and behaviours of older adults. A vivid picture was also painted of the concerns that different age groups have about how others view them. The thesis then provided a comprehensive review of age-based stereotype threat research, a body of literature that has grown extensively over the past 15 years. This review has given clarity to this area of research, provided direction for further studies and highlighted a number of limitations that are compromising this research. Moreover, experimental and survey-based studies tested novel research questions, extending the ABST literature. It was

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tested whether uncertainty might play a role in the performance decrements resulting from ABST effects. Further, older people's interactions with younger adults and receiving help from others were assessed for the first time as cues to ABST. Finally, perceived ageism was highlighted as a potentially important psychosocial determinant of health and well-being in later life. This research demonstrates the need for negative societal views of ageing to be challenged to allow older people to make the most of later life.

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Appendix A

Table A.1

Correlations between Main Survey Variables, including Means (M) and Standard Deviations (SD)

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.	M	SD
1. Survey format (0 = paper, 1 = online)	-																			-	-
2. Employment status	.10	-																		-	-
3. Education	.23*	.29**	-																	14.81	3.15
4. Gender	-.22*	.01	.05	-																-	-
5. Age	-.23*	-	-	-.16	-															50.50	20.38
6. Gender diversity	-.18	-.03	.01	.15	.08	-														4.58	1.18
7. Race diversity	.30**	.24*	.29**	.05	-	-	-													3.37	1.84
8. Intergenerational contact frequency	-.21*	.16	-.08	-.02	.08	.06	-.07	-												2.72	.69
9. Intergenerational contact quality	-.11	-.06	-.06	.28**	.18	.09	-.04	.28**	-											3.95	.57
10. Age identification	-.19	-.09	-.17	.23*	-.16	.13	-.05	.04	-.07	-										5.20	1.49
11. Promotion focus	-.09	-.15	-.14	.10	.06	-	-.02	.18	.23*	.22*	-									6.10	1.08
12. Prevention focus	-.13	-.07	-.14	.04	.28**	.05	-.19	.04	.22*	.17	.40***	-								5.57	1.64
13. Autonomy	.08	-.06	-.20*	.04	.16	-	.04	.15	.21*	-.01	.37***	.04	-							5.11	1.26
14. Gender S-C	.36***	.17	.18	-.23*	-.24*	-	.30**	-.18	-.24*	-.26*	-.04	-	-	-						3.15	1.43
15. Race S-C	.24*	.07	.28**	-.22*	-.03	.01	.28**	-.03	-.16	-	-.10	.10	.09	-.42***	-					1.95	1.22
16. Age S-C	.27**	.05	.21*	-.26*	-.17	-	.23*	-.12	-	-.18	-.04	-.06	.12	.66***	.31**	-				3.79	1.44
17. Gender- economy	.05	-.00	.02	.11	-.16	-	-.05	-.11	-.02	.24*	.04	-.03	-	-.07	-.06	-	-			3.84	.64
18. Race - economy	.01	.02	-.02	.06	.03	-	-.02	.03	.12	.05	.04	.06	.14	-.03	-.15	.06	.16	-		3.84	.82
19. Age - economy	.05	.14	.03	.07	-.12	-	-.13	-.13	-.13	.10	-.09	-.06	-.06	.02	-.17	.04	.30**	.29**	-	3.33	1.12
						.07						.06	.16								

Note: S-C = self-consciousness. Significant associations between variables are indicated, * = $p < .05$, ** = $p < .01$, *** = $p < .001$; M and SD only given for continuous variables.

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Table A.2

The Most Frequent Stereotype Themes, their Definitions and Distribution between Respondent Age Groups

Theme/stereotype	Stereotype definition	Key phrases	18-31	32-59	60-69	70+	Total
Irresponsible/reckless	Irresponsible and reckless behaviour, including drinking, partying, promiscuity and criminality.	Irresponsible Drinkers Partiers Promiscuous Immature Naughty Non-committal	31	-	-	-	31
Economic burden	A drain on society's resources, particularly health and social care.	Drain on resources Cost to NHS	1	3	6	15	25
Well-off	Well-off with financial stability and disposable income.	Well-off Privileged Financially stable	1	7	12	5	25
Old-fashioned/out of touch	Old-fashioned, out of touch with the modern world and living in the past.	Old-fashioned Out of touch with modern life Conservative	-	7	10	6	23
Parent/family/settled	Have a family, are settled, with children.	Have kids Family life Settled	5	14	1	-	20
Past-it	Being past their best and no longer useful or integrated within society.	Past-it Out-of-date Redundant	-	6	8	6	20
Worker/career focused	Working/ have a career, to work hard and be driven.	Working Career focused Driven	10	8	1	-	19
Physically incompetent	Showing physical weakness, slowness and decline.	Weak Slow	-	-	10	8	18

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Cognitively incompetent	Showing cognitive slowness, decline and senility.	Less mobile Deaf Near to death Less mental capacity Forgetful Unintelligent	-	-	9	8	17
Responsible/reliable	Showing responsibility, maturity and reliability.	Senile Responsible Mature Reliable Helpful	5	7	2	-	14
Unburdened	Unburdened with responsibility. Laidback and leisurely life.	Unburdened Lots of free time Having the easy life	4	2	7	-	13
Antisocial	Antisocial characteristics or behaviours	Intimidating Rude Antisocial	11	2	-	-	13
Inexperienced/naive	Inexperienced and naive	Inexperienced Naive	11	-	1	-	12
Lazy	Lazy and not hard working.	Lazy	8	1	1	1	11
Relationship/married	In a relationship or married	Married In a relationship	5	6	-	-	11
Boring	Boring or dull.	Boring Dull	-	10	-	-	10
Moaning/grumpy	Grumpy, grumbly and complaining.	Grumpy Complaining	-	4	2	4	10
Technologically illiterate	Unable to use modern technology	Technologically illiterate/inept/backward	-	3	5	2	10
Lively	Full of energy, adventure and enjoying life.	Energetic Adventurous Loud Active	10	1	1	1	13
Intolerant/prejudiced	Intolerant of younger people and prejudiced.	Intolerant Prejudiced	-	2	2	5	9

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Prosocial	Prosocial characteristics or behaviours	Friendly	-	2	5	1	8	
		Trustworthy						
		Volunteer						
Burden	A general burden to others.	Burden	-	-	2	5	7	
Experienced/knowledgeable	Experienced and knowledgeable.	Experienced	-	2	3	2	7	
		Knowledgeable						
		Wise						
Home owner	Own a house	Own a house	3	3	1	-	7	
Incompetent	Incompetent (cognitive or physical not specified)	Incompetent	-	-	3	4	7	
		Dithery						
Inflexible	Set in their ways with inflexible opinions.	Set in ways	-	3	2	2	7	
		Inflexible opinions						
Arrogant	Arrogant and self-assured.	Arrogant	2	-	3	-	5	
		Think they know best						
Grandparent	Grandparents that look after their grandchildren.	Grandparent	-	-	5	1	6	
		Babysitter						
Independent	Independent and self-sufficient. Not needing the support of others.	Independent	2	4	-	-	6	
		Self-sufficient						
Bad driver	Slow and bad drivers.	Slow drivers	-	1	3	1	5	
		Bad drivers						
Retired	Retired from work	Retired	-	1	1	3	5	
Unattractive	Physically unattractive	Unattractive	-	1	1	2	4	
		Wrinkly						
Wannabe young	Trying to be younger than their age e.g. through dress	Try to dress younger	-	3	-	-	3	
		Desperate for youth						
Lonely	Isolated and lonely	Lonely	-	-	2	-	2	
			Total	108	104	109	82	403

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Appendix B

Table B.1

Summary of ABST Studies Included in the Meta-Analysis.

Study	Condition	DV placement	<i>N</i>	<i>d</i>	DV type	Comparison group	ABST Manipulation type	Publication status
Abrams et al. (2008), Study 1		1	51	.755	Cognitive	Con	S-B	Published
Abrams et al. (2008), Study 2		1	84	1.086	Cognitive	Con	S-B	Published
Abrams et al. (2006)		1	97	.921	Cognitive	Con	S-B	Published
Andreoletti & Lachman (2004)		1	33	.043	Memory	Con	F-B	Published
		1	32	.055	Memory	Null	F-B	Published
		2	33	.150	Memory	Con	F-B	Published
		2	32	.088	Memory	Null	F-B	Published
		≥3	33	.221	Memory	Con	F-B	Published
		≥3	32	.082	Memory	Null	F-B	Published
Cassidy & Persson (n.d.)		1	44	-.036	Memory	Con	F-B	Unpublished
		1	44	.540	Memory	Null	F-B	Unpublished
		2	44	-.021	Memory	Con	F-B	Unpublished

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		2	44	.869	Memory	Null	F-B	Unpublished
Cavanagh (2011)	No prompt	1	66	.519	Memory	Null	F-B	Unpublished
Cavanagh (2011)	Prompt	1	65	.100	Memory	Null	F-B	Unpublished
Chasteen et al. (2005). Study 1		1	40	.816	Memory	Con	S-B	Published
Chasteen et al. (2005), Study 2		1	39	.835	Memory	Con	S-B	Published
Chasteen et al. (2005), Study 3		1	40	.631	Memory	Con	S-B	Published
Desrichard & Kopetz (2005), Study 1		1	40	5.518	Cognitive	Con	S-B	Published
Desrichard & Kopetz (2005), Study 2		1	60	2.495	Memory	Con	S-B	Published
		2	60	1.970	Memory	Con	S-B	Published
		≥3	60	1.103	Memory	Con	S-B	Published
Desrichard (n.d.)		1	240	-.076	Memory	Con	S-B	Unpublished
Fritzsche et al. (2009)	Self-paced	1	25	-	Skill-acquisition	Null	F-B	Published
	Self-paced	2	25	-	Skill-acquisition	Null	F-B	Published
				2.396				
				1.743				
				306				

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Fritzsche et al. (2009)	Timed	1	25	-	Skill-acquisition	Null	F-B	Published
				4.429				
	Timed	2	25	-	Skill-acquisition	Null	F-B	Published
				2.767				
Gaillard et al. (2011)	Prevention	1	30	.947	Cognitive	Null	F-B	Published
Gaillard et al. (2011)	Promotion	1	31	-.231	Cognitive	Null	F-B	Published
Haslam et al (2012)		1	34	1.134	Memory	Null	F-B	Published
Haslam et al (2012)		2	34	1.630	Cognitive	Null	F-B	Published
Haslam et al (2012)		3	34	1.116	Memory	Null	F-B	Published
Hehman & Bugental (2013)		1	54	.864	Cognitive	Null	S-B	Published
Hess et al. (2003)		1	32	.706	Memory	Con	F-B	Published
		1	32	.899	Memory	Null	F-B	Published
Hess, Emery & Queen (2009)	Deadline	1	45	.646	Memory	Null	F-B	Published
Hess, Emery & Queen (2009)	No deadline	1	37	.236	Memory	Null	F-B	Published
Hess & Hinson (2006)		1	71	.179	Memory	Null	F-B	Published
Hess, Hinson & Hodges (2009)		1	103	-.107	Memory	Null	F-B	Published
Horhota (n.d.)		1	32	.158	Cognitive	Con	F-B	Unpublished
Horton et al. (2010)		1	64	-.018	Physical	Con	F-B	Published

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		1	64	-.006	Physical	Null	F-B	Published
		2	64	-.167	Memory	Con	F-B	Published
		2	64	.077	Memory	Null	F-B	Published
		≥3	64	-.033	Physical	Con	F-B	Published
		≥3	64	.038	Physical	Null	F-B	Published
		≥3	64	-.207	Physical	Con	F-B	Published
		≥3	64	.040	Physical	Null	F-B	Published
		≥3	64	.207	Physical	Con	F-B	Published
		≥3	64	-.364	Physical	Null	F-B	Published
Joanisse et al. (2012)		1	61	.547	Driving	Con	F-B	Published
Kang & Chasteen (2009)		1	42	.696	Memory	Con	S-B	Published
		2	42	.168	Memory	Con	S-B	Published
		≥3	42	.193	Memory	Con	S-B	Published
Kominsky (2003)	Prospective* memory	1	40	.136	Memory	Con	F-B	Unpublished
	Prospective* memory	1	40	-.150	Memory	Null	F-B	Unpublished
Kominsky (2003)	Recall memory*	1	40	-.375	Memory	Con	F-B	Unpublished

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	Recall memory*	1	40	-.416	Memory	Null	F-B	Unpublished
Lambert (2011)		1	39	.558	Driving	Con	F-B	Unpublished
		2	39	.478	Driving	Con	F-B	Unpublished
Lamont (2011)		1	44	.000	Cognitive	Con	S-B	Unpublished
		2	44	.000	Physical	Con	S-B	Unpublished
Mazerolle et al. (2012)		1	110	.517	Memory	Null	S-B	Published
		2	110	4.000	Memory	Null	S-B	Published
O'Brien & Hummert (2006)		1	57	.032	Memory	Con	F-B	Published
		1	57	-.518	Memory	Null	F-B	Published
		2	57	-.351	Memory	Con	F-B	Published
		2	57	-.336	Memory	Null	F-B	Published
Popham & Hess (in press)		1	63	.482	Cognitive	Null	F-B	In press
Rahhal (DV gender; 1998)		1	48	.444	Memory	Con	S-B	Unpublished
Rahhal (DV truth; 1998)		1	48	.000	Memory	Con	S-B	Unpublished
Rahhal et al. (2001), Study 1**		1	48	.008	Memory	Con	S-B	Published
Rahhal et al. (2001), Study 2		1	56	.166	Memory	Con	S-B	Published

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Stein (2001)	Memory + evaluation	1	65	-.492	Memory	Con	S-B	Unpublished
Stein (2001)	Memory only	1	70	- 1.113	Memory	Con	S-B	Unpublished
Stein (2001)	Memory + time pressure	1	69	-.615	Memory	Con	S-B	Unpublished
Swift, Abrams & Marques (2013)		1	80	.525	Cognitive	Con	S-B	Published
		1	80	.977	Cognitive	Null	S-B	Published
		2	80	.984	Cognitive	Con	S-B	Published
		2	80	1.022	Cognitive	Null	S-B	Published
Swift, Lamont & Abrams (2012)		1	55	.664	Physical	Con	S-B	Published
Thomas & Dubois (2011)***		1	42	.271	Memory	Con	F-B	Published

Note: Where a second independent variable was used or multiple types of threat manipulation, 'Condition' uses the phrasing from individual manuscripts to refer to the level of the second independent variable or threat manipulation used to form the effect size. 'DV' = dependent variable; 'Comparison group' = control (Con) or nullification (Null) comparison condition; Manipulation type = stereotype-based (S-B) or fact-based (F-B) manipulation; *N* = study sample size; *d* = standard mean difference.

*A test of prospective memory was embedded within the test of recall memory making the placement of these two 'memory' tasks indistinguishable, they have therefore been distinguished within this 'condition' section. **For both Rahhal et al. (2001) studies, response accuracy to new items were not included when forming an overall accuracy score due to ceiling effects (as is laid out in the paper). As distraction condition was not of interest for the purposes of this meta-analysis, overall accuracy scores in each condition were computed based

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on the combination of accuracy scores for all critical items (both with and without distraction). ***In Thomas & Dubois, (2011) susceptibility to falsely remembering related lures is the point of interest. However, this meta-analysis is concerned with looking at the effects of ABST on overall memory performance and therefore, performance scores were computed based on the accuracy of responses to all items (related lures, studied words and unrelated words).

Appendix C

Table C.1

Pearson's Correlations, Means and Standard Deviations for Main Study Variables.

	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	M_{total}	SD_{total}	M_{men}	SD_{men}	M_{women}	SD_{women}
7. Age (years)	.03	.03	.08	-.02	-.01	.13	-.05	.03	-.01	-.10	33.51	11.39	33.11	10.89	33.87	11.86
8. Gender (1 = male, 2 = female)	-	.01	-.15*	-.13	-.08	.12	.20**	.63***	.40***	.05	-	-	-	-	-	-
9. Maths experience		-	.17*	.09	-.06	-.14*	-.18**	.04	-.01	-.12	14.77	2.15	14.76	2.16	14.78	2.15
10. Domain identification			-	.16*	.02	.21**	-.23**	-.06	-.16*	-.17	5.22	1.22	5.40	1.10	5.05	1.30
11. Maths score				-	.22**	.06	-.25***	.01	-.12	-.21*	10.12	2.66	10.48	2.90	9.79	2.38

RESPONSES TO AGE STEREOTYPES

12. Working memory capacity	-	.06	-.06	.08	-.21**	-.08	3.41	1.36	3.53	1.31	3.31	1.40
13. Task motivation	-	.15*	.03	-.05	.18	6.15	.95	6.03	1.00	6.26	.90	
14. Anxiety		-	.26***	.28***	.56***	2.52	.90	2.33	.84	2.69	.91	
15. Perceived gender-based judgement			-	.31***	.03	3.14	1.65	2.06	.94	4.12	1.54	
16. Stereotyping uncertainty				-	.15	2.42	1.10	1.97	.91	2.84	1.09	
17. Self-uncertainty					-	3.26	1.61	3.17	1.66	3.32	1.58	

*Note: * $p < .05$, ** $p < .01$, *** $p < .001$; Mean = M , Standard Deviation = SD .*

RESPONSES TO AGE STEREOTYPES

Statistics Used for Power Analysis of Study 3

Test family: F tests

Statistical test: ANCOVA: Fixed effects, main effects and interactions

Type of power analysis: Post hoc: Compute achieved power – given α , sample size, and effect size

Effect size F (based on Nguyen and Ryan's (2008) meta-analysis):

- subtle gender stereotype threat manipulations produce an effect of $d = .24$ ($F = 0.12$)
- moderately explicit gender stereotype threat manipulations produce an effect of $d = .18$ ($F = 0.09$)

α error probability: 0.05

Total sample size: 206

Numerator df: vary depending on which main or interaction effect you're looking at. Main effect of condition = 3, main effect of gender = 1, condition x gender interaction = 3

Number of groups: 8 (4 conditions x 2 gender)

Number of covariates: 1 (domain identification)

RESPONSES TO AGE STEREOTYPES

Appendix D

Table D.1

Pearson's Correlations, Means and Standard Deviations among Main Variables.

	2	3	4	5	6	7	8	9	10	11	12	M	SD
1. Age (years)	.06	.12	-.01	-.10	.03	.45***	-.02	-.06	.10	.02	.14	57.39	5.56
2. Gender (1 = male, 2 = female)	-	-.08	-.10	-.001	.03	-.07	.24***	.32***	.19**	.26**	.04	-	-
3. Education	-	-	.14*	.18**	.10	.00	-.10	-.21**	-.03	-.44***	.21**	4.30	1.52
4. Domain identification	-	-	-	.11	.19**	-.06	-.05	-.25***	-.16*	-.21**	.23**	5.78	.76
5. Young contact quantity	-	-	-	-	.26***	-.11	.06	-.10	-.11	.01	.07	3	1.20
6. Young contact quality	-	-	-	-	-	-.09	.04	.01	-.12	.01	.01	3.90	.76
7. Age self-categorisation	-	-	-	-	-	-	-.04	-.02	.18**	.00	-.08	-	-
8. GSE change	-	-	-	-	-	-	-	.44***	.32***	.23**	-.03	.56	.94
9. Anxiety	-	-	-	-	-	-	-	-	.45***	.39***	-.04	4.12	1.52
10. Threat-based concerns	-	-	-	-	-	-	-	-	-	.15	-.04	2.83	1.94
11. Proportion of errors	-	-	-	-	-	-	-	-	-	-	-.28***	.55	.23
12. Response time (in seconds)	-	-	-	-	-	-	-	-	-	-	-	63.63	30.29

Note: * $p < .05$, ** $p < .01$, *** $p < .001$. Education was rated from 1 = less than high school, to 8 = Professional degree.

RESPONSES TO AGE STEREOTYPES

Statistics Used for Power Analysis of Study 4

Test family: F tests

Statistical test: ANCOVA: Fixed effects, main effects and interactions

Type of power analysis: Post hoc: Compute achieved power – given α , sample size, and effect size

Effect size F (based on Lamont, Swift, & Abrams, 2015): $d = .52$ ($F = .26$)

α error prob: 0.05

Total sample size: 201 (without control)

Numerator df: 3 (without control)

Number of groups: 4 (without control)

Number of covariates: 4 (gender, domain identification, education and test response time)

RESPONSES TO AGE STEREOTYPES

Appendix E

Table E.1

Pearson's Correlations, Means and Standard Deviations among Main Variables.

	2.	3.	4.	5.	6.	7.	8.	9.	<i>M</i>	<i>SD</i>
1. Threat	.39***	-.31***	-.22***	.13***	-.13***	-.19***	.32***	.31***	2.10	.88
2. Challenge	-	-.14***	-.05	-.003	-.04	-.08*	.14***	.17***	2.97	1.01
3. Subjective well-being	-	-	.47***	-.17***	.16***	.52***	-.50***	-.35***	4.11	.73
4. Subjective health	-	-	-	-.38***	.15***	.56***	-.29***	-.24***	3.96	.85

Note: * $p < .05$, ** $p < .01$, *** $p < .001$.