CORA Cork Open Research Archive
Cartlann Taighde Oscailte Chorcaí

Title	An examination of the role of sustained attention and regulatory focus in stereotype threat and older adults and experiences of perceptions of ageing
Authors	Fawsitt, Feargus
Publication date	2023
Original Citation	Fawsitt, F. 2023. An examination of the role of sustained attention and regulatory focus in stereotype threat and older adults and experiences of perceptions of ageing. PhD Thesis, University College Cork.
Type of publication	Doctoral thesis
Rights	© 2023, Feargus Fawsitt. - https://creativecommons.org/licenses/by-nc-nd/4.0/
Download date	2026-11-05 19:09:30
Item downloaded from	https://hdl.handle.net/10468/16919



UCC
University College Cork, Ireland
Coláiste na hOllscoile Corcaigh

Ollscoil na hÉireann, Corcaigh

National University of Ireland, Cork



An Examination of the Role of Sustained Attention and Regulatory Focus in Stereotype Threat and Older Adults and Experiences of Perceptions of Ageing

Feargus Fawsitt

Submitted in fulfilment of the requirements for the degree of Doctor of Philosophy in Applied Psychology

University College Cork

School of Applied Psychology

College of Arts, Celtic Studies, and Social Sciences

Head of School:

Dr Chris McCusker

Supervisors:

Dr Annalisa Setti

Dr Samantha Dockray

2023

Acknowledgements 6
Publications and contributions 7
Abstract 8
Chapter 1: Introduction 10
1.1 Perceptions of Ageing 11
1.2 Internalisation of stereotypes and implicit activation of stereotypes 18
1.3 Stereotype Threat 18
1.4 Summary of constructs in the area, attitude to own ageing, awareness of age-related change, ageing perceptions, etc 23
1.5 How to measure perceptions of ageing 25
1.6 Prevalence of stereotypes in society 25
1.7 Levy's Stereotype Embodiment Theory 27
1.8 Barber's 2017 review paper 34
1.9 Thesis aims and research questions 39
Chapter 2: Extending the Stereotype Embodiment Model: A Targeted Review 41
2.1 Abstract 41
2.2 Introduction 42
2.3 Stereotype threat in older adults 48
2.4 Behavioural consequences 56
2.5 Conclusion 57
Chapter 3: Evidence updates and unexplored areas 62
3.1 Advancements in the physiological pathway 62
3.2 Advancements in the behavioural pathway 65
3.3 Updates to the Psychological Pathway 66
3.4 The role of subjective age 73
3.5 Ageism 75
Chapter 4: Regulatory focus and perceptions of ageing: exploring the connections 77
4.1 Abstract 78
4.2 Introduction 78
4.3 Method 83
4.4 Participants 83
4.5 Material 84
4.6 Results 87
4.7 Discussion 90
4.8 Limitations 94
4.9 Conclusions 94

Chapter 5: 'Just Keep Going': Older Adults Views and Perceptions of Ageing 96
5.1 Abstract 96
5.2 Introduction 96
5.3 Methods 99
5.4 Results 102
5.5 Discussion and Conclusion 118
Chapter 6: Testing stereotype threat mechanisms in a sustained attention task 126
6.1 Introduction 126
6.2 Method 131
6.3 Results 135
6.4 Discussion 138
6.5 Conclusion 141
Chapter 7: Discussion 143
7.1 Discussion of Chapter 4: Regulatory focus and perceptions of ageing: exploring the connections 143
7.2 Discussion of Chapter 5: 'Just Keep Going' Older Adults Views and Perceptions of Ageing 146
7.3 Discussion of Chapter 6: testing stereotype threat mechanisms in a sustained attention task 152
7.4 Updates to our model 153
7.5 General Discussion 158
7.6 Strengths and limitations 160
7.7 Future directions 161
7.8 Conclusion 161
Appendices 163
Appendix 1: Modified regulatory focus questionnaire 163
Appendix 2. Correlations for study 1 165
Appendix 3. Interview Schedule 167
Appendix 4. Regulatory Focus Prompts 168
Appendix 5. Descriptive statistics from study 3 169
References 170

This is to certify that the work I am submitting is my own and has not been submitted for another degree, either at University College Cork or elsewhere. All external references and sources are clearly acknowledged and identified within the contents. I have read and understood the regulations of University College Cork concerning plagiarism and intellectual property.

For Carolyn,

Acknowledgements

To my supervisors Annalisa and Samantha thank you both so much for guiding me through this. Your wisdom, insight, and patience made it possible and even at times enjoyable. I have always felt your support and belief in me and I hope that I can follow your good example.

To my fellow PhDs and friends I made along the way. I don't think I could have understood how important the comradery and support of people in a similar situation could have meant before I started. I have made genuine lifelong friends through this process for which I am eternally grateful.

To my friends who supported me through this, especially Zach Roche and Justin Alexander. Zach your unwavering belief in me has helped me more than you know. Justin for always providing me with fun, distraction and friendship.

To my family who supported me even when you did not know what I was doing or why, but always assured me they knew I could do it.

And most of all to my beloved wife and best friend, Carolyn. I could not have got here without you.

Publications and contributions

Published journal articles

Fawsitt, F., & Setti, A. (2017). Extending the stereotype embodiment model: A targeted review. *Translational Issues in Psychological Science*, *3*(4), 357.

Fawsitt, F., Dockray, S., & Setti, A. (2022). Regulatory focus and perceptions of ageing: exploring the connections. *Aging & Mental Health, 26*(7), 1451-1459.

Journal articles awaiting submission

Fawsitt, F, & Setti, A (Unpublished) 'Just Keep Going': Older Adults Views and Perceptions of Ageing.

Fawsitt, F, Dockray, S., & Setti, A (Unpublished) Testing stereotype threat mechanisms in a sustained attention task.

Contribution of first author

The above peer-reviewed articles are presented as part of chapters in this thesis. As the first author, I formulated the ideas, carried out data collection, analysed the data and led the writing of the articles and publication process.

Contribution of other authors

Dr Annalisa Setti and Dr Samantha Dockray: Involved in developing and discussing ideas and methodologies, and provided feedback on all papers and the overall thesis.

Abstract

The ageing process is largely thought of as a purely biological process but there are consequential psychological and social aspects of ageing. Perceptions of ageing are how individuals see older adults and the ageing process. These perceptions can have powerful direct and indirect effects on the experiences and lives of older adults. In the short term, being exposed to negative stereotypes about ageing can impact the performance of older adults on tests, such as those to detect cognitive decline. This effect appears to be caused by individual's concern being negatively evaluated due to an aspect of their identity. This phenomenon is known as stereotype threat. In the long-term, holding negative views of ageing has been linked with serious health conditions and decreased lifespan. The mechanisms for this are unclear but it has been suggested by Levy's (2009) Stereotype Embodiment Model that there are several pathways these negative views act through, including biological, behavioural, and psychological. Although these concepts appear related, research exploring the potential connections between stereotype threat and perceptions of ageing is scarce. This thesis explores theoretical and practical connections between these two areas while working on building our understanding of the experiences of Irish older adults' perceptions of ageing.

Chapter 1 introduces the background, concepts and literature on perceptions of ageing and stereotype threat in older adults, in the context of an ageing Western society, where negative stereotypes of older adults are still present and operating. Chapter 2 is a targeted literature review which proposes an update of Levy's 2009 Stereotype Embodiment Theory on the mechanisms through which perceptions of ageing influence outcomes over the lifespan. Our updated model more concretely connects stereotype threat and potential mechanisms to the short-term pathways of the model.

This model makes several testable predictions which are explored later. Chapter 3 provides updated evidence since the publication of the paper based on Chapter 2. Chapter 4 uses a cross-sectional methodology to explore correlational relationships between perceptions of ageing and trait regulatory focus, a key explanatory idea in the stereotype threat literature. Existing research findings support a connection between negative perceptions of ageing and a prevention focus providing early evidence these areas could be related which supports the updated model from Chapter 2. Chapter 5 uses reflexive thematic analysis to explore qualitative data from a sample of Irish older adults about their experiences and perceptions of ageing. Participants identified both positives and negatives to ageing as well as a complex perspective on how to age well in Irish society. Chapter 6 further tests predictions made in Chapter 2 on the mechanisms underpinning stereotype threat in older adults. Specifically testing two explanations for stereotype threat in older adults in a test of sustained attention. These findings support executive interference, a specific account of a mechanism potentially underpinning stereotype threat, but stereotype threat may act differently in certain circumstance such as the nature of the assessment, the surroundings, and the specific age range. Finally, Chapter 7 discusses how these findings build our understanding of perceptions of ageing, stereotype threat, and ageing in older adults. Each set of findings and theories is also contextualised with more current research and knowledge. Future directions and limitations are also discussed.

Taken together this thesis links perceptions of ageing and stereotype threat by exploring the dominant models in Levy's Stereotype Embodiment Theory, The Executive Interference model by Schmader, and Barber's work on Regulatory Focus as explanations for stereotype threat in older adults. By including qualitative data and analysis, an understanding of the unique situation of older adults in Ireland is

recognised and more insight is gained into their perceptions of growing older, both positive and negative.

Chapter 1: Introduction

The proportion of the world's population in older adulthood is growing, and it is expected that 20% of the world's population will be aged over 65 by 2050 (United Nations et al., 2020). In most developed countries individuals now spend a quarter of their adult life over the age of 65 (United Nations et al., 2020). The wellbeing of older adults is often considered solely in terms of physical health and quality of life, while psychological aspects of aging are frequently forgotten. A large factor in an individual's psychological wellbeing is how they view themselves, and as people age, the label of "older adult" starts to become almost unavoidably relevant. This label can be ascribed externally from others who see, treat, or describe the individual as old, but the label can also come internally from an individual's perception of themselves. The label of older adult can also be transient, changing from day to day and moment to moment as an individual negotiates different situations, demands, cultural factors and their own abilities which can fluctuate due to factors such as their health status (Bellingtier & Neupert, 2020; Bergland et al., 2014; Hughes et al., 2013). How individuals navigate this label with relation to themselves influences their health behaviours and their psychological wellbeing. If older adults see the label as meaning a journey of unavoidable decline, they may be less likely to engage in preventative health behaviours (B. Levy & Myers, 2004). Conversely, those who see the positives of getting older may be able to steer themselves away from poorer outcomes. A full understanding of perceptions of ageing could give direction to older adults for a healthier and happier old age.

.

1.1 Perceptions of Ageing

Perceptions of ageing is a term for the collection of constructs in the literature which can be called, perceptions of ageing, self-perceptions of ageing, awareness of age-related changes, self-directed stereotypes of ageing, to name a few (Burton et al., 2021; Diehl et al., 2014). Broadly, perceptions of ageing refers to how individuals view the ageing process and their own ageing.

In longitudinal research, perceptions of ageing have been found to be linked with numerous outcomes. A systematic review of self-perceptions of ageing and quality of life which included 32 studies, found a strong association between perceptions of ageing and quality of life whereby more negative perceptions of ageing were associated with poorer outcomes (Velaithan et al., 2023). To evidence the variety of perceptions of ageing measures used in studies, across three systematic reviews of perceptions of ageing, there was a total of twelve validated scales used across the included studies with several unvalidated ones (Tully-Wilson et al., 2021; Velaithan et al., 2023; Warmoth, Tarrant, et al., 2016). In a direct comparison of two scales Boeder and Tse (2021) showed that all scales are not created equal and some have more predictive ability in different domains. A recent review of measures by Burton et al, (2021) suggests the Brief-Ageing Perceptions Questionnaire has shown the most promise but further research is needed.

A wealth of evidence into the longitudinal effects of holding more negative views of ageing shows that people who hold more negative views of ageing tend to experience more negative consequences. In a 2016 systematic review Warmoth et al. (2016) concluded that holding more negative perceptions of ageing is associated with

poorer outcomes with relation to, health, quality of life, memory and cognitive performance, physical and physiological performances, disability and functioning, and medical conditions and outcomes. Since the publication of Warmoth et al. (2016)'s systematic review of correlates of negative perceptions of ageing more evidence has emerged showing a connection between negative perceptions of ageing and onset and persistence of anxiety and depression (Freeman et al., 2016), increased GP visits (Hajek & König, 2021), increased loneliness (Pikhartova et al., 2015), frailty (Warmoth et al., 2018), cognitive function (D. A. Robertson, King-Kallimanis, et al., 2015), life satisfaction and physical functioning (Veenstra et al., 2020). A more recent and larger review than the aforementioned 2016 systematic review, found similar results. It showed connections between "ageism" (defined as age stereotype, self-perceptions of aging, and age discrimination) and poorer outcomes in similar domains as the 2016 review (Hu et al., 2021). Hu et al. (2021) used a wider search and inclusion criteria and built on the previous review findings.

As well as negative views of ageing there is also evidence linking perceptions of retirement and longevity. Lakra et al. (2012) used a sample of 394 from the total participants in the Ohio Longitudinal Study of Ageing and Retirement (OLSAR) dataset. Participants in this sample took part over 23 years and found that more positive attitudes towards retirement at the beginning of the study predicted increased longevity. Perceptions of retirement were measured using a unique scale where participants rated how much they associated retirement with 14 pairs of positive and negative words (i.e., inactive-active) which then created a single score. In a similar study also using participants from the OLSAR but including 1,011 of the total participants Ng et al. (2016) used the same word pairing measure but created a different total score. Participant responses were used to create two scores on subscales

measuring mental health during retirement and physical health during retirement. Participants who were scored positively on the mental health and physical subscales lived on average 2.5 and 4.5 years longer respectively, when compared to those who scored more negatively. While these results are interesting, they need to be explored with other datasets and populations.

When someone who holds negative perceptions of ageing, themselves begin to age, their views can become self-fulfilling prophecies (Pikhartova et al., 2015; D. A. Robertson, Savva, et al., 2015; Wurm et al., 2013). Endorsement of negative stereotypes has been linked to more negative self-perceptions of ageing later in life (Brothers et al., 2021). Brothers et al. (2021) used a sample of 819 German adults (aged 40+) to investigate whether holding negative stereotypes about old age was predictive of future poorer self-perceptions of ageing. At a 2.5 year follow up endorsement of negative ageing stereotypes was associated with poorer self-perceptions of ageing. This highlights the need for more longitudinal research on the relationship between endorsement of ageing stereotypes and self-perceptions of ageing, but also that measures of perceptions of ageing may need to capture both to be more comprehensive.

As mentioned above, some older adults simply deny that the label ‘‘old’’ applies to them (Bordone et al., 2020). This denial strategy may be successful in the short term but long term it has to contend with other’s perceptions of their ageing process and classification as “old” and any effect this may have on the older adult’s self-perception. Bordone et al. (2020) found their sample felt that others were more likely to see them as old than they were to consider themselves old. Over time individuals fall into more concrete definitions commonly used for old such as higher chronological age, retirement or experiencing the loss of loved ones (Bordone et al.,

2020). Internal reminders from your own body can also chime in, such as hearing or vision loss which many people stereotypically associate with older adults. This evidence begins to pile up and chip away at an individual's denial of their status as old. Evidence from the Health and Retirement Study shows that deteriorations in physical health can also lead to more negative perceptions of ageing (Kim et al., 2021). In addition to difficulties with denial working as a long-term tactic, it might also have other drawbacks before then. According to research by Weiss and Lang, (2012) this strategy may be very common. In one study they found that unsurprisingly, feeling younger than your chronological age was positively associated with not identifying as part of the "older adult" group. In a second study they showed individual's distance themselves from membership of the older adult group when more negative age stereotypes are presented. This may have consequences for participation in programmes aimed to support "older adults". For example, individuals may refuse additional supports which could prolong their sense of independence such as refusing a walking stick, glasses, or a hearing aid because they associate these with the stigma of being an older adult and do not want to be seen by themselves or others as such. A systematic review of barriers and facilitators to older adults' participation in programmes targeting fall prevention found that the stigma of programmes and devices aimed at older adults is a substantial barrier (Bunn et al., 2008). This discomfort with being considered, or considering oneself, old was a barrier to accepting help to live more fully.

While these findings might seem unavoidable for those who have negative self-perceptions of ageing, there is evidence to suggest perceptions of ageing are not fixed but change over time and are modifiable. A longitudinal study over 21 years, using participants from the German Ageing Survey (N = 4,712), found that several

factors influence changes in perceptions of ageing, some being detrimental and some protective (Diehl et al., 2021). Some detrimental factors were negative changes in health and loneliness, while positive affect was protective. A strength of this study was the use of a multidimensional scale of perceptions of ageing, using the Aging-Related Cognitions Scales (Wurm et al., 2007) while much of the most influential longitudinal research comes from unidimensional measures comprised of just 5 items (B. Levy & Myers, 2005). This research showed that health issues, affect and social integration played significant roles in changes to self-perceptions of ageing over this time period. Region within Germany was also a predictor of perceptions of ageing scores so these results might not be generalisable. The authors speculate this difference in perceptions of ageing due to region may be due to geopolitical changes affecting issues like unemployment and retirement.

Interventions have also had some success in improving perceptions of ageing in older adults, providing an avenue for potential change. In a systematic review R. L. Knight et al. (2021) looked at ten papers which examined age stereotype-based interventions effects on health outcomes and found promising results. Intervention type and quality of studies varied but effects were seen across physical, psychological wellbeing, and quality of life. Interventions ranged from providing positive intergenerational contact, implicit and explicit exposure to positive stereotypes, combinations of exercise and promotion of positive age stereotypes. It is worth noting that the research only included studies published in English and is therefore somewhat limited in its scope.

Another review of interventions comes from Diehl et al., (2022), who examined “Views of Ageing” which is used by the authors as a catch all for “ Adults’ perceptions, stereotypes, and awareness of their own age and ageing process.” (Diehl

et al., 2022, p. 309). Diehl et al., (2022) identify several promising interventions including exposure to subliminal positive messaging regarding ageing (B. Levy, Pilver, et al., 2014) and some more explicit approaches to improving views of ageing. Among these explicit approaches a promising programme called "AgingPLUS" which had at the time some strong preliminary evidence, and which now has a completed randomised controlled trial carried out with middle-older aged adults (Diehl et al., 2023). The AgingPLUS programme runs for 4 weeks and consists of weekly 2-hour sessions aimed at improving views of aging (defined as above and additionally including perceptions of older adults as a group), self-efficacy beliefs, and behavioural intentions. The results showed significant improvements in views of ageing at 4 weeks and 8 months post-test. Views of ageing were measured using four questionnaires including The Age Stereotypes Scale (Kornadt & Rothermund, 2011), the Expectations Regarding Aging questionnaire (Sarkisian et al., 2005), the Essentialist Beliefs About Aging scale (Weiss & Diehl, 2021), and the Age-Related Change questionnaire (Kaspar et al., 2019).

In a systematic review of interventions to reduce ageism among young people (Apriceno & Levy, 2023) which included meta analyses, the authors found that interventions can effectively reduce ageist attitudes. Ageist attitudes were defined very broadly and included definitions from preference for young over old to endorsement of ageist stereotypes. The most effective interventions from this review were those which combined education about ageing and positive intergenerational contact. This is important as previous research has shown that lifelong beliefs about older adults, which may be expressed as ageism in young adults, become self-perceptions of ageing (B. Levy, 2009).

1.1.1 Conflicting evidence regarding perceptions of ageing research

The evidence supporting the consequences of negative perceptions of ageing is strong but it is important to also pay attention to times where it has not been found to be linked to expected outcomes. Using the Attitudes to Ageing Questionnaire Gale et al. (2018) found that perceptions of ageing did not predict either sedentary or walking behaviour at a 7 year follow up. The sample were aged 72 at the beginning of the study and 79 at follow up. While a strength of the study was the use of objective measures such as amount of time spent sedentary, number of sit to stand transitions and number of steps, it did not look at walking speed which is linked to perceptions of ageing and, in men at least, mortality (Liu et al., 2016; D. A. Robertson, Savva, et al., 2015).

Furthermore, in a cross sectional study of New Zealanders looking at health behaviours, Berton-Scarlet (2019) found only modest links between perceptions of ageing and some elements of healthy eating using the Attitudes to Ageing Questionnaire. However, the age range criteria was very narrow and was lower than what would be typically seen in older adult research, with participants all aged 50 years old.

Another study from The Irish Longitudinal Study of Ageing (TILDA) (Mallett et al., 2022) examined predictors of depression trajectory in a nationally representative sample of Irish Older adults. In this study, perceptions of ageing were measured using the Brief Ageing Perceptions Questionnaire at the beginning of the study and did not uniquely predict depression trajectory at the third wave of data collection. Other psychological predictors such as stress and loneliness were more effective in predicting depression trajectory. However, previous research using an earlier wave of the same sample showed perceptions of ageing were predictive of loneliness and social isolation (Santini et al., 2019). Strangely this research is not mentioned or addressed

by Mallett et al., (2022) so it is unclear if the researchers looked at the role of loneliness as mediating the relationship between perceptions of ageing and depression. These relationships should be further investigated to understand any potential causal directions between these variables.

1.2 Internalisation of stereotypes and implicit activation of stereotypes

T

1.3 Stereotype Threat

Stereotype threat is feeling at risk of confirming negative stereotypes about your group, in response to these feelings people often underperform in the stereotyped domain (Steele & Aronson, 1995). This effect was originally discovered in African-American adults in tests of academic performance but has subsequently been seen in test situations with many other groups and domains and may be evident in any group who has negative stereotypes about them in a testable area. These group stereotypes can be self-reinforcing, with individuals who are susceptible to it performing worse and potentially strengthening the stereotype. Although there is some concern regarding the replicability of the stereotype threat effect, large well powered meta analyses find reliable if small effects (Nguyen & Ryan, 2008; Pennington et al., 2016).

Stereotype threat is also seen in older adults in many stereotyped domains (Armstrong et al., 2017; Hess et al., 2003). In older adults these effects are most prominent and reliable in tests of memory (Barber & Mather, 2013). This makes sense as memory is heavily stereotyped in older adults (Hummert, 1999). This effect on performance is seen under controlled conditions in research settings but also has real world consequences. Older adults' performances in tests to diagnose dementia can be influenced by stereotype threat resulting in a less accurate diagnosis as their

performance is less reflective of their ability (Follenfant & Atzeni, 2020; Haslam et al., 2012; Mazerolle et al., 2016).

Barber (2020)'s review found that older adults suffer performance related consequences as a result of stereotype threat, in health, physical performance and driving domains. As stated earlier, stereotypes can become self-reinforcing. If an older adult performs worse on a task due to stereotype threat, they are effectively providing evidence in support of the stereotype existing. This could happen not only for themselves where poorer performance could confirm to themselves, but also to others, that they are living up to a certain stereotype. For example, with relation to health domains, this matches with some health professionals having negative views of ageing (Gallo, 2019) which has been shown to have negative impacts on the medical treatment of older adults (Chrisler et al., 2016; S. Levy & Macdonald, 2016; Schroyen et al., 2014). Although it is not clear how much ageism there is in health settings (Wilson et al., 2017).

Older adults may also feel stereotype threat in more day to day situations when they feel at risk of confirming a negative stereotype such as driving performance (Chapman et al., 2014; Joanisse et al., 2013; Lambert et al., 2015) or subjective hearing ability (Barber & Lee, 2015), walking (Barber et al., 2020) and even engagement with technology (Mariano, Marques, Ramos, Gerardo, et al., 2021). These real-world impacts are less studied than the threat of stereotype threat on cognitive tests but provide more insight into the effect of stereotype threat outside of laboratory settings.

An element of stereotype threat postulated by Steele et al. (2002) is "Domain Avoidance" which is where individuals simply avoid domains related to stereotypes and where they might apply. For example, if women are stereotyped to be bad at math,

they may avoid choosing subjects in college which includes modules in mathematics. This is an under researched area in older adults in relation to many stereotyped domains such as memory or hearing, but some research has been carried out related to the workplace (Armstrong et al., 2017; Bowen & Skirbekk, 2013; Chiesa et al., 2019; von Hippel et al., 2019). von Hippel et al. (2019)'s research suggests that older workers (typically 50+) are uniquely impacted by exposure to negative self-relevant age stereotypes when compared to younger workers. In their sample of older adults exposed to negative stereotypes about their age, they found that they were more negatively impacted in measures of job engagement, commitment, and intention to quit. If this phenomenon is found to be generalisable, it may mean that older adults are avoiding situations where their memory, hearing, or other stereotyped domains are tested either formally or informally.

There are currently two main theories on the mechanisms underpinning stereotype threat effects in older adult's performances. These are the regulatory focus account (Seibt & Förster, 2004) which draws on Higgins, (1997)'s regulatory focus theory and the executive interference account (Schmader et al., 2008). Regulatory focus comprises of two types of goal-based orientation that individuals can have when completing tasks. The two orientations are promotion focused or prevention focused, a promotion focus is aimed at maximizing gains while a prevention focus is aimed at avoiding negative outcomes. Tasks structures can fit better with a promotion or prevention focus. A task where you are encouraged to achieve gains is described as having a gains-based structure and fits a promotion focus. In contrast a task where you are encouraged to avoid losses is described as a loss avoidance structure and fits with a prevention focus (Barber et al., 2015). In tasks where older adults experience stereotype threat they are often observed to adopt a slower more careful response

pattern, this is consistent with a prevention focus approach. As can be seen in this research from Barber et al. (2015) where participants under stereotype threat performed better when a task had a structure that suited a prevention, rather than promotion focus.

The second theory, the executive control interference model by Schmader et al. (2008), refers to when older adults undergo stereotype threat they experience interference in their executive functioning due to increased task monitoring. This interference could be due to executive overload, excessive worrying, or mind wandering (Pennington et al., 2016) with the availability of working memory resources impacted as a proximal outcome.

1.3.1 Contrasting evidence regarding stereotype threat in older adults

Not all investigations into stereotype threat in older adults have found evidence supporting the existence of stereotype threat and it is worth exploring these results as the differences in stereotype manipulation, task type and even instructions may play a role. One meta-analysis in the area of older adults found that more subtle stereotype threat manipulations, rather than more blatant fact based manipulations, cause a stronger effect on performance (Lamont et al., 2015). Lamont et al. (2015) examined 32 studies and found that stereotype based, rather than fact-based stereotype threat manipulations, more reliably affected performance. For example, presenting older adults with a sentence such as “research has found older adults underperform younger adults on this task” causes less of an effect than a sentence such as “it is widely assumed memory declines with age”. By including several unpublished studies Lamont et al. (2015) also found evidence for publication bias in their results.

A similar review to Lamont et al. (2015) was carried out by Armstrong et al., (2017) and included more recent research, as well as making a distinction between blatant and subtle stereotype threat manipulations, and comparing the impact of stereotype threat's effect on working memory and episodic memory. Armstrong et al., (2017) found that more subtle stereotype threat manipulations resulted in greater effect sizes although cautioned that these subtle manipulations were underrepresented and further examination is needed. Similarly, Armstrong et al., found that stereotype threat effects did not reach significance when examining cued recall tasks but did reach significance when looking at recall tasks without environmental support. This could be due to the higher working memory load on non-cued recall tasks.

Deshayes, Palermo, et al. (2022) examined the effect of stereotype threat on older adults' performance in a task measuring physical activity. The authors found no evidence of a negative effect of stereotype threat on performance and found some positive impact on performance when compared to a control condition. The stereotype threat manipulation involved informing participants that the goal of the study was to look at differences between age groups. It is not clear, however, how this was done with repeated measures. The authors used a small homogenous sample of 20 participants with 90% women and a within participant design which is not typical of this area of research. Deshayes, Zory, et al. (2022) also found inconsistent evidence in another experiment looking at physical activity. In a novel design which aimed to test two domains simultaneously, Chalabaev et al. (2020) found that stereotype threat impacted performance on a cognitive task (the stroop task) but not on a walking task when both tasks were completed simultaneously. The study used a within participants design and therefore used a stereotype threat manipulation similar to Deshayes,

Palermo, et al. (2022) and participants were told their performance would be compared to a younger age cohort.

Although there is strong evidence supporting stereotype threat in older adults, these contrasting findings are also evidence against the existence of stereotype threat. This is particularly important given the replication crisis experienced in the field of Psychology in recent years.

1.4 Summary of constructs in the area, attitude to own ageing, awareness of age-related change, ageing perceptions, etc

Perceptions of ageing is a reasonably clear theoretical concept but there are several closely related concepts which muddy the waters. Views on ageing is another umbrella term used in the literature to capture most of these concepts (Kornadt et al., 2020) but it is not clear how this is distinct from perceptions of ageing. Perceptions of ageing are how people view older adults and self-perceptions of ageing are how an individual views their own ageing. Subjective age refers to how old a person feels while ‘awareness of aging’ is put forward as a superordinate term encompassing subjective age, age, identity, self-perceptions of ageing, attitude toward own ageing and awareness of age related change (Diehl et al., 2014). Age stereotypes are whether individuals associate their idea of an older person with negative or positive traits (B. Levy et al., 2004). Awareness of age related changes are “experiences that make a person aware that his or her behaviour, level of performance, or ways of experiencing his or her life have changed as a consequence of having grown older (i.e., increased chronological age)”(Diehl & Wahl, 2010 pg.340). These are a useful operationalisation of self-perceptions of ageing.

Subjective age is predictive of a range of health and wellbeing outcomes (Kornadt et al., 2020). Research from Spuling et al. (2020) suggests that subjective age is distinct from some measures of perceptions of ageing. In a study that used participants from the German Ageing Survey, Spuling et al. (2020) found that less than 50% of the variance in subjective age was accounted for by the measures of perceptions of ageing (the Attitude to Own Ageing Scale and the Ageing Cognitions questionnaire). Interestingly, the authors also found that subjective age and perceptions of ageing were independent of factors like disposition, depressive symptoms, self-efficacy and self-rated health. Further research is needed to parse these relationships in more detail.

Kornadt et al. (2020) suggests a lifespan perspective for views on ageing or perceptions of ageing. They make a novel observation that if perceptions of ageing influence how an individual grows old, then younger individual's experience of older adults is influenced by perceptions of ageing indirectly. The authors lay out a reasonable lifespan approach to perceptions of ageing to create a theory for how views of ageing are created, influenced, and utilised over a lifetime. The authors suggest that views on ageing are multidimensional, multidirectional, and multifunctional and are created and influenced by social contexts. Subsequently views on ageing are then integrated to an individual's personal contexts of ability, experiences and expectations. This insight into the complexity of views of ageing across the lifespan is especially important because work done by B. Levy et al. (2009) suggests that perceptions of ageing held relatively young in life, are associated with major health consequences in the form of cardiovascular events. An understanding of the social, cultural, and personal factors that influence views of ageing is therefore crucial. This research also

highlights the relative paucity of research on factors influencing younger people's perceptions of ageing.

1.5 How to measure perceptions of ageing

Klusmann et al. (2020) is an important paper in the area of measuring perceptions of ageing. Klusmann et al. (2020) examine 89 instruments for measuring perceptions of ageing. They note that most instruments frame ageing as looking at the gains or losses associated with ageing, that instruments are split between measuring either perceptions of older adults in general, self-perceptions of ageing, or a mix, and that research on implicit views of ageing is currently lacking. Klusmann et al. (2020) recommends a more multidimensional approach to measuring views of ageing that takes into account lifespan perspectives could prove beneficial. Some studies such as Hooker et al. (2019)'s have combined existing scales. Hooker et al. (2019 combined items from the Philadelphia Geriatric Center Morale subscale on attitudes towards own ageing and items from the Berlin Ageing Study which all relate to self-perceptions of ageing. This allowed the authors to divide items into positive and negative self-perceptions of ageing subscales, which both achieved good internal consistency (Cronbach's alpha of .76 and .76). Research in Ireland from TILDA has used the Brief-Ageing Perceptions questionnaire which has been shown to have good internal consistency as well (Cronbach's alpha .75 to .84) (Freeman et al., 2016).

1.6 Prevalence of stereotypes in society

It has previously been difficult to understand how prevalent negative stereotypes are about older adults and if or how they have changed over time, without relying on anecdotal evidence. A study by Ng et al. (2015) found that in a large sample

of writing, spanning over 200 years, in an American database, there was a trend towards more negative word associations with older adults after 1880. In a study by Lockenhoff et al., (2009) of college students across 26 countries, views of ageing were mostly negative in all but four countries (although this did include Mainland China). It is reasonable to assume therefore that perceptions of ageing vary across time and place.

Reports of how prevalent negative views of older adults are mixed, but there are certainly negative views present. B. Levy, Chung, et al. (2014) found that content in Facebook groups designed about older adults (this included a range of groups such as some which wanted to ban older adults from driving, and some dedicated to older characters from fiction) and that were open (viewable or joinable by everyone on Facebook) were predominantly negative. This suggests that social media and a more connected world has not solved the problem of negative stereotypes about older adults. More recent research on a newer social media platform (TikTok) does yield more positive results (Ng & Indran, 2022). Ng and Indran (2022) found that the majority of video content created by older adults with large followings (over 100,000 followers) produced content which largely showed them defying ageing stereotypes. Some research suggests participation by older adults in the workforce and voluntary work, may positively influence national perceptions of ageing (Bowen & Skirbekk, 2013). It is thought that older people's participation in the workforce predicts more positive perceptions of competence.

Positive or negative portrayals of older adults vary due to innumerable factors and can impact older adults quickly. B. Levy et al. (2022) showed that exposure to news stories related to the Covid-19 pandemic, which included negative stereotypes, led to older adults having anxiety and less peacefulness when compared to neutral or

positive conditions. In another study, endorsement of negative stereotypes was associated with older adult's views that they should avoid hospital when very sick with Covid-19 (B. Levy et al., 2021). A Swedish study found that older adults perceptions of ageing changed alongside government recommendations such as physical distancing (Seifert, 2021). These relationships demonstrate the complex, multifaceted and multidirectional relationships that perceptions of ageing have within society and that a lot of work is needed to be able to predict how developing societal conditions will interact with people's perceptions of ageing.

Other factors influencing the prevalence of stereotypes about ageing are the surrounding culture. Although some research suggests differences in the prevalence of negative ageing stereotypes between collectivist and individualist cultures with the former possessing more positive stereotypes of older adults (B. Levy & Langer, 1994; North & Fiske, 2015). However, these divides are not clear cut. North and Fiske (2015) found, following a literature search, that attitudes might be more positive in countries traditionally considered Western rather than Eastern, although there were many confounding factors. For example, some subcultures are reported to have better attitudes to ageing such as the American deaf population (B. Levy & Langer, 1994).

1.7 Levy's Stereotype Embodiment Theory

Parsing how perceptions of ageing can affect so many outcomes has not been straightforward. B. Levy (2009)'s Stereotype Embodiment Theory put forward a psychosocial approach to ageing which has been key in building our understanding of the area. This approach helped to encourage the reconsideration of ageing and put forward a theory on how beliefs affect ageing, adding psychological and social components to the model. This theory has demonstrated a plausible explanation for

how cultures and social structures influence an individual's ageing process. Furthermore, this influence is through stereotypes either negative or positive which can become self-definitions as people age and are held against oneself. The theory had four main parts: 1. That stereotypes become internalised over the life span, 2. That these stereotypes are not always conscious. 3. People are reminded of these stereotypes when they become relevant to themselves and finally 4. That these stereotypes have effects which work through multiple pathways.

B. Levy (2009) shows how age stereotypes when held against oneself (self-perceptions of ageing) can lead to poorer outcomes. These studies will be covered in more detail later but the evidence supporting this is primarily from large scale longitudinal studies and shows domains related to health, psychological wellbeing, and behaviour are all impacted by perceptions of ageing. However, Levy largely relies on longitudinal research which uses the Philadelphia five binary choice items on the Attitudes Toward Own Ageing subscale as part of the Philadelphia Geriatric Center Morale Scale (Liang & Bollen, 1983) as a measure of self-perceptions of ageing. The original analysis of existing large longitudinal datasets using a subscale on a measure of geriatric morale provided stark evidence for the role of self-perceptions of ageing long in term health outcomes, but it has limitations such as being a one-dimensional scale.

The Attitudes Toward Own Ageing subscale is a single dimension measure of self-perceptions of ageing but it has had excellent predictive power. In a systematic review by Tully-Wilson et al. (2021) they evaluated 21 longitudinal studies which pulled from 8 international datasets and showed scores on this subscale were predictive in physical, psychological and behavioural domains. These included longevity and better health, health behaviours such as diet, exercise and medication

regime adherence, as well as depression and cognitive functioning. More recent research by Wurm and Schäfer (2022) used a multidimensional questionnaire with a 4 point Likert scale. This scale divided self-perceptions of ageing into gain-related self-perceptions of ageing and loss related self-perceptions of ageing in three domains, physical, ongoing development and social. Only gains related scores were significant in predicting mortality over the 27 years of the study, with increased gains associated with lower mortality. These findings suggest that there is still a lot of development needed in the area of self-perceptions of ageing to refine the construct and further develop the Stereotype Embodiment Theory.

Levy argues that older adults are likely to be negatively stereotyped by all age groups, children especially as they are most segregated from older adults. A literature review of children's perspectives on older adults found that although children do adopt stereotypes about older adulthood this does not result in ageism (Robinson & Howatson-Jones, 2014). The same review found that positive contact with older adults predicted more positive views of ageing by children. Although children may not be explicitly ageist, this stereotyping demonstrates that negative views of ageing are ingrained at a very young age. Levy argues that long term these views can have negative consequences as seen in the longitudinal studies which have data on perceptions of ageing. Unfortunately, no research we are aware of has yet correlated perceptions of ageing held from a young age across the lifespan to middle and older adulthood.

Although we do not have evidence across the entire lifespan, Diehl et al. (2021) has looked at a nationally representative German sample of individuals aged 40-85 who were followed up with over a period of up to 21 years. Diehl et al. (2021) measured self-perceptions of ageing across three dimensions including, physical

losses, social losses and ongoing development. This study found that there were several predictors of changes to self-perceptions of ageing including location (East vs West Germany), number of chronic diseases, poorer self-rated health and loneliness. Interestingly the study also found that self-perceptions of ageing related to physical and social losses were mostly stable from age 40-65 and then began to decline. The ongoing development subscale showed decline beginning at 55. This means that dimensions of self-perceptions of ageing may change at different rates and with different developmental milestones, highlighting the importance of multidimensional tools in measuring perceptions of ageing.

Some findings from B. Levy, Slade, et al. (2014) suggested that perceptions of ageing are resilient to changes even in the face of stressful events. In one study in which looked at older adults (over 70) it was found that stressful events did not affect individual's perceptions of ageing. Participants of a longitudinal study who were over 70 at baseline were tracked for ten years. During this time, they were checked to see if they had any stressful events defined as hospitalisations or bereavement. Individuals' perceptions of ageing did not change in response to the stressful events, suggesting that perceptions of ageing are resilient in this age cohort, or that changes are not predicted by these particular stressful events. Evidence did emerge that perceptions of ageing at baseline were predictive of risk of hospitalisation, but not bereavement.

According to Levy, these negative views of older adults can be held for a long time and gain salience as they become self-relevant. This self-relevance is when an individual realises they are at risk of being in the stereotyped group and internalises these beliefs about themselves. For example, when someone retires, or qualifies for a senior discount they will be faced with the reality that society views them as old. This

means that the negative stereotypes about ageing are now relevant for the individual themselves. It is not just objective markers of age but also when individuals face discrimination or are treated differently to how a younger adult might be treated.

Levy's argument that more negative perceptions of ageing developed in early life predict more negative self-perceptions of ageing in later life is underexplored. The longitudinal research cited by Levy is mostly related to self-perceptions of ageing as it uses the Attitudes Toward Own Ageing subscale mentioned previously. These studies have therefore only focused on self-perceptions of ageing and not included measures of people's general perceptions of ageing. In more recent research carried out in Ireland as part of the Irish Longitudinal Study on Ageing or TILDA the Brief Perceptions of Ageing Questionnaire (B-APQ) is used and has shown some promise in bringing together these areas. However, the B-APQ uses questions which measure both perceptions of ageing and self-perceptions of ageing, using a multidimensional model. Research from Warmoth et al. (2018) used a twelve item measure which had two subscales consisting of six items which measured perceptions of ageing, and six which measured self-perceptions of ageing. The researchers combined these into a single score, meaning it was then a measure of perceptions and self-perceptions of ageing and showed acceptable internal reliability (Cronbach's $\alpha = .66$). Over a six-year period this research showed more negative perceptions of ageing predicted greater frailty in an English sample. There is no strong consensus across the area on use of terms and a recent systematic review has put forward self-directed ageing stereotype as a catch all term for various terms such as perceptions of ageing, self-perceptions of ageing, attitudes to own ageing, but this has not gained traction (Burton et al., 2021). Even within the literature these terms are not used consistently. For example, Burton et al., (2021) identified 27 papers which used the Attitude to Own Ageing

Questionnaire, a five-item dichotomous measure where 19 studies used it as a measure of self-perceptions of ageing, three studies measure of ageing satisfaction, a further three as a measure of attitudes towards own ageing, and two as a measure of self-perceived uselessness. See Burton et al., (2021) and Diehl et al., (2014) for a fuller review of these terms and measures used in the area and

Further evidence supporting stereotype embodiment was found by Sánchez Palacios et al. (2009) who, in a correlational study with older adults found that a greater endorsement of negative stereotypes (using a 15 item questionnaire where participants rated their level of agreement with statements containing negative stereotypes of older adults) of ageing was associated with poorer subjective health, objective health (as measured by GP visits), physical activity and engagement in community social activities. Some evidence suggests a distinction between perceptions of ageing and self-perceptions of ageing comes from studies which use the Expectations Regarding Ageing (ERA) 12 item survey. The ERA uses a 4-point Likert scale to measure agreement with statements containing negative stereotypes of ageing. Andrews et al. (2017) found that more positive perceptions of ageing correlated with increased moderate to high intensity physical activity over a two-year period. However, these results were not only found in women for the full scale but across the entire sample when a subscale of "physical domain" was used.

Although these negative perceptions of ageing are often explicit, Levy also summarises the evidence for the unconscious existence of these negative views. This is seen through implicit activation of stereotypes in older adults using subliminal primes. In short, older adults who are shown negative stereotypes about older adults, too fast to consciously see but slow enough to encode, suffer negative performance consequences. Levy cites her own research showing that when older adults are

presented with words associated with negative stereotypes affecting them, like “frail” and “forgetful”, too fast to consciously read but slow enough to see caused older adults to performance worse on tests of memory (B. Levy, 1996). Levy does not appear to make a connection between these implicit activations and any implicit beliefs the individual might already hold, suggesting this priming works regardless of an individuals’ perceptions of ageing being positive or negative. However some findings suggest that these negative effects are only present in those for whom the stereotype is self-relevant as the effect is not seen in young adults exposed to implicit stereotype primes (Stein et al., 2002).

This internalisation process described by Levy and how these negative views become self-fulfilling is proposed to use multiple pathways. Levy groups these pathways into psychological, behavioural and physiological. Although I will expand on these later in our targeted review paper (Fawsitt & Setti, 2017), I will summarise them briefly here. The psychological pathway is described by Levy as stereotype matching, essentially a self-fulfilling prophecy. Levy considers this distinct from stereotype threat citing O’Brien and Hummert, (2006) as evidence for internalisation as opposed to stereotype threat. This stereotype matching comes from research suggesting that when older adults are exposed to stereotypes their performance on tasks related to these tend to match the stereotypes. This could be either positive or negative. The behavioural pathway is described actions people take deliberately such as health behaviours. Older adults with more negative perceptions of ageing are less likely to engage in positive health behaviours according to Levy. Finally, the physiological pathway relates to the short-term biological stress experienced by older adults when exposed to negative stereotypes. The physiological consequences of these

repeated exposures are hypothesised to have negative health consequences for older adults.

Levy concluded this paper, which has now been cited over a thousand times, with future directions. Levy describes a need to understand what ageing stereotypes are most harmful for older adults and he need to develop interventions to improve perceptions of ageing.

1.8 Barber's 2017 review paper

There are several types of stereotype threat that individuals experience summarised as put forward by (Shapiro & Neuberg, 2007) and the application of this with relation to older adults is summarised by Barber (2017). Barber puts forward clear theoretical developments in the area, clarifying factors and mechanisms related to stereotype threat, specifically in older adults. Barber uses evidence from a meta-analysis that suggests stereotype threat varies in nature between groups (Nguyen & Ryan, 2008). Barber notes that older adults are stereotyped across several domains and that these stereotypes lead them to expect to experience steep declines in several areas including cognition, physical ability, sensory thresholds and skills such as driving.

Barber uses Shapiro and Neuberg's (2007) multi-threat framework as a way of making sense of the differences between stereotyped group's experience of stereotype threat. Shapiro & Neuberg (2007) suggest that there are qualitatively different types of stereotype threat which differ along two dimensions resulting in six different forms of threat. The dimensions are the target of the threat (oneself or one's group) and the source of the threat (the self, one's group, an outgroup). For example, where the target of the threat is the self, and the source of the threat is self an individual experiences self-concept threat, which is the fear that the behaviour will confirm to the individual

that the negative stereotypes held about their group are true of them. As another example if the source of the threat is outgroup members, and the target of the threat is the individual's group, they experience group-reputation threat (outgroup) which is the fear the individual's behaviour will confirm in the minds of outgroup members the negative stereotypes about the individual's group leading to the group being judged or treated badly by an outgroup.

This framework has had powerful explanatory powers and Barber uses it to hypothesise the primary type of stereotype threat that older adults experience. Barber suggests this type of threat is self-concept in that they are primarily worried about confirming stereotypes are true about themselves to themselves. This means when an older adult experiences stereotype threat they are worried about confirming the stereotypes apply to themselves by their own poor performance. Barber also notes that older adults are also likely susceptible to own-reputation threat as well, and have concerns about being judged negatively by others. Other groups may experience different forms, such as being worried about confirming stereotypes are true to members of other groups. Given the premise that stereotype threat is predicated on existing stereotypes about older adults, perceptions of ageing and stereotype threat may be connected. The amount older adults endorse the negative beliefs might logically affect the strength of the threat.

Some results are more difficult to explain using this theory however. Desrichard et al. (2022) used a novel study design as part of two large longitudinal studies in Europe (the Survey of Health, Ageing, and Retirement in Europe n=32,768 and the Vivre-Leben-Vivere studies n=960) which found that older adults performed better when the tester carrying out cognitive assessments was also older. This suggests the mere presence of younger adults may induce stereotype threat which does not fit

with self-concept threat, but may fit a more reputational threat where an individual is worried about their own or their groups appearance to those outside of their group. If older adults primarily experienced self-concept threat, there would be a more uniform effect seen regardless of tester age. However, one possibility is the tester's age acted as a negative stereotype prime, reminding the participants of their own advanced age.

These theoretical insights help clarify the mechanisms at play in stereotype threat in older adults. In younger adults, in stereotyped groups, two factors are important, the extent to which an individual endorses a stereotype and how much/ whether they identify with the stereotyped group. For older adults it is slightly different. The stereotype of "older adult" as a group, is one in which everyone in the group has been an outgroup member and transitioned to being a member of the group. Shapiro and Neuberg (2007) make clear that for self-concept threat, individuals must believe there is some truth to the negative stereotypes. Therefore, older adults may be worried about becoming ingroup members. This particular dynamic for older adults means the threat they experience is self-concept. This makes sense as the threshold for becoming an in-group member (old) is blurry so a good defence against it is to deny you are in the group.

Barber connects the practical implications of some of these effects, by pointing to how older adults can worry about being negatively evaluated by their physician due to their age. Barber highlights the importance of this as those fears of negative evaluation are associated with beliefs and behaviours that impact health such as physician distrust, dissatisfaction with health care services and a lower rate of receiving the influenza vaccine (Abdou et al., 2016). More recent research from Phibbs and Hooker (2018) suggests that only 8.31% of participants felt worry or fear that medical staff judged them due to their age. However, Phibbs and Hooker (2018) found

several factors were predictive of a fear of being judged. These included, previous experiences of age-based discrimination and poorer self-perceptions of ageing.

Barber also summarises the research by suggesting that older adults do not identify as old. This is important as it has consequences for the nature of stereotype threat. This means they have low group identification, strengthening the case for their stereotype threat type being self-concept. Changes in ability and experience may force older adults to wrestle with the idea of themselves as being "old". Older adult's experiences of this are not currently well understood.

In support of stereotype threat in older adults being self-concept, Barber makes the prediction that affirmations may be useful in alleviating the stereotype threat effects. Evidence on the effectiveness of affirmations with self-concept as threat is mixed and at the time no research on affirmations had been carried out with older adults (Barber et al., 2017). However, Barber is clear that self-concept threat may not be exclusively the only type of stereotype threat experienced by older adults. One type of stereotype threat may not apply uniformly across a group, for example older adults are stereotyped as being less technologically savvy and they may be more concerned with how others see them than confirming this to themselves. Barber suggests that the mechanisms underlying different forms of stereotype threat may not be uniform across age. Specifically, that while executive interference mechanisms may be dominant in younger adults, older adults experiencing stereotype threat are more likely to experience motivational changes in regulatory focus. To be clear, this is not due to the type of threat but due to the individual's age. This may be due to changes in emotional regulation abilities as although older adults experience similar anxiety and physiological responses, they are not moderators of the effect of stereotype threat. This is seen to be a cause of executive interference in stereotype threat experienced by

younger adults. In contrast, older adults stereotype threat is better explained by regulatory focus theory. This is supported by evidence both before and since the publication of Barber's review (Barber et al., 2015; Gaillard et al., 2011; Thomas et al., 2018).

Finally, Barber highlights a suggestion from Shapiro and Neuberg, 2007) that these two explanations may be compatible. Shapiro and Neuberg (2007) suggest that as part of their executive interference model there may be changes in motivation leading to executive interference. Adopting a prevention focus may use up cognitive resources as individuals may use extra effort monitoring for mistakes, resulting in less resources for other elements of the task. Barber concludes by reviewing potential interventions for stereotype threat in older adults. Barber also recognises the potential usefulness of improving negative perceptions of ageing as a way to reduce the effects of stereotype threat. Self-concept threat requires endorsement of stereotypes so those with more positive perceptions of ageing should be less susceptible to stereotype threat. This has been partially examined subsequently by Marquet et al. (2019) but the only relationship found was that older adults with more positive perceptions of ageing were more likely to perceive threat.

This perspective on stereotype threat in older adults as a change in regulatory focus has been successful in predicting outcomes in several studies (Lamont et al., 2015; Meisner, 2012) but does not fully explain the phenomenon of stereotype threat in older adults. Some research findings appear to go against the regulatory focus perspective and are more consistent with the executive interference model of Schmader (2008). These include a study which found automatic responses were strengthened under stereotype threat in older adults (Mazerolle et al., 2012).

1.9 Thesis aims and research questions

The main aim of this thesis is to extend the Stereotype Embodiment Theory by proposing a model with clearer pathways, and to help understand how negative perceptions of ageing and stereotype threat in older adults potentially connect. The main hypothesised mechanisms for stereotype threat are not currently linked to outcomes from negative perceptions of ageing beyond performance in individual tests and how this might affect an individual's view of themselves. For example, although under stereotype threat older adults may perform worse on cognitive tests, and older adults with more negative views of ageing are more likely to see cognitive declines, the relationship between these phenomena, if there is one, is not fully understood. I hypothesise that the mechanisms of stereotype threat may also play a role in longitudinal consequences of negative perceptions of ageing. Stereotype threat likely happens through regulatory focus and executive interference and holding more negative perceptions of ageing may be related to having a more preventive regulatory focus. We also aim to clarify the mechanisms involved in stereotype threat in older adults. The majority of research suggests that regulatory focus is the chief driver of stereotype threat in older adults, however there is research suggesting that executive interference could play a role as well. Some research has found evidence of mind wandering, perhaps as a consequence of executive interference (Jordano & Touron, 2017; Mrazek et al., 2011). We hypothesise that executive interference and regulatory focus act independently as mechanisms for stereotype threat in older adults. We also hypothesise that perceptions of ageing may play a role in moderating the effect of stereotype threat in older adults, with more positive perceptions of ageing being protective against impacts on performance from stereotype threat.

A secondary aim of this research is to understand older adults' perceptions of ageing from a qualitative perspective. This research aims to give us some insight into how negative or positive beliefs may interact, how older adults conceptualise the label of old. Furthermore, it aims to help ensure interventions designed to improve negative perceptions of ageing can take older adults' perspectives into account.

Chapter 2: Extending the Stereotype Embodiment Model: A Targeted Review

2.1 Abstract

Perceptions of Ageing (PoA) can negatively impact older adults in domains such as cognition, mobility and health. The Stereotype Embodiment Model outlines how perceptions of ageing are internalised over a lifetime and have consequences on health in later life. However, the mechanisms through which negative PoA produce their negative effects remains unclear. Recent literature on stereotype threat in older adults indicates inefficient resource allocation to the task at hand, in terms of regulatory focus and executive functioning as plausible mechanisms. In light of these findings, we propose a revised Stereotype Embodiment Model to argue that these two mechanisms could also explain the detrimental effects of negative PoA. Specifically, we focus on evidence for working memory interference and sustained attention and we highlight directions for testing the role of these mechanisms.

Public Significance Statement

This review aims to highlight the pathways through which negative views of ageing become self-fulfilling prophecies. Additionally, it highlights areas which are of interest for future interventions in helping people age successfully and free from the consequences of negative stereotypes.

Keywords: Perceptions of Ageing, Stereotype Threat, Stereotype Embodiment Model, Attention, Regulatory focus

2.2 Introduction

Older adults are generally viewed negatively in Western societies, with stereotypes such as older adults being considered forgetful, frail, deaf, and helpless. These views are adopted by people at every stage of life including children (Cuddy et al., 2005; Isaacs & Bearison, 1986) and older adults themselves although these views soften with age (Rupp et al., 2005). Over the lifespan these views, which are originally held against an out-group (about older adults by the young), start becoming applicable to the person holding them. Someone who spends their life thinking that older adults have poor memories eventually has to contend with the fact that in older age this stereotype also applies to them. Many older adults not only have to contend with this internalised ageism but also with the explicit negative beliefs and prejudices held by others. Older adults are reminded of these whenever they are implicitly evaluated in completing a task, for example trying to remember a fact or story in front of other people, or clinically when they are being evaluated by a clinician for cognitive decline.

Research shows that growing older while holding negative views on ageing negatively impacts the individual's health and psychological well-being (B. Levy, 2009). Perceptions of Ageing (PoA) are defined as the way people of any age view older adults and the ageing process. This is distinct but related to self-perceptions of ageing which is how people view their own ageing process. These constructs are related but peoples' attitudes to themselves don't always match up with their general attitudes to ageing (B. Levy, 2008). Negative self-perceptions of ageing occur when an individual views their own ageing process negatively. This includes viewing their own mental and physical state as prone to age-related deterioration and believing they have little or no control over this decline. Negative self-perceptions of ageing can be considered a form of internalised ageism whereby individuals hold negative PoA and

see them as applicable to themselves (B. Levy, 2009). Ageism is harmful in a social sense, with older people being discriminated against, but the studies on negative PoA show that it also has negative, internally generated consequences for the discriminators as they become older adults.

It's difficult to quantify what portion of the population holds negative PoA, however considering the societal views of older people, it is likely to be a significant one, especially if we consider that the effect does not only hold for extreme cases. For example, in a study of 600+ participants, B. Levy, Slade, Kunkel, et al. (2002) found that participants scoring below the median in their negative PoA test had a mean life expectancy 7.6 years shorter than those over the median, over a period of 22.6 years.

The effects of holding negative PoA are extensive. They impact health: predicting cardiovascular events (B. Levy et al., 2009), biomarkers of Alzheimer's (B. Levy, Ferrucci, et al., 2016) and respiratory mortality (B. Levy & Myers, 2005). Importantly, PoA predict longevity (B. Levy, Slade, Kunkel, et al., 2002), as well as affecting psychological wellbeing, with increased loneliness (Pikhartova et al., 2015), dependency (Coudin & Alexopoulos, 2010), and earlier onset and persistence of depression (Freeman et al., 2016). Behavioural factors are also influenced, such as engagement with health behaviours including physical activity and diet (Beyer et al., 2015; Huy et al., 2010; B. Levy & Myers, 2004). Finally, physical ability outcomes such as functional health (B. Levy, Slade, & Kasl, 2002) and walking speed (D. A. Robertson, Savva, et al., 2015) are also associated with PoA.

Current theories of how negative PoA contribute to negative consequences of ageing aim to establish a causal relationship between the two. Research has looked at the association between negative PoA an individual holds before growing old, and

how these views are internalised and eventually become self-directed in old age. In particular, the Stereotype Embodiment Model from B. Levy (2009) provides the foundation from which to define these factors and the pathways through which they act. The model indicates three main pathways; the Physiological pathway, the Behavioural pathway, and the Psychological pathway.

The Physiological pathway is related to physiological stress caused by considering the negative PoA as applicable to oneself. The Behavioural, which acts through changes in behaviours, for example, withdrawal and lack of effort in areas such as health behaviours (B. Levy & Myers, 2004). Finally, the Psychological pathway relates to the psychological mechanisms through which negative PoA and internalisation contribute to negative outcomes. For example, seeing negative views related to older adults as more relevant. The Stereotype Embodiment Model constitutes a framework to study negative PoA, however, it remains underspecified in regard to the mechanisms, cognitive and psychological, behind these pathways as research has progressed significantly as has our understanding of the area. In the present paper, we focus specifically on these mechanisms proposing a revised version of the model which also aims to integrate the literature on Stereotype Threat as a part of the reinforcement of negative PoA.

The original definition of stereotype threat proposed that “Stereotype threat is being at risk of confirming, as self-characteristic, a negative stereotype about one’s group” (Steele & Aronson, 1995, p. 797). This definition was originally only applied to African Americans performance in tests of intellectual ability but has since been extended to other groups. These include older adults, who are affected in a number of domains including for example, memory and attention (Lamont et al., 2015; Meisner, 2012). Older adults tend to suffer self-concept threat (Barber, 2017; Shapiro &

Neuberg, 2007) meaning that they tend to be worried about confirming the stereotypes to themselves rather than or in addition to how others view them, although these forms of threat aren't mutually exclusive. For example, an older adult performing a memory test might be worried about doing poorly as they would feel that it proves they are getting "old", as stereotypically older adults have poorer memory. Older people are afraid of performing in such a way that it would suggest they are actually "old". In fact, as people age, they tend to move their estimates of what makes someone "old" away from their own age and older adults tend not to classify themselves as "old": this can be seen as a way to try to avoid applying the older age stereotypes to themselves while still worrying about confirming stereotypes and being seen as old by others (Taylor et al., 2009). When facing stereotype threat, they are reminded of potentially being "old" or that others might view them as old. For a fuller account of this kind of stereotype threat see Barber (2017).

The literature distinguishes between implicit priming of age-related materials and stereotype threat; stereotype threat is associated with negative consequences when the individual embraces the stereotype and refers it to the self. It occurs when older adults are deliberately exposed to the idea that they are expected to perform more poorly due to their age and are concerned with being evaluated. This form of threat is called stereotype threat(Barber et al., 2015). Another phenomenon uses implicit cues, i.e. implicit priming, such as flashing words too quickly for conscious recognition associated with negative or positive stereotypical connotations of older adults (B. Levy, 1996). The relevance of implicit activation of stereotypes outside of a lab setting has not been investigated in research in older adults to the best of our knowledge. This is one reason that research exploring explicit threat has had more attention in recent years (Meisner, 2012).

Implicit activation of stereotypes, as opposed to stereotype threat appears to operate also on individuals for whom the stereotype is not relevant. Exposure to implicit stereotype threat even young adults to embody these stereotypes, including a slower walking speed and poorer memory (Dijksterhuis et al., 2000); but see (Hess et al., 2004; B. Levy, 1996) where this was not found: see also (Wheeler & Petty, 2001) for a review and (Barber & Mather, 2014), for a detailed description of age based stereotype threat).

According to Multi-Threat framework (Shapiro & Neuberg, 2007) there are multiple forms of stereotype threat. These vary along dimensions based on if the target is worried about confirming a stereotype to themselves or others within the stereotyped group, or others outside the stereotyped group, and whether they are worried about confirming them about themselves or about their stereotyped group. An individual must endorse a stereotype in order to be subjected to the "self-concept" stereotype threat. Following this model, an older adult who scores highly for negative PoA would be more susceptible to self-concept forms of stereotype threat. Some research has shown that holding positive PoA has a protective effect for older adults against age-based stereotype threat (Fernández-Ballesteros et al., 2015). However, implicit activation of stereotypes could also operate in older adults, even those who do not hold very strong negative ideas on their own ageing. We will focus on the mechanisms underlying stereotype threat literature as its consequences in non-lab settings are clearer (Barber et al., 2015). The negative impact of implicit activation of stereotypes should still be taken into account however as it adds to our picture of the effects of stereotype threat on older adults.

Based on this association between negative PoA and susceptibility to stereotype threat, the revision of the Stereotype Embodiment Model we propose is

based on this emerging literature on stereotype threat in older adults. This literature indicates that lack of executive control, including interference in working memory (Lamont et al., 2015) and plausibly poor sustained attention and difficulty in maintaining focus as well as mismatch between task requirements and individual attitude towards the task (Barber & Mather, 2013) are plausible mechanisms leading to negative consequences of stereotype threat and, we propose, also leading to negative consequences of negative PoA.

In this revised model we focus on the Psychological Pathway and we highlight the plausible mechanisms linking negative PoA with poor behavioural outcomes based on the literature on stereotype threat. As a consequence, we propose that the Behavioural Pathway is not standalone but should be better conceived as a consequence of the Physiological and Psychological/Cognitive Pathway. However, we recognise that behaviour could in turn have profound psychological effects. For this reason, we propose that this is a loop where negative PoA are associated with poorer executive control and task engagement and consequently, negative behavioural outcomes, which, in turn, feed more negative PoA and further negative psychological consequences. In the original model the Psychological Pathway was the internalisation of stereotypes over time. The revised model is presented in Figure 1. In the next sections we first review the relevant literature on stereotype threat in older adults and then detail the revised model we propose. Finally, directions for future research are

discussed.

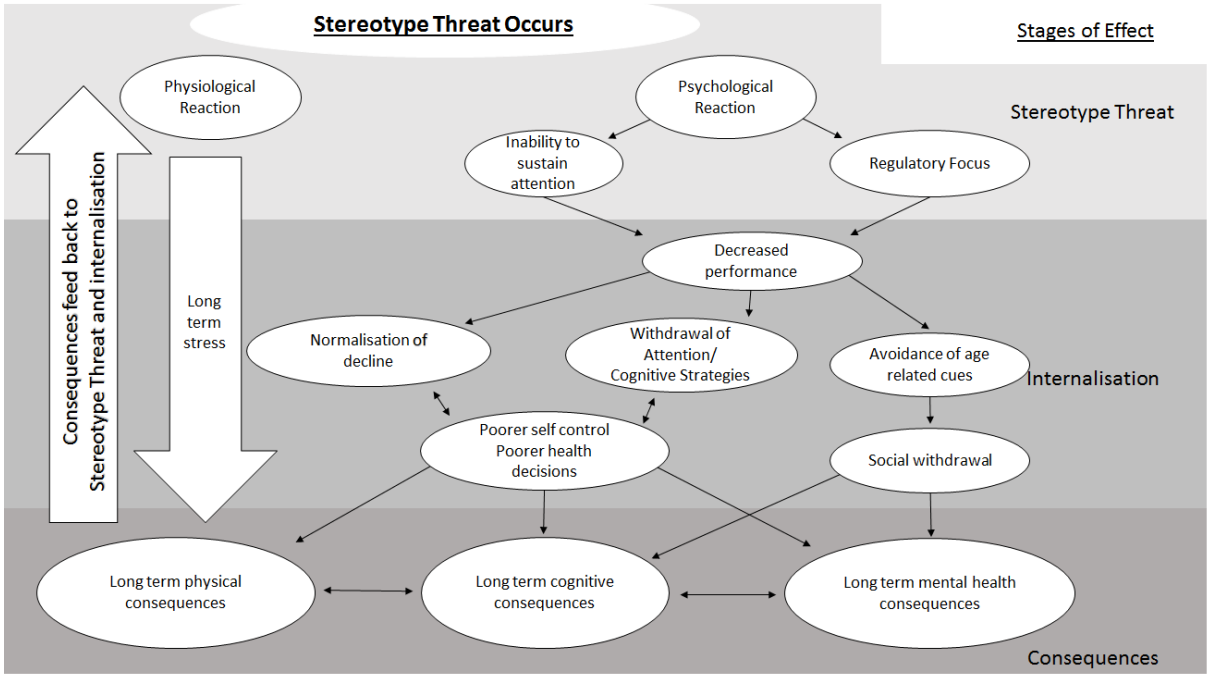


Figure 1. Revised Stereotype Embodiment Model. This figure illustrates the pathways through which stereotype threat leads to long term consequences of negative PoA

2.3 Stereotype threat in older adults

Emotional regulation, stress/arousal, withdrawal of effort, regulatory focus, and narrowing of attention have been proposed as mechanisms for stereotype threat to act on behaviour (Grimm et al., 2009; Inzlicht & Kang, 2010; Johns et al., 2008; Osborne & Walker, 2006). Stereotype threat spillover has also been shown, which causes even domains not directly stereotyped to be negatively impacted (Beilock et al., 2007), for example the positivity of older adults memories is affected by stereotype threat (Barber et al., 2019).

Schmader et al. (2008) propose executive control interference as a cause of the negative effects of stereotype threat. Executive control is the ability of an individual

to control and sustain attention, avoiding attention lapsed and mind wandering in a task (Diamond, 2013). In Schmader et al. (2008)'s model, executive control deficits are associated with working memory interference. Working memory is a multi-component system with a limited capacity that stores and processes information short term (Baddeley, 2002). In essence, the threatening situation leads to exhausting working memory capacity due to increased task monitoring, resulting in outcomes such as increased mind wandering. Mind wandering is likely to occur under threat (Mrazek et al., 2011).

While mind wandering under threat has not been examined specifically in older adults yet, it has been shown that older adults tend to have more task interference when they mind wander (Zavagnin et al., 2014), despite experiencing less mind wandering than younger adults. Older adults also experience more negative thoughts associated with mind wandering even if not under stereotype threat, which could be potentially associated with negative consequences under stereotype threat. It is also important to distinguish between sustained attention and mind wandering as they are related. Lapses in sustained attention may lead to instances of mind wandering but mind wandering is not necessarily a consequence of a lapse in sustained attention; importantly mind wandering can be qualified by the nature of mind wandering events. The content of mind wandering is also important. Mind wandering is when thoughts unrelated to the completion of a task interrupt, while sustained attention is the ability to focus on a task or stimulus (Christoff et al., 2016).

The distinction between task related and task unrelated mind wandering is important because previous studies have shown their differential effects on performance. Task related mind wandering occurs when thoughts relate to the task but don't help performance ("I don't think I can do this" or "I wonder should I be doing

this differently"). Conversely, task unrelated mind wandering pertains to a completely different context, for example "What am I going to make for dinner?". Mind wandering is not always negative and can actually improve performance on creative tasks but doesn't appear to be beneficial in more controlled cognitive tasks (Mooneyham & Schooler, 2013). Older adults also tend to experience more task interference as their mind wandering tends to be task related (McVay et al., 2013).

A well supported cause of poor performance under stereotype threat is a lack of regulatory fit, which plays a large role in stereotype threat in older adults (Gaillard et al., 2011). Regulatory focus theory pertains to goal pursuit strategies. Individuals use either a promotion focused or a prevention focused strategy when performing a task (Higgins, 2000). A promotion focus means an individual is oriented towards making gains, such as getting a high mark in an exam. A prevention focus means an individual is more concerned with avoiding a particular outcome, such as failing an exam. This can lead to more cautious behaviour. For example, in cognitive tests a promotion focus can lead to a decrease in response time, whereas a prevention focus can lead to an increase in response time as individuals are more focused on avoiding a wrong answer. When an individual adopts a promotion focused strategy and performs a task with instructions that encourage this, i.e. when the regulatory focus meets the demands of the task, there is regulatory fit (Higgins, 1997). When the strategy and the task don't match there is a regulatory mismatch. Regulatory mismatch results in poorer performance on tasks.

There is evidence to suggest, from work with other groups as well as older adults, that stereotype threat induces the adoption of a prevention strategy in individuals. This leads to underperformance in tasks with a gains-based structure (Barber et al., 2015; Gaillard et al., 2011). Older adults seem predisposed to a more

prevention focused orientation and stereotype threat manipulations can exacerbate this (Barber et al., 2015) to the detriment of performance in tasks with a gains-based structure. Grimm et al. (2009) argues that most cognitive tasks are promotion focused and individuals under stereotype threat adopt a prevention focus. Therefore, older adults, adopting a prevention focus, would be disadvantaged in performing gain-based tasks (Barber et al., 2015; Barber & Mather, 2013). For example, older adults might be too cautious in decision making, as well as performing worse on tests for dementia in clinical settings. This is supported by the impact of stereotype threat on performance in tests of dementia (Barber et al., 2015).

We propose that stereotype threat is a potential antecedent for negative PoA, whereby from being subjected to threatening situations, the threat becomes chronic when the ageing individual sees the negatives views of ageing as applicable to oneself. In addition, negative PoA can be a catalyst for negative effects of stereotype threat, based on the Multi-Threat Model (Shapiro & Neuberg, 2007).

In the present revised version of the Stereotype Embodiment Model (B. Levy, 2009) we utilise the above summarised evidence to specify the mechanisms operating in the Psychological Pathway.

The Psychological Pathway Revised

Based on the stereotype threat literature, the revised model proposes that executive dysfunction and a lack of regulatory fit are the two main causes of cognitive and physical deficits associated with negative PoA (Figure 1). Executive dysfunction is in line with the original Stereotype Embodiment Theory (B. Levy, 2009), which indicated a withdrawal of effort in the form of lowered self-efficacy and viewing health behaviours as pointless, as a potential cause of negative consequences of

negative PoA. However, here we go further and specify potential processes associated with executive dysfunction which may lead to the withdrawal of effort.

The first potential mechanism is working memory interference. In the case of negative PoA, the older individual may use working memory capacity to process task-irrelevant thoughts. If older individuals devote part of their cognitive effort to task irrelevant negative ideas about ageing and themselves, i.e. task irrelevant mind wandering, they would have fewer resources to devote to the task at hand. This would lead to working memory interference and to working memory load. This condition could become a chronic effect in individuals with negative PoA, especially if we consider that in our society we are frequently exposed to age-related stereotypes (Donlon et al., 2005).

Alternatively, older adults may suffer from excessive task-related mind wandering (Zavagnin et al., 2014) thinking too much about how to approach the task at hand and eventually adopt overly conservative strategies (Gaillard et al., 2011). For example trying to reflect excessively on the task at hand, which can affect performance negatively especially in familiar tasks such as gait (a person's manner of walking), which present a high level of automaticity (Mazerolle et al., 2012; D. A. Robertson, Savva, et al., 2015). This kind of increased self-monitoring has been shown to affect performance in other populations, for example in athletes (Beilock et al., 2006; Beilock & Gray, 2012).

More research is needed to understand what kind of mind wandering is associated with negative PoA and whether there is a difference between age-related or not-age related mind wandering in how performance is affected. This could be tested first by assessing the working memory capacity under threat in older adults in

conjunction with self-reported mind wandering. One may expect the strongest effects of threat in tasks loading heavily on working memory (e.g. N-Back), while tasks that can be resolved with little working memory load, such as exogenous attention tasks or speed of processing (e.g. choice response time tasks) should show a milder effect. However, some evidence suggests that performance under stereotype threat in older adults in the digit span task is not impacted (Hess et al., 2009), possibly because the task is not sufficiently challenging. It should be noted that effects of negative PoA are present in tasks with low working memory impact, such as auditory thresholds and therefore further research is needed on this matter (B. Levy et al., 2006).

The effect of negative PoA on psychophysical tasks such as visual assessment and hearing thresholds (B. Levy et al., 2006) may be better explained by another cognitive deficit potentially present in individuals with negative PoA: sustained attention. Poor sustained attention could include disengagement from the task and/or difficulty in keeping a sufficient level of alertness and task engagement as suggested by work of Langer et al., (2010). Preliminary findings support a correlation between sustained attention performance, assessed by the Sustained Attention to Response Time Task (I. H. Robertson et al., 1997) and negative PoA, as well as poor sensory integration over time and negative PoA (Fawsitt et al., 2015) A correlation between poorer sustained attention and more negative PoA has also been found cross sectionally in a larger national study (D. A. Robertson, King-Kallimanis, et al., 2015). In addition, executive functions decline (assessed by verbal fluency) is associated with negative PoA. In this large longitudinal study, verbal fluency decline was associated with negative PoA at two years follow up (D. A. Robertson, King-Kallimanis, et al., 2015).

Indirect support of the sustained attention hypothesis can be found in the evidence that negative effects of negative PoA can be counteracted by helping the individual to engage in the task and pay attention by adopting positive priming (Langer et al., 2010). In Langer et al. (2010)'s study, adult participants were encouraged to believe they had better vision by impersonating the role of a group characterised by excellent vision (pilots and in the second study athletes). Similar results were achieved in a second experiment where individuals were primed to read smaller writing on an eye chart by reversing the direction of the change in size (starting small at the top and becoming larger at the bottom). The results from all three experiments showed that participants' scores in eye tests could be improved using these techniques.

While not yet studied in the PoA literature, another mechanism potentially related to withdrawal of effort is susceptibility to external distraction. While mind wandering is an internal source of distraction, it is also possible that older adults with negative PoA do not focus attention sufficiently well, being more subjected to distraction induced by irrelevant stimuli in the environment. There is evidence of the effect of stereotype threat on older adults' attention performance (Lambert et al., 2015). We can expect that other components of the attention system may be affected (Petersen & Posner, 2012). However, to our knowledge, no study tests specifically the effect of negative PoA on selective attention tasks. It is important to distinguish between different forms of attention as it is a multi-component construct (Sarter et al., 2001). Complementarily, lower inhibition capacities characterising older adults (Hasher et al., 1991) may be exacerbated by negative PoA.

Empirical evidence explicitly assessing whether working memory interference/overload or task disengagement (poor sustained attention/alertness) or poor selective attention or inhibition are at the grounds of the effect of negative PoA

on performance is lacking. These alternative hypotheses need to be tested empirically in future studies. It is possible that working memory interference or overload may be at play when the threat is explicit, while failure in sustaining attention and task monitoring may be the mechanism underlying the effect of negative PoA when not under threat (D. A. Robertson, King-Kallimanis, et al., 2015), further research is needed on this topic.

In regulatory focus theory (Higgins, 2000) older adults use a prevention focused strategy while under stereotype threat (Barber, 2017; Barber & Mather, 2013). This can either enhance or impair performance depending on whether the task performed matches or whether it calls on skills that are impaired by a particular strategy; for example, creativity is hampered by adopting a prevention focus (Baas et al., 2008). Prevention focus could characterise individuals with negative PoA, so that they become conservative and try to avoid losses. This in turn may impair performance when the task is oriented to gains (Barber, 2017). While strong evidence supports this hypothesis for older adults under stereotype threat, to our knowledge no studies have specifically considered negative PoA in relation to it. As susceptibility to self-concept threat is endorsing the stereotype and fear of confirming it to yourself, this is an important link in the research that has not yet been explored.

In sum, we propose that withdrawal of effort, as indicated in the proposed model can be specified by two mechanisms: executive dysfunction and regulatory mismatch. Within executive dysfunction, several specific processes are hypothesised as potential causes of deficits, chiefly working memory interference, and sustained attention. Lapses in sustained attention may lead to poor task performance, therefore confirming the stereotypes and feeding negative PoA. Within working memory interference, one can hypothesise task irrelevant mind wandering or task related mind

wandering as potential causes. While task irrelevant mind wandering is in line with the idea of withdrawal of effort, task related mind wandering appears linked to an excessive engagement in the task and fear of failure. This is in turn linked with the regulatory focus hypothesis, whereby older adults under threat become more conservative and try to avoid losses, which could apply also to individuals with negative PoA when not under threat.

2.4 Behavioural consequences

As depicted in Figure 1, executive dysfunction and regulatory mismatch then lead to poor performance and lowered self-efficacy, in turn associated with normalisation of decline and poor health decisions.

Older adults with negative PoA can see the negative consequences of ageing as inevitable compared to older adults with more positive views (Sargent-Cox & Anstey, 2015). As people grow older they expect a decline in health, in perceptual abilities, in mental faculties, and even in the ability to complete daily tasks (Kite et al., 2005; Sarkisian et al., 2001). These changes seem inevitable to people and this can lead people to considering any change associated with old age as unavoidable (Williamson & Fried, 1996), this mechanism is referred to as normalisation of decline. Normalisation of decline may also lead to over-reliance on other people. In turn, being over cared for leads to a decline in self-efficacy as well as performance in older adults (Avorn & Langer, 1982). While it is possible that older adults who make poor health decisions due to poor PoA may benefit from letting caring others make more decisions for them, this will increase their dependency and their lack of self-efficacy, which are in turn related to poor health (Solomon, 1990). Not taking part in decision making encourages dependence, initially in health decisions but increasingly in different areas.

This is most evident in institutions where learned helplessness can negatively impact on patient's health (Langer & Rodin, 1976).

Normalisation of decline is linked with behavioural consequences. Older adults with negative PoA are less likely to engage in health seeking behaviours (Sarkisian et al., 2002). For example, older adults with negative PoA are less likely to engage in behaviours that promote cardiovascular health such as exercise and a healthy diet (Emile et al., 2014; B. Levy & Myers, 2004) and are less likely to attend check-ups or investigate symptoms via doctor visits (Sarkisian et al., 2002). This normalisation of decline leads to a vicious cycle where individuals who don't engage in heart healthy behaviours will have more heart problems while being less likely to act on them (Huy et al., 2010), this effect snowballs into negative health consequences. It should be noted however that normalisation of decline is not a necessary consequence of negative PoA. Some individuals are more resilient to these stereotypes and refuse to consider their personal declines normal but can still hold negative PoA (B. Levy, 2008). This could also make those older adults more susceptible to self-concept stereotype threat as they focus on avoiding the stereotypes for themselves. The elucidation of this dissociation in future studies would be useful to clarify to what extent normalization of decline is an avoidable consequence of negative PoA.

In the present revised model, we propose that the Behavioural pathway is better represented as a continuation of the Psychological pathway, with effects like poor health decisions and avoidance behaviours accumulating to result in major negative consequences. These consequences are then seen in the longitudinal research (Kotter-Grühn et al., 2009; B. Levy, Slade, & Kasl, 2002; Sargent-Cox et al., 2014).

2.5 Conclusion

In the present paper we proposed a revision of the Stereotype Embodiment Theory (B. Levy, 2009) integrating the findings from the literature on stereotype threat. The original model, while providing a framework for research in the field of negative PoA, needs to be further specified in relation to the cognitive and psychological mechanisms at play. The original model focused on how older adults internalise negative PoA and gave an outline for how negative PoA create negative consequences using three pathways. The Psychological pathway dealt with how expectations shaped outcomes through stereotype matching. The Behavioural pathway illustrated how poorer expectations for ageing led to less engagement with health behaviours. Finally, as in the original model, the Physiological pathway leads to poorer health outcomes because exposure to negative PoA leads to a biological stress response. Continued and prolonged stress contributes to health problems.

Our adaption to the pathways used by the Stereotype Embodiment Model help clarify the mechanisms used and point towards avenues for intervention. We highlighted evidence for two main mechanisms potentially leading to the cascade of negative consequences of negative PoA. First explaining the short-term impact of stereotype threat. We focused particularly on the Psychological pathway and the cognitive processes underlying it.

The Psychological pathway is includes the cognitive impact of stereotype threat, specifically working memory interference, as shown by poorer performance under threat in tasks relying on working memory (Ferris, 2013). Attention is also impacted, with difficulty in maintaining focus (Lambert et al., 2015) and, possibly, difficulty in inhibiting irrelevant stimuli. In parallel, a more conservative regulatory focus can lead the older individual to become more prevention focused, therefore performing poorly when the task focus is on promotion (regulatory mismatch)

(Gaillard et al., 2011). Decreased self-efficacy can also lead older adults to increase their dependence on care when exposed to stereotypes (Coudin & Alexopoulos, 2010).

These psychological processes lead to poorer performance. Poorer performance is in turn associated with further withdrawal of effort (Strough et al., 2015) and we propose this leads to a normalisation of decline. Normalisation of decline with ageing is potentially associated with poorer health choices in older adults (Huy et al., 2010; Sarkisian et al., 2002). Research suggests that negative PoA are correlated with future loneliness and isolation (Pikhartova et al., 2015). The short term effect on performance by stereotype threat, as well as the effect of stereotype threat on self-appraisal (Barber & Lee, 2015) could lead older adults to avoid "threatening" social situations although more research is needed to understand this link. Social withdrawal and poor health choices potentially are associated with long term poorer physical, cognitive and mental health feeding the negative cycle of poor performance, withdrawal of effort and poor self-efficacy (Figure 1).

This shows how the short-term stereotype threat or psychological pathway leads into the long-term behavioural changes, which, in turn, feed into the negative mechanisms illustrated in the Psychological pathway. This model lays out testable hypothesises for future PoA and stereotype threat research. Research testing this model then gives clear directions for interventions to be more targeted as the area has suffered from a lack of successful interventions. These interventions could be based on training sustained attention, changing default regulatory fit in older adults, and integrating these approaches into interventions that have shown promise already.

There are still many unanswered questions around negative PoA. The links between threat, short term negative consequences of threatening situations and

internalization of negative PoA needs to be clarified. In addition, long term cognitive effects have only started to be analysed (D. A. Robertson, King-Kallimanis, et al., 2015) as well as neural correlates of withdrawal of attention in older individuals with negative PoA. Longitudinal studies such as The Irish Longitudinal Study on Ageing (Donoghue et al., 2018), including a wide range of psychological and cognitive measures, as well as measures of negative PoA will allow to provide prevalence data; as well as longitudinal data on the negative impacts of negative PoA. The mediating role of factors such as educational attainment (Lindsay et al., 2002) or social networks (Fratiglioni et al., 2004; Seeman et al., 2001) also deserve further investigation in light of their role in cognitive decline.

The model proposed here contributes in specifying the cognitive and psychological processes through which negative PoA may act on the individual to produce negative outcomes. This in turn can inform remediation strategies as well as interventions. Researchers have had some success in short term interventions (Donlon et al., 2005; B. Levy et al., 2000) operating on modifying the negative views of older adults, however a more precise definition of the cognitive mechanisms operating opens the possibility to utilise cognitive training as remediation or compensation, especially in individuals more resilient to change their negative views. Potentially, providing older adults with cognitive strategies to better focus and regulate their attention may allow them to better stay ‘on task’, with positive consequences on performance. This could in turn contribute to instigate a virtuous cycle, including resilience to threat and, possibly, reduction of negative PoA. Considering that stereotype threat encourages a loss-prevention focus and this is associated with poorer self-efficacy (Tudoran et al., 2012), more research is needed on the specific link

between stereotype threat in older adults, decision making and regulatory focus and its real life implications, for example in financial and health decision making.

Chapter 3: Evidence updates and unexplored areas

3.1 Advancements in the physiological pathway

Since the publication of the first paper in this thesis (Fawsitt & Setti, 2017), there has been developments in the area of self-perceptions of ageing and potential pathways. One of the most interesting findings has been the expansion of the physiological pathway. B. Levy and Bavishi (2018) found that an inflammation marker (c reactive protein) level was associated with negative perceptions of ageing. Skoblow and Proulx (2022)'s findings support this and they suggest it may be due to heightened stress reactivity due to holding more negative perceptions of ageing. This is supported by findings from Bellingtier and Neupert (2016) who found that holding negative perceptions of ageing leads to greater psychological reaction to daily stressors, although with a small sample of n=43 and only over 9 days.

The physiological pathway has also been supported by research from Wilton-Harding et al. (2022) who found in an Australian sample that more positive perceptions of ageing was associated with lower reactivity to daily stressors in a daily questionnaire, although no biological measures were collected. B. Levy and Bavishi (2018) found that the inflammation marker also mediated the role between perceptions of ageing and survival over a six-year period. Another study found that older adults with more negative perceptions of ageing had increased cortisol levels from a baseline as they aged over a period of, on average, nine years. This was not true for those with positive perceptions (B. Levy, Moffat, et al., 2016). B. Levy, Ferrucci, et al. (2016) found a link between individuals with more negative ageing stereotypes and biomarkers of Alzheimer's disease on autopsy.

There are other biological findings which are less clear. Although the link between perceptions of ageing and risk of dementia onset has been found previously, more recent research into the risks associated with dementia, has looked at those with high risk genes (B. Levy et al., 2018). A cohort of older adults (60+) from the Health and Retirement Study were followed over 4 years and it was found that those with positive perceptions of ageing were less likely to develop dementia in that period. As well as this, participants were gene sequenced and those with a gene associated with greater risk of developing dementia (the APOE gene) were identified, roughly a quarter of the overall sample (n=1,250). Even in this high-risk group, those with positive perceptions of ageing were almost 50% less likely to develop dementia. Although this is a relatively short time period, it demonstrates the potential for perceptions of ageing's role in understanding vulnerable populations life trajectory.

Few research studies have looked at the effect of stereotype threat on the physiological responses of older adults. Weiss (2018) carried out two experiments looking at the interaction between essentialist beliefs (stronger negative perceptions of ageing) about ageing and stereotype threat. The first experiment found support for the hypothesis that older adults who held more essentialist views of ageing, made more errors on a memory test when under stereotype threat. In the second experiment, Weiss (2018) also included a measure of cardiovascular stress which showed that older adults in the stereotype threat condition, who endorsed essentialist beliefs about ageing, had higher cardiovascular reactivity. This was not found in older adults who did not endorse essentialist beliefs about ageing. Unfortunately, due to small sample sizes it is difficult to generalise these findings, although they are promising and warrant further investigation.

Of particular interest is a research study by Chen et al. (2022), who used fMRI to look at the neural correlates of older adults' stereotype threat effects within the domain of memory performance.. Chen et al. (2022) found that older adults in the stereotype threat group were not different in their physiological stress response (measured by heart rate variability) and did not show evidence of the attention interference hypothesis. Chen et al. (2022)’s results did not show evidence of the executive interference model with brain areas associated with motivational changes being more activated in those under stereotype threat. However, there were no group differences in performance and the artificial setting for the experiment make it difficult to interpret the findings further. This study does show promise in helping us understand the mechanisms underpinning stereotype threat in older adults using fMRI technology.

Research from other groups has also found some evidence supporting the physiological response under stereotype threat. John-Henderson et al. (2014) found, in a sample of undergraduates exposed to stereotype threat increased activation of inflammatory processes, as evidenced by increased levels of IL-6 which is a stress-related biomarker. In similar research John-Henderson et al. (2015) found female college students exposed to stereotype threat showed the increases in the same stress associated biomarker, and also found that reappraisal (instructions to view the physiological feeling of anxiety as helpful) was an effective buffer for participants under the stereotype threat condition. In a study that assessed older adults with cognitive tests (including a recall task) older adults displayed more elevation in cortisol levels than younger adults but it is unclear if the test was framed as a memory test to older adults and whether it may have triggered stereotype threat (Pearman et al., 2020).

These findings are consistent with Levy's hypothesis that holding negative views of ageing and being exposed to negative stereotypes can cause physiological stress and the effects of this accumulate over time. This will need further examination to understand the biological causal pathways that have begun to be elucidated.

3.2 Advancements in the behavioural pathway

The behavioural pathway also has more recent evidence supporting it. Research using the TILDA data found more negative perceptions of ageing were linked with increased smoking and alcohol use (Villiers-Tuthill et al., 2016). Research has found poorer medication adherence in breast cancer survivors with more negative perceptions of ageing (Brier et al., 2018). Another study found that older adults with more negative perceptions of ageing tend to have a more external locus of control (Sargent-Cox & Anstey, 2015), i.e. to feel less empowered in their life. On the other hand, older adults with more positive self-perceptions of ageing are more likely to engage in higher levels of physical activity (Beyer et al., 2015). Klusmann et al. (2019) found that older adults with more positive perceptions of ageing were more likely to have healthy eating behaviours over the course of a year. This relationship was mediated by self-efficacy and intention to eat healthily.

Older adults may also avoid using devices such as hearing aids to avoid being seen or feeling as old (Da Silva et al., 2023). A recent meta-analysis by Da Silva et al. (2023) suggests that an important factor in whether older adults wear hearing aids is being seen as older.

S. Zhang and Neupert (2021) found that control beliefs mediates the relationship between health beliefs and self-perceptions of ageing (Lachman & Agrigoroaei, 2010). Control beliefs are a measure of the strength of the relationship

between an individual's actions and a desired outcome. Barber (2020) also suggests that stereotype threat in clinical settings could lead to poorer performance in assessments and stereotype threat in workplaces (Follenfant & Atzeni, 2020; Fresson et al., 2017; Régner et al., 2016). These impacts on performance could also be impacting areas like self-efficacy and worsening perceptions of ageing. This has already been demonstrated where older adults experiencing stereotype threat have lower memory self-efficacy (Bouazzaoui et al., 2015).

A systematic review of the area of age stereotype based interventions found age stereotype based interventions significantly improved physical function or activity (R. L. Knight et al., 2021). R. L. Knight et al. (2021) examined a wide range of types of interventions including those that promoted positive perceptions of ageing or suppressed negative perceptions of ageing. The authors called for more rigorous research to be carried out in the future (R. L. Knight et al., 2021). Further evidence of the behavioural pathway is the success of interventions that use positive perceptions of ageing alongside exercise. This has been found in a randomised controlled trial which compared a physical activity intervention, a physical activity and perceptions of ageing intervention, and a control group (Wolff et al., 2014).

3.3 Updates to the Psychological Pathway

The psychological pathway and the implications of stereotype threat in older adults over extended periods of time is still not clearly understood. In Levy's original paper (B. Levy, 2009) she describes the psychological pathway as being about expectations that act as self-fulfilling prophecies. This pathway is similar to stereotype threat in older adults but it is not made clear how these short-term effects, where individuals do worse in single tasks because of stereotypes, then experience long term

consequences for this. It is assumed that repeated poor performance in physical and mental tasks will have deleterious effects but the mechanisms are not clearly laid out beyond the potential psychological effect of doing poorly in a test. The first study in this thesis aims to demonstrate a link between the short-term effects of stereotype threat and long-term effects of negative perceptions of ageing.

Recent research has found that older adults who have more positive attitudes towards their own ageing, experience less cognitive interference on days with additional life stressors (O'Brien et al., 2021). O'Brien et al. (2021)'s study defined cognitive interference as task unrelated thoughts during the completion of a cognitive task. This was secondary analysis on data that found that negative ageing attitudes predicted increased emotional reactivity to daily stressors (Bellingtier & Neupert, 2016). These findings link the day-to-day cognitive interference that older adults may experience with holding more negative views of ageing. This is similar to how older adults experience cognitive interference from stereotype threat. This may provide another connection between perceptions of ageing and stereotype threat. The study from O'Brien et al. (2021) is of particular interest to us as the definition used for cognitive interference is similar to that of the definition commonly used for task unrelated thoughts in stereotype threat research, which looks at mind wandering as a consequence (Jordano & Touron, 2017). This suggests that a consequence of negative perceptions of ageing is increased mind wandering, similar to the consequence of stereotype threat in older adults. However, as this is one data source, further research is needed to understand the relationship between perceptions of ageing and mind wandering.

Levy's process of internalisation which is not explored heavily in our model has also found more support. Brothers et al. (2021) found that in a sample of 819

German and American older adults, perceptions of ageing influenced self-perceptions of ageing at 2.5 year follow up. This makes more concrete Levy's hypothesis that negative views of ageing translate to negative self-perceptions of ageing through internalisation.

A study from Kornadt et al. (2017) provided additional insight into how internalisation of stereotypes and even projection of stereotypes might take place over time. Kornadt et al. (2017) looked at participants (n=593) and their perceptions of ageing, and self-perceptions of ageing over 4 years. Participants aged 30-80 years were given a questionnaire about their views in several domains regarding older adults in general, and about themselves. This was repeated four years later. The results show that the process of internalising stereotypes was most prevalent in the young and middle-aged groups, meaning their perceptions of themselves changed to match their stereotypes of older adults. Interestingly, the reverse happened with older adults where their views of ageing changed to match their views of themselves, they projected their experiences onto older adults in general. This provides promising evidence for future studies examining how individuals internalise perceptions of ageing and how this may vary as a function of chronological age.

Although previous research has shown holding negative perceptions of ageing is associated with poorer recovery from disability in older adults (B. Levy et al., 2012), more recent research shows the relationship is not so straightforward. B. Levy, Slade, et al. (2019) conducted a study with 189 older adults (aged over 60 years) who had experienced a cardiovascular event, myocardial infarction, recently. Participants were asked to provide 5 words to describe younger and then older adults. Those participants who provided answers which idealised younger adults over older adults had poorer recovery from their cardiovascular event. This presents a more complicated picture of

perceptions of ageing as it means that perceptions of older adults are important, but so is the perception of younger adults. Further research is needed to clarify this relationship.

One possible long term mechanism for the Psychological pathway is loneliness. Pikhartova et al. (2015) suggest that loneliness in later life can be a self-fulfilling prophecy. Pikhartova et al. (2015) found that endorsement of negative stereotypes of ageing predicted subjective loneliness at an 8 year follow up in a longitudinal study of ageing. Similarly Schwartz et al. (2021) found that perceptions of ageing predicted social involvement in a six year follow up in the German Ageing Survey, a large longitudinal study in Germany. This study used informal and formal measures of social involvement which included frequency of lending support to friends, and number of organisations joined (taking into account frequency of attendance). There were also some reciprocal relationships where social involvement influenced perceptions of ageing. Further support comes from Pedroso-Chaparro et al. (2022) who found in a correlational study that a combination of endorsement of negative stereotypes of ageing and self-identifying as old, predicted loneliness in a cross sectional sample. Self-identifying as old also impacted whether endorsement of ageing stereotypes was associated with increased anxiety and depression highlighting another potential route for future investigation - how does self-identification as “old” impact the effects of perceptions of ageing.

In a shorter piece of research Segel-Karpas et al. (2022) found that older adults’ daily variations in mental health were related to their daily variations in subjective age. This research followed adults (30-90 years of age) for 14 days and found that perceptions of ageing moderated this relationship, especially in older adults. Due to the relatively young age of the sample, it would be beneficial to further examine this

relationship in older adults (65+) and investigate any potential causal relationships. Taken at face value, these results suggest that those with more negative perceptions of ageing are more prone to feeling older when they are experiencing depressive symptoms.

In research from Caughie et al. (2023) which explored stereotype threat's effect on performance in tests of mild cognitive impairment and dementia, another surprising effect was found. Although there was no significant effect of stereotype threat on performance in the tests, participants in the stereotype threat group were more likely to attribute their errors to possible dementia. A lack of stereotype threat may be due to the use of "factual-based" stereotype threat manipulation which have been shown to be less effective (Lamont et al., 2015). But see the meta-analysis from Armstrong et al. showing that this may not be the case (Armstrong et al., 2017). Another reason for the lack of evidence for stereotype threat in this experiment is the use of 8 tests in the battery completed by participants. Meta-analyses have shown stereotype threat's effects are strongest in the task immediately following exposure to negative stereotypes (Armstrong et al., 2017; Lamont et al., 2015).

Interventions into reducing the effects of stereotype threat also help us understand how stereotype threat may be acting. Follenfant and Atzeni (2020) investigated two interventions to reduce the impact of stereotype threat in older adults' performance in cognitive tests. The two interventions were self-handicapping and individuation. Self-handicapping is an intervention that allows individuals to distance themselves from their results by explaining potential poor performance as down to individual factors (such as tiredness on the day of testing), while individuation allows an individual to distance themselves from the stereotype by reminding an individual of their identity beyond the stereotype. Only the individuation intervention was

significant in reducing the impact of stereotype threat in older adults. These results support Barber (2017)'s theory that stereotype threat in older adults is largely self-concept threat, as the individuation intervention allows individuals to distance themselves from confirming the stereotype identity as true for themselves.

Research from Fresson et al. (2017) supports the existence of stereotype threat's effect on tests of cognitive decline. Fresson et al. (2017) found evidence that stereotype threat could affect older adult's performance on cognitive tests enough to be considered indicative of cognitive decline. These results also found that level of worry about dementia moderated this relationship, meaning those most worried about dementia were most negatively impacted in the battery of tests. Régner et al. (2016) suggests that as much as 20% of false positives on tests for prodromal and early Alzheimer's disease, highlights the importance of further investigation.

Stereotype threat in older adults occurs when older adults feel vulnerable to confirming negative views about ageing or views of older adults to themselves or others. From reviews of the research there are two primary theories for how this happens, regulatory focus and executive function interference. Evidence for regulatory focus is more widespread and consistent (Barber, 2017) but there is still evidence for a mind wandering or executive interference account (Mazerolle et al., 2021). As Barber (2017) points out the explanations are not mutually exclusive.

It is clear from the similarities and theoretical links between perceptions of ageing and stereotype threat in older adults that these two areas and their potential connections need further exploration. Our proposed additions to the Stereotype Embodiment Model (B. Levy, 2009) help unify these two theories by proposing connections. Subsequent to the publication of our review (Fawsitt & Setti, 2017) there

have been further studies which provide further detail, and indicate direction for an elaboration of the model.

A recent systematic review of longitudinal consequences of self-perceptions of ageing sheds light on the current state of self-perceptions of ageing research (Tully-Wilson et al., 2021). This review specifically looked at papers which used felt age and self-perceptions of ageing, which is described as "a person's general evaluation of their ageing process and reflects internalization of societal attitudes to ageing, and as such, is more stable over time." (Tully-Wilson et al., 2021) (Pg.2). This description recognises the interplay of effects between general perceptions of ageing and self-perceptions of ageing. The review uses the Attitude Toward Own Ageing measure (Liang & Bollen, 1983) which is 5 items related to a person's assessment of their own ageing from the Philadelphia Geriatric Morale Scale. This standardisation of the scale used allowed for a more targeted review than the previous one in the area (Warmoth, Tarrant, et al., 2016) but also reflected theoretical development in the area. Warmoth et al. (2016)'s review cast a wide net but not every measure within the perceptions of ageing literature has remained relevant for the latest theories. Warmoth et al. (2016)'s systematic review found strong relationships between self-perceptions of ageing and physiological outcomes such as lifespan and the development of conditions such as dementia and obesity. Six studies in the review 2016 looked at psychological outcomes including depression, cognitive performance, subjective age, and personality factors and found relationships with each.

Implicit activation of stereotypes has been demonstrated in lab settings but it is unclear how it might work in real world settings (Hess et al., 2004; B. Levy & Leifheit-Limson, 2009; Moriello et al., 2013). Implicit priming has however been shown to improve physical functioning on one study that tested an implicit

intervention, an explicit one, and a joint implicit and explicit intervention into improving perceptions of ageing (B. Levy, Pilver, et al., 2014). The authors propose that implicit interventions may have more success than ones based on explicitly combatting negative perceptions of ageing, due to them being harder for people to consciously rationalise or argue against.

3.4 The role of subjective age

A review paper published around the same time as ours does an excellent job of summarising the role of stereotype threat, stereotype embodiment theory and subjective age research and how they might relate (Wurm et al., 2017). Although they group together health outcomes they make the point that the behavioural pathway may prematurely group together health behaviours. Wurm et al. (2017) suggests that there are different types of health behaviours; preventative behaviours such as taking medication for a condition, promoting behaviours such as exercising, and risk behaviours such as smoking. Each of these behaviours could have a different relationship with perceptions of ageing and this is worth further investigation. One strength of Wurm et al. (2017)' s paper is the inclusion of subjective age as a separate and important construct which I will speak about briefly here, but an in depth discussion is beyond the scope of this thesis. Although it is unclear how subjective age functions as a mechanism and its operationalisation can be problematic, subjective age can be a good predictor of health (Alonso Debreczeni & Bailey, 2021). With regards difficulty in operationalisation, what do people believe is being asked of them when asked to rate what age they feel? In a review paper, Kotter-Grühn et al. (2015) shows that subjective age is a multi-dimensional construct which is influenced by many factors including physical health, psychological factors, and cultural factors. Findings from Pinquart and Wahl (2021) and Alonso Debreczeni and Bailey (2021) show that

subjective age is influenced by cultural differences including differences in levels of collectivism vs individualism, an under researched area in the perceptions of ageing research.

In a meta-analysis of the area of subjective ageing across the lifespan, Pinquart and Wahl (2021) found a predictive factor for differences between subjective and chronological age was a stronger implicit and explicit preferences for being younger. Meaning that those that had preferences for being younger tended to have a greater distance between their chronological age and their subjective age (for in depth reviews see Alonso Debreczeni and Bailey, (2021) and Pinquart and Wahl, (2021)). While subjective age as a construct does seem to be related to perceptions of ageing, and more specifically awareness of age-related changes, a clearer understanding of this relationship and what factors influence an individual's answer to the question, are needed. An argument can also be made that asking older adults their subjective age perpetuates a belief that younger is better (Gendron et al., 2018). Gendron et al. (2018) makes the argument that by researchers asking the question "how old do you feel?" they are encouraging participants to conflate old with negative stereotypes. This is because the markers most people associate with this question according to Gendron et al. (2018) are negative.

Cary and Chasteen (2015) suggest that older adults reporting a younger subjective age could be a strategy to distance themselves from being labelled old, a finding that is supported from research which looked at subjective age during Covid-19 (Terracciano et al., 2021). Terracciano et al. (2021) found that older adults who endorsed statements such as "Covid is only a danger to older adults" reported a greater difference between chronological age and subjective age.

There also appears to be a limit on the usefulness on the protective value of holding a much younger subjective age for older adults Blöchl et al. (2021). In a study which used data from a single wave of a large nationally representative study in England, Blöchl et al. (2021) found evidence to suggest that feeling younger is beneficial to a point. Blöchl et al. (2021) found that feeling younger beyond a certain point (based on a number of years relative to your own age) actually had detrimental effects on older adults scores on a measure of life satisfaction. This may be more suggestive of subjective age as a form of defence mechanism against negative perceptions of ageing as it allows older adults to avoid considering themselves "old". This extreme perspective could be adopted due to individuals having more negative perceptions of ageing and therefore being more unsatisfied as they are exposed to more self-concept threat as their subjective and chronological age become too disparate.

3.5 Ageism

Ageism is an area that was not covered in great detail in Levy's original theory and our model. Here we briefly examine age-based discrimination, ageism, and the effect it has on older adults. Including more recent global developments which have also allowed us to see how perceptions of ageing have a complex relationship with the recent Covid-19 Global health pandemic, as well as the measures taken and how older adults are portrayed. These recent cultural shifts provide us with practical real time examples and building a better understanding will help us plan for future challenges.

Hooker et al. (2019) found that age discrimination influenced self-perceptions of ageing longitudinally. The effect of age discrimination on health behaviour was mediated by self-perceptions of ageing six years later. Although B. Levy (2009) discusses social and cultural attitudes to aging in the Stereotype Embodiment Model,

the model would benefit from inclusion of the effect of ageism on self-perceptions of ageing. Experiences of ageism can be stressful for older adults and could contribute to chronic stress and therefore health issues (Allen, 2016). This could come from the stress associated with individual instances of discrimination, increasing stress and impacting self-perceptions of ageing as suggested by Hooker et al., (2019). Giasson et al. (2017) used cross sectional data to show that those with more positive perceptions of ageing were less likely to report experiences of age discrimination. This connects with the physiological pathway as not just exposure to negative stereotypes but exposure to ageism could contribute the long-term physiological stress.

One challenge of ageism is that it can appear in the friendly form of paternalism and/or benevolent ageism. In a cross cultural study Fernández-Ballesteros et al. (2020) found that the prevailing stereotype of older adults is one that sees them as having higher warmth but lower competence. In European countries, prevalence and strength of this stereotype is associated with lower levels of active ageing (Fernández-Ballesteros et al., 2020).

A large, longitudinal study by Hooker et al. (2019) (the Health and Retirement Study n=4,467) found that over three waves of data collection over 6 years, increased self-reported incidents of experiencing age based discrimination affected self-perceptions of ageing negatively. Meaning that those who reported experiencing more incidences of age-based discrimination had more negative views of their own ageing. This subsequently influenced health behaviours including smoking, alcohol consumption and physical activity. Although this evidence suggests ageism is an important part of understanding perceptions of ageing and the experiences of older adults, it is beyond the scope of this thesis to cover in more depth.

Chapter 4: Regulatory focus and perceptions of ageing: exploring the connections

Feargus Fawsitt [a]*. Dr Samantha Dockray[a], and Dr Annalisa Setti[a],

[a] *University College Cork.*

* Corresponding author: feargus.fawsitt@ucc.ie

4.1 Abstract

Perceptions of ageing can become a self-fulfilling prophecy for older adults, with those who hold more negative views of ageing experiencing more negative consequences of the ageing process, including poorer health and cognitive declines. Exposure to negative stereotypes about their group can also affect older adult's performance in cognitive tests, as they are more likely to adopt a prevention focus to avoid mistakes, therefore performing poorly in tasks requiring them to adopt a gains-oriented focus. Based on Regulatory Focus Theory, we hypothesised that negative perceptions of ageing and stereotype threat may be connected, specifically we hypothesised that those with more negative perceptions of ageing would also have a stronger trait prevention focus. Two hundred adults aged 60+ took part in an online questionnaire examining their perceptions of ageing and their trait regulatory focus. Results indicated that negative perceptions of ageing were predictive of a stronger trait prevention focus in a hierarchical multiple regression model. This provides evidence that older adults with more negative perceptions of ageing may adopt a stronger prevention focus, potentially influencing psychological attitudes to everyday tasks and behaviours. Perceptions of ageing and regulatory focus can have implications for the efficacy of health messaging for older adults.

Keywords: Perceptions of ageing, regulatory focus, stereotype threat

4.2 Introduction

Perceptions of ageing can be thought of in several ways: how people view ageing as a general process, how they view their own ageing, and how they view older adults as a group (Barber, 2017). Societally, older adults can often be viewed negatively through stereotypes, contributing to the view that they are less valuable to

society than younger adults (Ehni & Wahl, 2020). These views may be held by people of all ages, including older adults themselves. Older adults who hold these stereotypes, or negative perceptions of ageing, must contend with these views becoming applicable to themselves, as they age. Despite media portrayals of older people including more positive examples of ageing, negative stereotypes persist (Robinson & Anderson, 2006; Westerhof, Harink, Van Selm, Strick, & Van Baaren, 2010). Not only is this detrimental for those who are currently in the 'older age' demographic, but also for those who are exposed to these negative views as younger people and will age while holding those views. People who hold the most negative views of older adults, experience worse consequences of their own ageing, and this has been demonstrated in longitudinal research, as well as cohort studies (Freeman et al., 2016; Wurm et al., 2013). Negative perceptions of ageing are associated with higher incidence of physical illnesses such as poor cardiovascular health, respiratory mortality, and higher incidence of Alzheimer's Disease (Levy et al., 2009; Levy et al., 2016; Levy & Myers, 2005) as well as mental health issues, loneliness and social disengagement (Pikhartova et al., 2015; D. A. Robertson & Kenny, 2016). A recent systematic review which included 422 journal articles across 45 countries found reliable effects of ageism, including negative self-perceptions of ageing, in 11 health domains (Chang et al., 2020).

How negative perceptions of ageing may lead to negative consequences is not yet fully understood, with many different processes and mechanisms theorised and synthesised in the Stereotype Embodiment Theory proposed by B. Levy (2009) (see also Fawsitt and Setti, (2017). Three main pathways have been proposed as the mechanisms through which negative perceptions of ageing act. These are the physiological, the psychological and the behavioural (Fawsitt & Setti, 2017; B. Levy,

2009). These pathways propose that some of the consequences of negative perceptions of ageing come about through a lack of engagement in different important aspects of life, including health behaviours, social interaction and the overall effort and interest into maintaining physical and mental health. In order to avoid these negative outcomes for older adults it is important to understand these mechanisms behind these pathways further. One potential mechanism is stereotype threat.

In a review of stereotype threat and perceptions of ageing Fawsitt and Setti, (2017) have argued that the literature on stereotype threat can provide insight into the mechanisms through which negative perceptions of ageing act as a catalyst to negative consequences. Stereotype threat was first described as "being at risk of confirming, as self-characteristic, a negative stereotype about one's group" (Steele & Aronson, 1995, p. 797). Stereotype threat is the negative impact on performance when an individual is required to perform on a task for which they are stereotyped. For example, a woman may perform worse at a maths test than she actually could, because she is reminded of the stereotype of women being considered to have poorer performance in tests of mathematical ability (Cadinu et al., 2005). This effect in older adults is moderated by whether they view themselves as older adults, and whether they think others view them as older adults (for a review see Barber, 2017). Tests such as those of memory are impacted by being exposed to negative views about ageing, particularly if the individual feels they belong to the older person group or feel at risk of belonging to it. This has been reliably found in three meta-analyses on stereotype threat in older adults (Armstrong et al., 2017; Lamont et al., 2015; Meisner, 2012). The consequences of poor performance on these tests are significant, such as inaccurate results from tests of mild cognitive impairment, potentially leading to incorrect diagnoses (Barber et al., 2015). The consequences may also be less immediately apparent with perceptions of

ageing and stereotype threat influencing engagement with and decisions concerning healthcare (Abdou et al., 2016) as an example of the far reaching impact of being subjected to stereotype threat. Insight on the link between stereotype threat and its consequences can be drawn from the role of regulatory focus in health messaging in younger populations (Garza, 2019; Ludolph & Schulz, 2015). Two mechanisms have been proposed by which this negative prompt acts, i.e. disruptive thoughts interfering with task relevant information in working memory and regulatory mismatch (Armstrong et al., 2017; Barber, 2017). This research highlights the need for a better understanding of the processes underpinning these long-term consequences.

Regulatory mismatch is defined as a misalignment between task demands and the way the individual approaches the task itself. Regulatory Focus theory (Higgins, 2000; 1997) posits there are two ways to approach a task, a promotion focus is when someone is interested in making gains and achieving goals, and a prevention focus where someone is interested in avoiding losses and preventing negative outcomes. Tasks themselves often suit either a promotion or prevention focus as well, such as gains-based structure or a loss avoidance structure. A regulatory mismatch occurs when an individual's and a task's regulatory focus are opposed, and this leads to poorer performance. For example, one may focus on accuracy to avoid a loss in performing a task that rewards speed instead. This is hypothesised to be the main process through which stereotype threat in older adults works (Barber, 2017; Barber & Mather, 2013). Importantly, each individual is characterised by a trait regulatory focus, which represents a default position (Lockwood et al., 2002), while state regulatory focus is the focus one temporarily adopts in a given task, which generally corresponds with their trait regulatory focus, although not necessarily. Stereotype threat in older adults seems to act through regulatory focus mechanisms with stereotype threat inducing a

prevention focus in individuals which negatively impacts performance when completing tasks that have a promotion focus (Barber et al., 2015; Gaillard et al., 2011). A large review of studies on regulatory focus suggests that it may be relatively stable across the lifespan and it may be partially based off personality traits (Lanaj et al., 2012). However, many aspects of personality change over the lifespan in reaction to repeated exposure to situations and environment (Baumert et al., 2017; Bleidorn et al., 2020)

In sum, a portion of older adults holds negative perceptions of ageing, (B. Levy & Myers, 2004). Societal ageism also puts older adults under threat when they perform tasks in which the stereotype is that older adults should perform poorly, this effect of threat has been shown experimentally time and again (Armstrong et al., 2017; Lamont et al., 2015; Meisner, 2012). The mechanisms behind the negative effect of stereotype threat are thought to be a mismatch between task demands and individual attitude towards the task, i.e. regulatory focus mismatch. Despite the clear theoretical link between negative perceptions of ageing and stereotype threat in the context of Regulatory Focus theory, empirical evidence is lacking on it. There is currently no single measure that indicates an individual's susceptibility to stereotype threat and no study has yet examined its relationship with negative perceptions of ageing.

The present study aims to explore cross-sectionally the association between perceptions of ageing and trait regulatory focus. We hypothesise that older adults who internalise negative stereotypes of ageing are more likely to develop a stronger trait prevention focus (Fawsitt & Setti, 2017). This is of relevance to understand the mechanisms behind negative perceptions of ageing and their negative outcomes, as well as of applied relevance to establish whether trait focus is a potentially modifiable factor related to such mechanisms. In order to test this, measures of trait regulatory

focus and perceptions of ageing will be administered with other potential confounding factors also measured such as affect, age, medication use and cognitive failures. These factors have all been linked to perceptions of ageing. A measure of self-reported cognitive failures was included as there is evidence of links between performance on cognitive measures and perceptions of ageing (Sindi et al., 2012). Affect has been found to influence scores on regulatory focus questionnaires with negative affect being linked to a prevention focus (Gorman et al., 2012). Perceptions of ageing have also been linked to affect (Bellingtier & Neupert, 2017), in order to understand any role this variable plays, participants completed the Positive and Negative Affect Scale.

4.3 Method

4.4 Participants

Participants were 200 adults aged 60+ recruited from across the UK and Ireland through an online site (Prolific). This sample size was chosen based on a priori power calculations carried out in G*Power (Faul et al., 2009). A sample of 146 was required based on a six-predictor variable equation with a medium effect size with an alpha = 0.05 and a power = 0.95. A sample size of 200 was chosen to ensure dropout or exclusion on other factors was not an issue. Prolific works by advertising studies to potential participants on Prolific with an estimated completion time, reward, and eligibility criteria. Participants were mostly female (n=123) and overall healthy (n=16 took five or more medications regularly). Participants were asked their age in years, their sex with an option to not provide that information, the level of schooling achieved, their current marital status, and the number of daily medications as a measure of polypharmacy. Participants' ages ranged from 60 to 85 years. The average age of participants was 65.39 (Standard Deviation (SD)=4.43). Participants took on

average of 2.72 medications a day with less than ten percent of participants taking more than five a day. Participants were reimbursed at an average of £11.25 per hour with most participants completing the task in less than 20 minutes. The study was approved by the School of Applied Psychology Ethics Committee, University College Cork.

4.5 Material

Trait Regulatory Focus Questionnaire

Participants completed the Promotion/Prevention Scale from (Lockwood et al., 2002) to measure participants' trait regulatory focus. This questionnaire was chosen as it targets the present time, unlike several others measures which use questions about individuals childhood's which are less relevant to older adults (Haws et al., 2010; Higgins et al., 2001). However, a limitation of this measure is that it does not always correlate with other measures of trait regulatory focus so the results may not be replicable with other scales (Summerville & Roese, 2008). This consists of two scales, with 9 items measuring promotion focus and 9 items measuring prevention focus. Each item is a description such as "In general, I am focused on preventing negative events in my life" which participants then answer with a scale ranging from 1 – not true of me at all, to 9 – very true of me. Four questions were not considered relevant for our population, as they related to desired school performance and academic success and were changed to more generally apply to an older adult's life (Lockwood et al., 2005). The modified version is available in Appendix 1. Scores from each scale are summed to give two independent scales, one indicating an individual's promotion focus, and the other their prevention focus. Both subscales were reliable (promotion α=.89, prevention α=.77), and had a small correlation with one another (r=.198, p

<.01). Only the Regulatory focus questionnaires did not have protocol for missing data so participants with missing data were not included in the final analysis using listwise exclusion. To ensure complete measures it may have been prudent to force responses (not allow progression unless all questions were answered) for some or all measures.

Brief-Perceptions of Ageing Questionnaire

The Brief-Ageing Perceptions Questionnaire (B-APQ) is a measure of an individuals' perceptions of ageing and was chosen as there is data from a representative Irish sample (Santini et al., 2019) and has been identified as a promising measure in the area of perceptions of ageing (Burton et al., 2021). Only one measure of perceptions of ageing was chosen to reduce participant burden. The B-APQ is made up of 17 Likert scale items where participants are asked to select their level of agreement or disagreement, from Strongly Agree, Agree, Neither Agree nor Disagree, Disagree, Strongly Disagree). The 17 statement items are categorised into five domains; Timeline-Chronic (e.g. I feel my age in everything that I do), Consequences Positive (e.g. As I get older I get wiser), Emotional Representations (e.g. I get depressed when I think about how ageing might affect the things that I can do), Consequences and Control Negative (e.g. Getting older makes me less independent), and Control Positive (e.g. Whether I continue living life to the full depends on me). An overall score for Perceptions of Ageing is created by summing all scales after reverse scoring Consequences Positive and Control Positive. This gives a range of possible scores from 17-85, the higher a participant scores the more negative their perceptions of ageing. This summing technique was used in Freeman et al.'s, (2016) paper where B-APQ scores were predictive of the onset and persistence of anxiety and depression in a large representative sample of older adults. The individual subscales have not been shown to have predictive value and as we had no hypothesis as to their

interaction in this experiment Freeman et al.'s (2016) summing technique was used. The B-APQ has been validated previously on a large population of older adults (Sexton et al., 2014).

Cognitive Failures Questionnaire

In order to control for the cognitive status of participants, the Cognitive Failures Questionnaire (CFQ) scale (Broadbent et al., 1982) was used. The 25-item scale asks participants to self-report how often they have experienced an event over the last six months. Participants are asked questions such as "Do you find you forget appointments" and are asked to rate on a scale including Very often, Quite often, Occasionally, Very rarely, Never. Answers are scored from 4 to 0 on individual items which are then summed to give a score from 0-100 meaning the more often participants experience cognitive failures, the higher their score.

Positive and Negative Affect Scale (PANAS)

Positive and negative affect were measured using the Positive and Negative Affect Scale (Watson et al., 1988) which asks participants to rate how much a word describes how they feel right now at this very moment. It consists of 20 items presenting a word (e.g. Interested, alert, irritable, active) which participants endorse on a 1-5 scale from "Very slightly or not at all", to "Extremely". It is a combination of two, ten item scales to evaluate positive and negative affect. Scores from both scales are summed creating a positive affect and negative affect score.

Procedure

Participants who met the demographic requirements were notified of the availability of this study and people who wanted to take part were directed to a consent form and information sheet hosted on Qualtrics, and those who consented continued

to complete the study. Initially participants were presented with a demographics questionnaire to ensure suitability to participant selection criteria (i.e. age). Then the regulatory focus questionnaire and the B-APQ were presented in counterbalanced order. Finally, participants were presented with the Positive and Negative Affect Scale and the Cognitive Failures Questionnaire. These two questionnaires were administered last to ensure they did not influence our main variables as priming about forgetfulness could prompt participants to answer more negatively about their perceptions of ageing and priming negative or positive moods could influence other answers. There were no differences found in any results between participants who answered the PANAS first or the B-APQ first. Following completion of the questionnaires, participants were brought to a page thanking them for their participation.

4.6 Results

Participants' CFQ mean score was 32.36 (SD = 12.36) in line with data from a similar age range (R. G. Knight et al., 2004). The Positive Affect Scale (PAS) and Negative Affect Scale (NAS) means and standard deviations are normal for the population (Watson et al., 1988). The Brief Perceptions of Ageing Questionnaire had a mean of 42.27 and standard deviation of 9.25 which is consistent with a large nationally representative sample in an Irish study (Freeman et al., 2016). The promotion and prevention focus scales were standardised and then the prevention scores were taken from the promotion scores to create a difference score [difference score = z(promotion score) – z(prevention score)] representing the strength of promotion relative to prevention scores. This technique was used in the original paper from Lockwood et al., (2002). Higher scores in this difference meaning a stronger promotion focus, relative to prevention focus.

Table 1.

Descriptive Statistics

	N	Mean	Std. Deviation
Age (years)	200	65.39	4.43
Number of medications taken per day	185	2.72	1.72
CFQ (Cognitive Failures Questionnaire)	193	32.36	12.36
B-APQ (Brief-Ageing Perceptions Questionnaire)	200	42.27	9.25
PAS (Positive Affect Scale)	200	31.09	8.02
NAS (Negative Affect Scale)	200	12.05	4.40
Prevention Focus	189	36.77	10.37
Promotion Focus	180	56.77	13.66

4.6.1 Correlations

Exploratory correlations were run to investigate the relationships predicted in our hypotheses. Spearman Correlation was used as the data was non-normally distributed. B-APQ had a large negative correlation with the Promotion-Prevention difference scores $r=-.683$, $n=173$, $p<.0005$. The B-APQ scores correlated with scores from the CFQ $r=.337$, $n=193$, $p<.0005$, the PAS $r=-.495$, $n=200$, $p<.0005$ and the NAS $r=.303$, $n=200$, $p<.0005$.

4.6.2 Multiple regression

To examine these relationships further we performed a hierarchical multiple regression to investigate the contribution of B-APQ scores to the promotion-prevention difference scores, while controlling for age, gender and the PANAS scores. The factors controlled for in step 1 were basic demographic characteristics, i.e. age and sex, these explained less than 1 per cent of variance in promotion-prevention difference scores and were non-significant but were retained for theoretical significance to the model. Step two controlled for affect, i.e. NAS scores and the PAS scores. The second step of the model explained 28 per cent of the variance in promotion-prevention difference scores. Finally, in the third step we examined the contribution of B-APQ scores. The total sample at this step after listwise deletion was n=173. The order of these steps was first to control for demographic variables, then affect which was a statistically significant confounding variable and finally our independent variable of interest. The total variance explained by the model was 51.5 percent, $F(5, 167) = 37.159$, $p < .001$. The B-APQ scores explained an additional 23 percent of the variance in promotion-prevention difference scores, after controlling for age and gender, R^2 change .23, F Change $(1, 167) = 82.458$, $p<.001$. In the final model, only the PAS and BAP-Q scores were significant, and BAP-Q explained a greater amount of variance (beta =.584, $p<.001$) than the PAS (beta = .219, $p<.001$). The contribution of the NAS to the model was not statistically significant in this model. With B-APQ recording a higher beta value (beta=-.584, p<.001) than PAS (beta=.219, p<.001). The statistical significance of the NAS diminished to non-significance. We carried out tests to see if the data met the assumption of collinearity which indicated that multicollinearity was not a concern (NAS, Tolerance = .9, VIF = 1.11).

Table 2.

Table of Regression Coefficients for Standardized Regulatory Focus Scores.

Step	Predictor	Unstandardized Coefficients		Standardized Coefficients					
		B	SE	β	p.	R^2	R^2 change	F	P
1						.006		.514	.599
	Age(years)	-.022	.022	-.077	.315				
	Gender	.031	.200	.012	.876				
2						.296	.29	34.685	<.001
	Age(years)	-.005	.019	-.017	.796				
	Gender	.012	.170	.005	.945				
	PAS	.077***	.010	.486	<.001				
	NAS	-.054**	.019	-.186	.005				
3						.529	.233	82.458	<.001
	Age(years)	.013	.015	.045	.409				
	Gender	-.078	.140	-.030	.577				
	PAS	.035***	.010	.219	<.001				
	NAS	-.015	.016	-.052	.356				
	B-APQ	-.080***	.009	-.584	<.001				

Note. N = 173; *p < .05, **p < .01, ***p< .001 SE= standard error

4.7 Discussion

These results suggest that older adults with stronger negative perceptions of ageing hold a more preventive regulatory focus. This relationship exists independently of controlling factors including age, sex and affect. The relationship between affect,

both positive and negative, and scores on the regulatory focus questionnaire is in line with previous research that has shown these two constructs to be related (Summerville & Roese, 2008). Perceptions of ageing also had a significant relationship with negative and positive affect. Previous research points to an interaction between awareness of age related changes, perceptions of ageing, and daily affect (Bellingtier & Neupert, 2017) with more positive perceptions of ageing being protective of more negative reactivity to daily stressors, measured as negative affect (Bellingtier & Neupert, 2016). Perceptions of ageing can predict changes in daily affect after changes in age related awareness (Bellingtier & Neupert, 2017) and after serious adverse health events (Wolff et al., 2015).

These results provide direction for future research to investigate the potential ways by which short- and long-term effects of negative stereotypes in older adults are connected. Stereotype threat can influence performance in tests and contributes to treatment and support decisions, and long term which may influence their health and wellbeing through the physiological, psychological and behavioural pathways (Fawsitt & Setti, 2017; B. Levy et al., 2009; B. Levy, Ferrucci, et al., 2016; B. Levy & Myers, 2005). These results help connect these two seemingly distinct processes through the mechanism of trait regulatory focus. These results support the hypothesis that the more negative a view of ageing older adults have, the more likely they are to adopt a prevention over promotion focus style.

Another explanation however is that holding more negative perceptions of ageing, and adopting a relative stronger prevention focus, and stereotype threat induces a prevention focus, and these facts are unrelated. This is still an important finding however as some researchers highlight the interaction between trait and state

regulatory focus as important in performance in cognitive tasks (J. Keller & Bless, 2006).

This research suggests that older adults who have internalised more negative stereotypes related to older age, the ageing process and themselves as older adults, experience stereotype threat which can cause them to adopt a more preventive dispositional focus. These results have theoretical and practical applications. Theoretically, they demonstrate a link between negative perceptions of ageing and regulatory focus that can potentially constitute a mechanism behind the long-term effects of negative perceptions of ageing on mental and physical health. Some research has found that health interventions, prevention focused individuals may require more support early on for success (Fuglestad et al., 2015). One potential pathway highlighted by Fawsitt and Setti (2017) suggests that regulatory focus changes in older adults may lead to ineffective or inefficient strategies around health behaviours. There is research showing the connection between regulatory focus and health behaviours in those with type two diabetes (participants' mean age 61.66 years), finding that patients with a promotion focus had better self-management of the condition (Laroche et al., 2020). This would fit well with Levy's Stereotype Embodiment Theory within the behavioural pathway (B. Levy, 2009).

These results can contribute to the development and tailoring of practical interventions with older adults who hold negative perceptions of ageing. Lockwood et al., (2005) found that older adults respond better to prevention focus health messages than younger adults. There is already some evidence suggesting trait regulatory focus is related to health behaviours (Gomez et al., 2013) and that health messaging tailored to a regulatory focus is more effective (Lin & Yeh, 2017; Uskul et al., 2009). Future research could examine perceptions of ageing's relationship with health related scales

of regulatory focus and if this could inform more effective health messaging as regulatory focus has been seen to play a role in some health messaging already (Berezowska et al., 2018). Older adults with more negative perceptions of ageing are more likely to suffer from loneliness (Pikhartova et al., 2015). If it is the case that they also have a more dispositional prevention focus, then this is a potential avenue for intervention. Targeted awareness messages such as "In order to avoid losing a healthy social circle you should ensure you reach out to people" could be beneficial for this group. Although further research will be needed to examine whether this form of targeted messaging could improve current approaches. Given the link between negative perceptions of ageing and poor health behaviours, this study suggests that leveraging on regulatory focus can potentially support healthier behaviours in older adults with negative perceptions of ageing.

Understanding the association between regulatory focus and negative perceptions of ageing can inform the design of cognitive tests for detecting conditions such as mild cognitive impairment and dementia. Older adults' performance on these tests may currently be being affected by their regulatory focus and/or their perceptions of ageing.

In addition, utilising appropriate messaging may contribute to more positive perceptions of ageing. Preliminary findings have found small positive changes in self-perceptions of ageing may have positive consequences with mental health (Beyer et al., 2019). There have been promising developments with using regulatory focus theory to inform interventions for depression, weight loss, and medication adherence but this research has not focused specifically on older adults (Fuglestad et al., 2015; Laroche et al., 2020; Strauman et al., 2006). Recent research on the efficacy of health messaging for older adults demonstrates potential pathways which could be used to

improve older adults health behaviours (O'Connor et al., 2018; R. Zhang et al., 2019). More research is needed to understand regulatory focus with older adults and the interplay with perceptions of ageing.

4.8 Limitations

This study has several limitations. Due to its cross-sectional nature a direction for the association between perceptions of ageing and regulatory focus cannot be discerned. It also relies on an older adult sample recruited online which is clustered at a younger-old age and may not be representative of older adults as a whole. The regulatory focus questionnaire was primarily developed for students and had to be adapted to better suit this population, older adults may require a regulatory focus questionnaire that is tailored to their experiences. The regulatory focus questionnaire used was chosen as there is currently no questionnaire for measuring trait regulatory focus in older adults. Despite these limitations this research builds on our understanding of how negative perceptions of ageing and possible mechanisms of stereotype threat fit to influence older adults' psychological states and behaviours.

4.9 Conclusions

These results build support for the connection between regulatory focus as a mechanism of negative perceptions of ageing in older adults in a range of domains (Fawsitt & Setti, 2017). Future research should explore the causal nature of this association as it will provide a clearer picture of how perceptions of ageing and stereotype threat are connected. Future research could also examine if these relationships influence the interactions between regulatory focus and perceptions of ageing in relation to health decisions and care seeking behaviours in older adults. This understanding would benefit interventions aimed at improved outcomes in ageing such

as health interventions (P. A. Keller, 2006) and performance on clinical tests (Barber et al., 2015).

Statement of ethical approval

Ethical approval was gained from the Ethics Board of The School of Applied Psychology, University College Cork.

Statement of funding

No external funding was used for this study.

Declaration of contribution of authors

Statement of conflict of interest

No conflict of interest declared.

Chapter 5: ‘Just Keep Going’: Older Adults Views and Perceptions of Ageing

Authors

Feargus Fawsitt, Annalisa Setti

Older Adults Perceptions of Ageing in Ireland

5.1 Abstract

Older adults’ perceptions of ageing can have a powerful impact on their ageing process, but research has frequently neglected the voices of older adults. This study aims to investigate older adults’ perceptions and experiences of ageing. A combination of focus groups and interviews were used to get both individual and group perspectives. The sample was older adults from different settings including rural and urban residents. Thematic analysis was carried out on the data and four main themes were identified. These were Ageing as Decline, Challenging Ageing, The Interconnectedness of Ageing, and Feeling Free. While older adults often said they were enjoying their old age, they frequently defined ageing in negative terms, using terms to describe declines as synonyms for ageing. The participants were also clear in actively challenging these declines where possible. Ageing was heavily tied with social elements such as social facilitation through transport and their roles within families. Finally, participants were clear they found freedom in their status as older adults. This research provides novel insight into older adult’s views of ageing and can potentially inform psycho-educational interventions to improve perceptions of ageing in older adults.

5.2 Introduction

Approximately 13% of the population of Ireland is over 65 (*Census 2016 Profile 3 - An Age Profile of Ireland - CSO - Central Statistics Office*, 2017). This is low compared to Europe overall (20%) but higher than the global average (9%) (The World Bank, 2019, p. 65). With improved healthcare technology this portion of the population is set to increase in coming decades. Healthcare and social solutions are constantly being sought to support older adults to live longer and more active lives, however one modifiable and largely unaddressed factor is perceptions of ageing.

Perceptions of ageing are older adults' views of the ageing process in general and older adults, while self-perceptions of ageing are how they view their own ageing process. Older adults' own perceptions of ageing (or self-perceptions of ageing) may be negative, reflecting the portrayal of ageing in our culture (Bai, 2014; B. Levy, 2003; Lyons et al., 2009). Perceptions of ageing are usually operationalised using questionnaires and this is a rich area of research (Warmoth, Tarrant, et al., 2016). There is some evidence that how older adults are portrayed in media is improving, but stereotypes and negativity are still an issue in other areas such as social media (B. Levy, Chung, et al., 2014; Markov & Yoon, 2020). Research shows that this can lead to a self-fulfilling prophecy where older adults exposed to negative portrayals of ageing suffer negative consequences to their own health and wellbeing (Warmoth, Tarrant, et al., 2016; Westerhof et al., 2010). This process is hypothesised to happen through several pathways, the psychological, behavioural and physiological pathways (Fawsitt & Setti, 2017; B. Levy, 2009). However older adults may adopt strategies to defend themselves from those negative perceptions of ageing such as adopting the belief they do not fit the definition of old or that chronological age does not matter, therefore the negative views do not apply to them (Bordone et al., 2020). Other strategies such as adopting a positive outlook which buffers the negative effects

associated with negative perceptions of ageing (Wurm & Benyamini, 2014). Wurm and Benyamini (2014) found that optimism mediated the relationship negative perceptions of ageing and a deterioration of physical health and depressive symptoms over a three-year period. Another way older adults may protect themselves from experiencing the adverse effects of negative perceptions of aging is by disengaging from the context that is associated with such negative views. For example in companies with more negative perceptions of ageing (among workers) there was a higher frequency of older workers disengaging (such as a loss of interest in career development) from work (Chiesa et al., 2019).

There is a wealth of research examining associations between perceptions of ageing and health, functional, and psychological outcomes (e.g. Robertson et al., 2015, 2015; Robertson & Kenny, 2015; Sexton et al., 2014). This research highlights the potential benefits of improving older adults' perceptions of ageing. Two such studies have reported successful results using interventions to improve perceptions of ageing and self-perceptions of ageing (Beyer et al., 2019; Wolff et al., 2014). These interventions took the form of psychoeducational interventions coupled with exercise regimes; those who underwent the perceptions of ageing interventions and exercise experienced more positive effects compared to groups that underwent the exercise regime only. Another route for potential future intervention was demonstrated by Lytle et al. (2020). The design of this study was a two-month experiment which combined psychoeducation and positive intergenerational contact through both virtually and in person. Although using a small sample size of just 14, participants ageist attitudes were reduced, their anxiety about ageing was reduced, and their perceptions of ageing improved. Interventions such as these show promise in improving perceptions of

ageing in younger adults although further research is required to validate the approach with a larger sample and to investigate whether the effects are long term.

Engagement in health behaviours such as exercise, and their efficacy is highly influenced by how older adults perceive themselves and perceive aging (Wurm et al., 2010). In order to inform potential future interventions to change or influence older adults' views of ageing, it is important to explore and understand older adults' views. Research on this is currently lacking. The present study aims to help fill this gap by qualitatively exploring older adults' perceptions and experiences of ageing.

5.3 Methods

5.3.1 Participants and recruitment

All participants were required to be over 65 years old. Participants ages range from 65-95 years old. Three focus groups with a total of seven participants in the first group, five in the second and four in the third for a total of n=18, (13 women) participants were carried out. Two interviews were carried out. The first with an individual identified as being a positive example of ageing as this was a woman in her mid-90's living independently and engaged in a strenuous physical exercise regime. The second interview scheduled as a focus group but due to a lack of participants signing up to that time slot an interview was conducted with the participant who did attend. Participants in both focus groups and interviews responded to the same interview schedule. Participants in the focus groups had preexisting relationships to varying degrees. All participants were recruited by the first author from local active retirement groups, exercise classes for older adults, and Men's Shed (a social club for men to meet and share crafts). Women were overrepresented in part due to the difficulty engaging older men in groups such as active retirement groups. A 2012 study

in Ireland reported 77% of Active Retirement attendees are women (Ní Léime et al., 2012). The first focus group was mixed gender, the second focus group was entirely women and the third focus group was entirely men.

5.3.2 Ethics

All participants provided informed consent to take part in the current study and for the use of their data for the purposes of publication. Names and other identifying details were removed at the beginning of the study, so that all those involved would remain anonymous. All names included are pseudonyms chosen by the researcher at random. Quotes are not differentiated between which focus groups they were in to avoid identification of participants. Ethical approval was obtained from University College Corks Social Research Ethics committee (Applied Psychology sub-committee).

5.3.3 Procedure

Focus groups and one-to-one interviews were carried out using a semi-structured interview format. An interview schedule (available in Appendix 3) was generated from questions from the brief-perceptions of ageing questionnaire (Sexton et al., 2014) and developed further based on discussions between the authors and responses from participants.

The focus groups and interviews were carried out by the first author and a research assistant. The first author transcribed all the interviews verbatim. The transcribed interviews were then analysed using reflexive thematic analysis, as detailed below.

5.3.4 Approach to Data Analysis

Reflexive thematic analysis was used to analyse the data with the first author coding at both a semantic and latent level and developing themes following existing guidelines (Braun & Clarke, 2006, 2020). Reflexive thematic analysis was chosen to allow for a freer development of themes from the data and its reflective nature which encourages researchers to be aware of potential influence from their own views and perceptions. Reflexive thematic analysis allows the researcher to identify common themes across data which are relevant to the research question and arrange the themes in a way that answers the question meaningfully. Theme development was inductive and deductive as although the aim was to develop themes from the interviews the researcher is familiar with stereotype embodiment theory (B. Levy, 2009) and its applicability to older adults' experiences. This approach was adopted to allow for the use of the theory but not to limit the results by fitting them to researcher assumptions. The data was read and transcribed by the first author to aid in the familiarisation process. Coding was carried out by the first author and refined through discussions between both authors exploring potential ideas and themes. Initial themes were generated in relation to the research question and existing theories although this was discussed between authors to minimise inappropriate shaping of data to these theories. Themes were revised, revisited, refined and illustrated allowing for an analysis that was reflexive.

The first author's primary area of research is perceptions of ageing and therefore it was important to be aware of and to reflect on how this influenced interpretation in the coding and theming processes. The researchers like everyone also have their own experiences, perceptions, and opinions of ageing to be aware of. In order to be aware of the interplay of these, the researcher kept a reflective journal during the analysis and discussed themes and interpretations with the second author

regularly. The first author's own comparatively young age and therefore outsider status from older adults, and previous experiences with older adults was kept in mind to remain cognisant of any influences on the researchers' analysis (Berger, 2015). This was important as there were instances where the interviewer's age was mentioned by participants so it was a factor they were aware of and could have influenced how they spoke about certain topics.

5.4 Results

5.4.1 Themes and notes

Generally, the data showed that when older adults were asked to define ageing, they rarely used numbers. Participants sometimes described how when they were young, they would define old as above a certain age but that this changed as they got older and the definitions expanded to include more than just chronological age and diminishing its importance. Our participant's definition of old rarely encompassed themselves. Participants generally presented a positive perspective of ageing, drawing on their own experiences and life stories to illustrate their points.

We discuss four themes in the data: (a) Ageing as a Decline, (b) Challenging Ageing, (c) The Interconnectedness of Ageing, and (d) Feeling Free. Each of these themes will be discussed separately.

5.4.2 Ageing as Decline

The participants described several ways in which they see growing old as declines in the physical, mental and social domains. Rather than declines being consequences of ageing, these declines were described as what ageing is. The most commonly discussed declines were physical, health and a lack of energy or general slowing down and these were the most common topics around defining ageing. One

participant used an example of someone with dementia to demonstrate ageing. Although participants did give examples of positives of ageing, when asked to describe ageing it was these declines which dominated their definitions.

Participants frequently mentioned their health concerns, whether current or expected in ways that suggest they were not only normal but unavoidable. As Ann (all participant names are pseudonyms) a focus group participant describes '*Suddenly they sprang it on me. when I was a certain age, and I have pains here, pains there and pains everywhere'*. Suggesting either a sudden decline or a growing focus on aches and pains because of her age. Another participant, Nora, describes the sense of inevitability of health issues that comes with age *'when's something going to happen*?'. This comment reframes health problems as just a part of ageing and a lowering of expectations for health that comes with age. These comments were more than participants just listing negatives associated with ageing as the negatives were often conflated with the ageing process itself. The examples were described as aspects of ageing rather than as independent negative events. For example, below we see participants concerned about their mortality because of their age, such as David below and having constant thoughts about it and another, Catherine who says a lack of energy is a constant reminder of growing old.

> *When I passed 60, what comes to mind to me is because of the, what would you say, the mortality rate in my family rate at that age, from 60-65 nearly everyone. So, I think about it all the time. That's one thing I always think about.*
>
> *David, focus group*
>
> *So for me a lack of energy reminds me that I'm getting old… I just don't want to think I'm old but my lack of energy tells me yes you are*

Catherine, focus group

Participants also described ageing and declines as objective reality, that although ageing may be a mindset as was frequently said, this was viewed as less true as you get older. As can be seen in the below exchange between a participant and the rest of the group.

Geraldine: (ageing is) not attitude from when you're older I think it's attitude when you're twenty yes

Group response: yes

Instances where participants expressly went against the prevailing attitude that age is a mindset were notable for how unusual they were and the fatalistic sentiment they were expressed with. When participants spoke about the negative realities of ageing, they seemed more resigned. One participant even expressed scepticism that the oldest older adults could be happy. Mary from a focus group said '*There was lady there on television one night, now I would never like to live to be her age but she (was) a hundred and twenty or something. and she said she never had a pain or an ache and she was quite happy. She didn't look happy but she said she was.'* This participant effectively states that even if someone claims they are happy and pain free that it was so unlikely as to be impossible at a great age.

Throughout the interviews and focus groups these negative points about ageing were frequently raised. However, it appeared that there was almost a taboo element in raising some of these issues in the presence of others. For example, in the first focus group one older adult outlined that they felt very limited by old age and felt obliged to give up on certain dreams and aspirations for practical reasons. This sentiment was met by others in the group disagreeing through general 'no's but also through

encouragement to the individual. This also happened in the second focus group where one older adult mentioned being advised by their doctor to cut back on some activities which was met by strong disagreement with that sentiment and the proposal of alternative approaches and solutions. In both of these groups when individuals suggested their ability to do something was limited by their age, the rest of the group pushed back. In the focus group which was the only all male group when one participant mentioned cutting back and pulling away from work, in this case a physically demanding job, because he felt he got in the way, there was no push back from the group.

> *They'd be complaining that they can't get through nothing in the day cos they're slowing down for the old cog*
>
> *Albert, Focus Group*

The reaction was not the only difference as the type of activity was much more physically demanding. This all-men group spoke more about hard physical labour as something they could no longer do with one participant referencing large losses in strength and physical ability which may explain the difference. This difference may also be due to physical labour being more relevant for rural living men. The other two focus groups were primarily women and the activities they mentioned being told to cut back on were mostly recreational ones which they could break up more manageably like gardening where Jackie suggested they just cut back the amount of activity they did each day '*you could reduce what you're doing, you could take a patch and only look after that patch, find it and keep it'* whereas the David in the all-men group felt his lack of physical strength and speed made him more of a liability than an asset in a working environment so there was no cutting back which would be

acceptable as seen here '*you'd see the lads jumping up on the tractor and hitching up the trailer and you become a liability yknow?'* Interestingly the male participants did not mention recreational physical activities, physical pursuits were always framed as work.

Fear and anxiety often accompanied more negative, but less talked about, consequences of ageing such as dementia. These topics came up semi frequently but were avoided and participants expressed being uncomfortable talking about them.

as for Alzheimer's or things like that I don't think about that.

Patricia, Focus Group

I would still have anxiety about getting much older and ending up with dementia, that would be a big worry for me.

Elizabeth, Focus Group

This suggests that even though participants spoke about many negatives associated with ageing, they avoided talking about the worst aspects.

In sum, the participants frequently described the health declines as being synonymous with ageing as well as being inevitable. The participants rarely separated these declines from their definitions of ageing. These opinions were almost always counterbalanced with an attitude that was a reaction to this, a push back against the negatives of ageing, described here as Challenging Ageing.

5.4.3 Challenging Ageing

This theme captures a sentiment often expressed by participants both implicitly and explicitly, that they treated ageing as something to be challenged in various ways. This framed ageing as something to be stood up to, either through actions or mindset,

but some participants also opted for denial. Older adults employed denial through not thinking about ageing, or focused on gratitude at having done as well as they had or, adapting to ageing through making adjustments or accommodations for the ageing process. An individual's attitude to ageing or their mindset was highlighted repeatedly as an important factor in older adults' views.

The belief that ageing could be affected by mindset and staying active were the main approaches, as one participant John noted:

> *you meet some people old, and they could be miserable because they're getting older and they're old. Yknow the way they're looking at it they're miserable because they're blaming perhaps age, being older and you get some people then who are quite the opposite.*
>
> *John*

Suggesting that dissatisfaction with ageing was in part down to the attitude towards it. The perceptions of others played a role in how these strategies were used. Some participants just denied being old, saying they either didn't think about age or growing old but took everything one day at a time, but there was sometimes a sense of unease about this denial as seen from Ann here:

> *I never, first and foremost never thought about it. And I never realised until I had a certain birthday round here... and I never... since then I have all sorts of aches and pains which I didn't have before.*
>
> *Ann*

Some participants did not consider themselves or others old because they were active meaning their definition was less based on chronological age. Others revised

their definition of old up numerically from 70-90 etc. Sometimes this was quite drastic as in the case detailed by Pauline below:

> *I have a relative who is 89 and a neighbour comes and they come every second week and take her dancing at night-time to the local the local club, the local hall and the neighbour comes and … she loves to dance and she's well able to dance she lives alone and she's 89 and runs her own farm, she's 89 and I don't consider her old.*

Pauline describes "old" as not being about age but being about energy, attitude and ability. According to Pauline, someone is able to defy the label of old because of what they do. Similarly, Helen below describes how her view of what makes someone old has changed over time:

> *The older we get the further away we put it, when I think of someone being 70, it conjures up an old stooped woman or man with a stick, but now, jeekers (a shocked exclamation).*

These descriptions show how 'old' is somewhat fluid depending on experience and reference points. These descriptions also reinforce the positioning of "old" as a negative state but give the participants leeway to escape defining themselves as old.

Another strategy is seen when one participant described their idea of an old person comes from their oldest living relatives. This pushed the definition of old to others meaning the participant could not be old as someone else was older. When it came to describing themselves, few participants considered themselves to be old but some saw it as a transitory state they came in and out of.

> *Interviewer: Does anyone else in the room consider themselves old?*

Catherine: some days yes, yes some days yes

Or were reminded of by external sources as described by Nora below:

I don't see myself as old really, it's only sometimes when I look in the mirror

Saying that some days they felt old but not others, this related more to what participants saw as the symptoms of ageing such as tiredness and slowing down. This description allowed participants to accept that they may sometimes fit the description of old, but that this was not their permanent state. This gave them some leeway to escape describing themselves as old. As can be seen in the below exchange, there was general agreement that 'old' was not a fixed state of being and it changed sometimes frequently:

John: You're as old as you feel.

Catherine: That's true.

Margaret: And that differs from day to day and hour to hour, it sure does.

Attitude played a large role being mentioned explicitly with statements such as '*age is just a number*' and '*you're as old as you feel*' and even the notion of a self-fulfilling prophecy. One participant, David in a focus group, described a cycle whereby you might feel a pain or stiffness and when you are not busy through activity or socialising you start to focus on the pain and it reinforces it.

(if you are) *out and about to be sociable and you stimulate your brain,* (as opposed to) *I guarantee if you're sitting down inside and you've a pain in your knee and your knees are stiff. And it comes up into your head, my knees are stiff, now you've a second opinion coming in on the first one.*

David is describing how distraction and activity help you avoid focusing on

any aches and pains associated with ageing. This came up elsewhere where activity was a prescription for ageing well. When asked for advice on how to age well Eileen was succinct in her reply:

I mean just keep going.

Participants described that this view of ageing as a mindset or controllable, encouraged them to engage in activities to delay the negative consequences they associate with ageing. Many participants described having to keep going or moving in a use it or lose it situation. This belief of old as a mindset, allowed participants to push themselves to keep going and to energise themselves into working harder to overcome the perceived negative consequences and avoid any self-fulfilling prophecies around negative views of ageing.

Keep going keep active because some people if they do it they can get into a rut. And not want to do anything then like and they can wind up, what can take hold of them then is depression.

Eileen, Interview

Instead of challenging the ageing process, some participants accepted being an older adult as another stage of life with its own opportunities and features. Instead of having a combative attitude this acceptance seemed to allow participants to relax and enjoy their life. This approach seemed to help participants reduce the dissonance between competing ideas such as feeling old occasionally or appearing old to others but not thinking of themselves as old. It reframed the idea of old as different from the negative consequences, as they described such as slowing down to being a necessary stage of life. As Pauline describes:

I think it's a fantastic stage of my life, the best stage of my life I must confess

These different approaches to ageing all helped individuals avoid the distress of focusing on the negatives of ageing.

5.4.4 Interconnectedness of ageing.

Participants experiences and definitions for ‘old’ frequently were informed by others and the social world around them through social interactions, conversations, material conditions and supports. These factors were often spoken of in terms of the limitations. For example, in one discussion in a focus group which had more rural participants, the issue of rural transport was spoken about extensively and how limiting it was being isolated. David emphasises how important it is:

> *But the main thing is (to) have the transport, it’s vitally important at all costs, and if there’s people living in rural areas who are not driving, they should be looked after.*

This limitation was seen as a negative consequence of ageing but exacerbated by poor infrastructure. David also spoke about how:

> *you are isolated but you can actually be more isolated in the middle of the city living in a flat.*

This suggests participants viewed isolation as an issue associated with being old. A similar issue arose in interview one with an older adult based more rurally although they were still driving and the issue of isolation only became relevant due to poor weather conditions such as snow where they said neighbours would check in and she felt supported. This issue did not come up in the groups based closer to urban hubs. Instead, those in urban hubs were able to point to public transport as a reason they could avail of so many amenities and be more active. Older adults in urban areas did not mention ageing as a limitation to their activities to the same extent, potentially

because of the supports society offers them. This theme points to how people do not grow old in a vacuum, but their experiences are shaped by their environment and supports (Cassarino & Setti, 2016).

Participants would say they did not feel old but that others might see them as old. Sometimes this perception was treated as endearing such as when a young child would make a comment which could be seen as insensitive as they are not expected to know better. This exchange captures how children's attitudes are treated differently despite being some of the harshest comments if taken at face value.

> *Pauline: I find even the small ones saying things like "you must be going to die soon"* (and) *"you're very old aren't ya?"*
>
> *Jackie: I remember one asking his grandfather "when I'm an adult, will you be dead?" he's six*
>
> **Group Laughter**
>
> *Patricia: I think that's the innocence is so lovely*

Other times the attitudes of others could be seen as infantilising, condescending and needing to be challenged. These adverse perceptions were especially common when the comment was coming from medical professionals as seen in this exchange:

> *Patricia: I had a ride on lawnmower and I used to do an awful lot of the garden myself and a* (medical) *consultant told me you're too old to do it.*
>
> **Disagreement and disapproval from the group**
>
> *Helen: I think Doctors have a negative attitude to ageing.*

What was clear in the responses was that older adults often expressed dissonance between how they felt and how they knew they appeared to others, as Paul says:

> *I try not to think about it but it always comes up, my son always reminds me "ah sher you're old".*

The participants in this study when asked to describe ageing and their experiences often framed their ageing in terms of others. Participants said they considered themselves old using markers like how old others were or their own social roles. Some participants recognised that they looked conventionally old or had hit landmark ages that meant they were considered old. The participants were reminded by these external markers and their social meaning and this was often expressed negatively. Being reminded about being older in a social context often led participants to speak negatively about being older.

> *You'd be a, deep down when you come to a certain age, you'd almost be afraid to say you're sick because people would say we'll you're getting up to 72*
>
> *Paul*

Some of the participants found benefits in being seen as older when they could benefit or when they felt the help was appropriate. One participant described that they feigned helplessness in order to avoid unpleasant tasks such as at a bank and was happy to turn down offers of help at the shop when she felt they were not needed, but appreciated knowing they were there if she ever did need them. This comment was from a more rurally based participant so the realities of needing material supports was more pressing.

*One makes use of them too. I see people now in (the local supermarket)"oh can we carry this out for you?" *laughter* no thank you. But eh… If I did want help, they're there.*

Eileen

Although references to markers of ageing, such as wrinkles or birthdays, were often negative, being more senior in a family unit was almost always mentioned positively and as a source of comfort and happiness. Being a grandparent or the oldest generation in a family was often described as the moment they realised they were older. Reminders in this form came with positive connotations and an acceptance of ageing as a part of life which has its own positive role. Participants found joy not only in relating as a grandparent to their family but also in being able to contribute to the family unit in ways they wanted to. As Nora describes below her tone was positive

*When my children were young for instance just a simple example my mother would always come out to my house and do my ironing … and we were babysitting a few weeks ago down in my son's house and what I found, I found myself doing the ironing and when my son came home he said *impersonates her son* "oh you're after turning into nan", things like that yknow.*

However, sometimes these contributions were double edged when participants felt obligated to help out or perceived that they were infantilised and seen as incapable, although it was not attributed to maliciousness.

I go to one of my sons every Friday and then my other son, but my daughters away, but if I could ysee I… get the dinner ready for everyone while they're out and I do different bits and I wash the bins and my son comes in and he'll be like "mum what are you doing?!" he thinks I shouldn't be doing it. He

doesn't want me doing these kind of jobs but that's the way they are, they want to protect us.

Patricia, Focus Group

These social interactions around older adults' age could be sources of stress or comfort, they could exacerbate the feeling that they were getting older or they could reassure them that ageing was another stage or part of their life and that they were fulfilling a role. This perception was dependent in part on how they were being treated by others but also on their own levels of independence. Participants made clear that their experience of ageing as positive or negative was influenced by the world they lived in and that although there were objective changes with ageing, some of these were only an issue when there was a lack of support to help them be independent. These discussions highlighted how the ageing process was collectively built around an individual through perceptions and their supports.

5.4.5 Feeling Free

While descriptions of ageing were frequently negative, there was several benefits mentioned to growing older, the most frequently mentioned was freedom. When talking about older adult's experiences of ageing this positive benefit of ageing is important to highlight as participants did not exclusively frame ageing as purely a decline or something to be challenged. This freedom took the form of freedom from responsibilities, free time and freedom from expectations. Participants described feeling they could speak more freely as they minded less what others thought. This came up independently in most of the groups and seemed to be a very common experience.

It has an awful lot of advantages too though, you can say what you like when you're 72 that you get away with it if you know what I mean

Paul, Focus group

Participants repeatedly spoke about a freedom from social convention or as one participant put it the freedom '*to call a spade a spade*'. This ability to speak their mind was something that had developed as they aged and which they recognised in other older adults. Participants frequently spoke about free time and pursuing new interests. This came up repeatedly with participants talking about how at earlier stages in their lives they did not have the time to try these things due to other commitments. Participants also described that as an older adult they felt more able to focus on what they wanted without fear of judgement.

it's much better, I never thought I'd be as good as I am at this age of my life I never thought I'd be enjoying it as much or having such fun I think it's just brilliant altogether and the freedom, you can go at the drop of a hat, if someone asks you to go out, you can just go, if you want to go on holiday, no problem.

Patricia, Focus group

Participants reported having a feeling of freedom which they very much associated with ageing. Of note is that while participants described this freedom as being a benefit of ageing, it was not used interchangeably like the negative changes associated with ageing were. Participants did not use freedom as a sign of ageing or as a synonym for ageing like with negative consequences. Instead, this freedom was always described as a benefit that came along with ageing. This is possibly because while the negative consequences seemed inevitable, the freedoms depended on social supports and resources. For example, Margaret who moved to sheltered

accommodation so her freedom from some worries was dependent on being able to move ‘

> *Not socially but I, as I was getting older I decided to come in here as a resident and it has freed me up and the security yknow it was wonderful and feel more free to do what I want now not have to be worrying about the roof being blown off the house’.*
>
> *Margaret, Focus Group*

.

Participants spoke about how they used this time for exercise, socialising and pursuing hobbies they might not have had the chance to before. For most participants freedom came with ageing but one participant questioned whether this was due to retirement and freedom from work as opposed to a part of ageing. This only happened once but it is notable as it is part of how older adults define ageing. It highlights that there is a complex understanding of ageing, while this participant parsed events and circumstances surrounding ageing, others took life stages and events such as retirement as part of ageing.

> *The benefits of all of that are anything to do with ageing or whether it’s just that I’m doing more of that as opposed to working and going home and being tired.*
>
> *Catherine, Focus group*

This freedom was also seen as a double-edged sword and individuals had to be prepared to make the most of it. This was especially talked about in the group with only men participants who spoke about watching their fathers or friends suffer from a

depressive state once they finished work and had nothing to fill their time and reduced income. This was also the main piece of advice from older adults to those who were ageing, to keep active and keep doing things to avoid feeling aimless. As described under the Ageing as Decline theme, one of the dangers of ageing identified by participants is slowing down and focusing on the negative and not having anything to distract yourself or do as it could mark the beginning of a negative self-fulfilling prophecy.

> *you retired with your pay on a Friday and the following Friday you've got about a third of the money in your hand all the time in the world to spend it but you don't have the finance to spend it and you've no interest outside of the work you did*
>
> *Patrick, Focus group*

Our themes of Ageing as Decline, Challenging Ageing, The Interconnectedness of Ageing and Feeling Free paint a complicated picture of how older adults experience ageing.

5.5 Discussion and Conclusion

In our findings, older adults' descriptions of ageing seemed at times contradictory. Ageing was described by some participants as relative, or due to mindset, but others used concrete markers such as chronological age, slowing down or wrinkles to define it. Participants described limitations on what they could do as reminders of getting older but were told those limitations were breakable with strategy or reframing. This contrast was seen in some discussions where one participant pointed to her wrinkles as something that contradicted her internal belief that she was not old, and another participant tried to reframe them as simply an indicator of the life you've

lived. A third participant joked that if you took your glasses off you would not see the wrinkles and they therefore would not bother you. This interaction sums up a lot of the exchanges in the focus groups where participants stated that they often preferred not to think about ageing but were reminded by perceived negatives markers (physical or social) and these negatives were seen as needing challenging by other participants either through avoidance or adaption. This brings to light the social creation of meaning in ageing, being around other positive minded individuals willing to prompt you to overcome challenges may help older adults engage with more positive behaviours and attitudes.

Similar findings have been found in other research studies including looking at older adults experiences with frailty (Warmoth, Lang, et al., 2016). The participants in Warmoth, Lang, et al.,'s (2016) study described how other's perceptions of them influenced their own beliefs similar to when our participants felt infantilised by others. Similarly, as well their participants noted strategies they used to avoid becoming frail. Something that may have been missed due to their study being interviews is the social nature of this support through other older adults. Our findings further add to these findings and help build a picture of how older adults respond to other's ideas of them as old.

There are limitations to this research such as the sample was recruited from groups of older adults who are already engaged in proactive behaviours such as attending exercise classes or activity-based groups. This is not representative of older adults in general and unfortunately groups of older adults who do not attend these public events are harder to find and may have a different story to tell. Future research should seek out those not involved in these groups and try to understand their experiences of ageing and how they relate to current theories around perceptions of

ageing. The nature of focus groups which constituted the majority of participants means that discussions between participants can prompt perspectives which may not have been shared, conversely participants may have been less comfortable sharing views than in interviews. This was seen in several participant interactions where the group seemed to correct individuals' perspectives in some cases. This specific phenomenon means that although this research may have missed some detail on the experiences of individuals, it did observe group dynamics which are unlikely to have been captured by interviews.

Although our group of older adults was inclined to be more active as they were recruited from Men's Sheds and activity groups in a leisure centre, they did not escape having negative perceptions of ageing. They often outwardly expressed positive views especially relating to the ways they approached ageing and the strategies they used but in all the groups there was an indication that ageing was still an impending decline that could only be delayed not halted. The negative aspects of ageing were regularly challenged either outright, denial or through strategies to overcome them.

An alternative explanation for the reluctance to speak about the more serious negatives of ageing, despite them being hinted at on occasion, is the interviewers young age and gender and therefore potential outsider status. The groups that most strongly seemed to avoid talking about the negatives associated with ageing were the groups comprised solely or primarily of women, while the group that spoke more freely about the negatives was the group comprised solely of men, this may have been because the interviewer was seen as less of an outsider. One piece of evidence for this argument was found when a participant mentioned the changing nature of inter-gender relationships with age. Although this did not come up again, it is important to note.

Well I suppose young men wouldn't look at us as they'd look at young women or old men even. They wouldn't look after us like they'd look after a sexy young woman.

Helen, Focus Group

As was mentioned under the Ageing as Decline theme, participants defined ageing using its negatives but attempted to balance this by describing positives that came with it. This is consistent with other qualitative research where researchers and participants use declines in physical and mental abilities as synonyms for ageing (Berman & Iris, 1998; Shaw & Langman, 2017). Although most of the positives were described as benefits associated with ageing, an exception was the descriptions of ageing when placed in the context of roles in a family.

Moments of positive descriptions of ageing, rather than positive associations with ageing, were when participants used descriptions of becoming a grandparent. These weren't described as factors that come with ageing, but a sign of ageing itself. Focusing on these positive roles and an appreciation for the cycle of life could help older adults reach a more accepting place in relation to their ageing. This is consistent with Socioemotional Selectivity Theory (Fung et al., 1999) which suggests that as people age they preference emotionally meaningful relationships. And grandparenthood has been described as a source of joy for many grandparents (Mansson, 2016). However, as grandparent status was not explored further, it is unclear if participants without grandparents described a similar role in their life, or a similar move to preference more meaningful relationships.

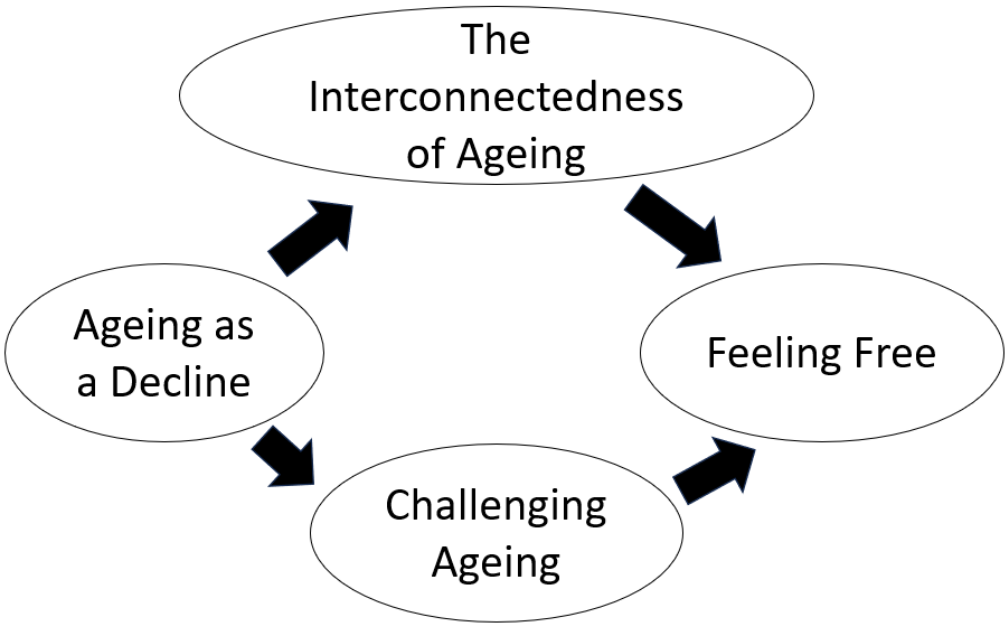
The theme Challenging Ageing speaks to coping strategies. Coping 'is an *organizational construct* used to encompass the myriad actions individuals use to deal

with stressful experiences' (Skinner et al., 2003, p. 217) and in this instance ageing itself or ageing in current society is seen as a stressful experience. Many of the strategies described in Skinner's (2003) paper are seen in these interviews, problem solving, support seeking, avoidance, and acceptance. Other research has similarly found the importance of individual coping strategies in supporting successful ageing (Reichstadt et al., 2010).Participants experience of ageing as a stressful experience seems to be negotiated through the factors covered in the theme Interconnectedness of Ageing. Setbacks or slowing down or other perceived negatives were often only negatives when framed as negative or because they were exacerbated by material conditions such as (lack of) independence. For example, our urban based groups did not display the same sense of loss of independence from not being able to drive while this isolated and was seen as a negative aspect of ageing by our rural group. This is in part because the urban groups had more accessible public transport. This allowed them to remain independent. Although our last theme does not relate directly to coping strategies, it does suggest that when ageing as a stage of life is accepted older adults can find joy in aspects of ageing like freedom.

Another way of viewing some of these themes is through the lens of selective optimisation with compensation (Marsiske et al., 1995). This is a framework for individuals to respond to changes in their ability or environment which may result in a shifting of their ability to meet goals. Through collaboration in the focus groups, we can see others finding ways to compensate for a reduction in ability such as when a lesser amount of gardening was suggested as an alternative when an individual was tired. Participants also appeared to naturally focus more on activities within their ability with some participants describing attending exercise classes specific to their age.

Figure 2. shows an illustration of how our themes connect to each other to build a picture of how older adults may experience ageing. Ageing is seen as a decline initially and can be reframed as a positive (feeling free) based on social supports (the interconnectedness of ageing) and through strategies to challenge ageing (challenging ageing). This is not to suggest all older adults experience ageing as a positive eventually but more to illustrate that these are the ways that our participants described reaching that point. Through focusing on their relationships, through having more support, through challenging their stereotypes of ageing, they could shift from viewing ageing as a decline to a more positive experience.

Figure 2. Illustration of themes



This research complements the existing theoretical research on pathways involved in perceptions of ageing, substantiating proposed mechanisms and placing them within the real experiences of older adults. Previous research into perceptions of ageing has focused on the consequences associated with scores on quantitative

measures of perceptions of ageing, with fewer qualitative studies. Along with this research such as Levy's Stereotype Embodiment theory (B. Levy, 2009) have gone some way to connecting the existing research into plausible pathways through which negative perceptions of ageing act. Our research shows that older adults have a certain level of insight into these processes themselves, recognising the potential for negative cycles and pathways to lead to self-fulfilling prophecies. As well as this explicit awareness of these pathways they also engage in the kind of beliefs and behaviours that an intervention designed to create positive perceptions of ageing might encourage such as using positive role models, recognising the need for healthy physical and social activities, and focusing on and appreciating the positives of ageing. Understanding older adults' experiences of ageing is key to understanding how to improve their perceptions of ageing. Questions like this from the Brief Ageing Perceptions Questionnaire (Sexton et al., 2014) 'Slowing down with age is not something I can control' and 'The quality of my social life in later years depends on me' might be answered more positively if effective interventions to increase positive perceptions of ageing were more commonplace.

This research helps expand the Stereotype Embodiment Theory (B. Levy, 2009) into the social realm as well. Stereotype Embodiment Theory suggests that both positive and negative stereotypes held by older adults become internalised and directed towards oneself. The model illustrated three pathways through which this internalisation takes place, the biological, psychological and behavioural. The participant discussions make clear that interactions between older adults can offer psychological reframing of ageing, behavioural strategies, and support others in coping with negative emotions associated with ageing. Participants' own perceptions of ageing and their consequences were modulated by encountering others who could

provide support or offer solutions to issues. It also shows the importance of social and structural supports in how individuals perceive the consequences of ageing such as limited mobility being balanced out by effective public transport. The reframing of stereotypes by others or a supportive environment may make negative stereotypes less relevant leading to a reduced impact of internalisation. This of course goes both ways with evidence showing positive perceptions of ageing may help even those in precarious contexts to age more positively (Craciun et al., 2017). Future research could examine how smaller social networks influence perceptions of ageing and the processes that inform older adults experiences.

While much research focus has been on improving outcomes for older adults, avoiding hospitalisation and allowing people to live longer, it is important we also understand how older adults experience ageing. Our participants are from a sample engaged in healthy behaviours and their understanding of challenging ageing could be beneficial in health messaging for older adults. Our participants also spoke of focusing on the positives of ageing, the freedom and the way roles and relationships evolved helping them balance the perceived negatives of ageing while not ignoring or denying them. Finally, participants made clear that their ageing process depended on others either in individual social interactions or in societal supports, each of which could have positive or negative impacts. Supports and understanding of what independence means to older adults could allow the minimisation of negative perceptions of ageing, removing barriers and allowing people to enjoy the freedom they might find with age.

Chapter 6: Testing stereotype threat mechanisms in a sustained attention task

6.1 Introduction

Stereotype threat occurs when members of a group experience concerns about being evaluated in tasks relating to stereotypes concerning a group they identify with, which can impact their performance (Steele & Aronson, 1995) It is well known that there are negative stereotypes about older adults such as being forgetful or slow (Kite et al., 2005; Markov & Yoon, 2020). People first hold these views about older adults as an external group, when they are younger, but as people grow older, they become part of the group they hold stereotypes against (Isaacs & Bearison, 1986; Newman et al., 1997). This self-stereotyping can have negative consequences. Research has reliably found that older adults perform worse on certain tasks when reminded of stereotypes related to their age. This is especially true on cognitive tasks (Armstrong et al., 2017; Lamont et al., 2015).

Although stereotype threat has been demonstrated in older adults in a range of areas (Armstrong et al., 2017; Lamont et al., 2015) there is still debate over the exact mechanisms through which it may act. Understanding these processes may prove vital in ensuring older adults perform closer to their actual ability both in real-life situations and in cognitive tests. This has implications for accurately diagnosing cognitive decline (Barber et al., 2015; Haslam et al., 2012; Régner et al., 2016). Regulatory Focus Theory and Executive Resource Depletion (ERD) are the two main hypotheses on the mechanisms at play (Barber & Mather, 2013; Schmader et al., 2008).

Regulatory focus theory (Higgins, 1997) posits that individuals can have either a promotion or prevention focus when completing tasks. A promotion focused

individual is primarily interested in achieving gains while a prevention focused individual is more oriented towards avoiding losses. Tasks themselves can also be better suited to different regulatory focus orientations, being more gains based, suiting a promotion focus or loss avoidance based, suiting a prevention focus. For example, tasks encouraging participants to focus on getting correct answers (gains-based) as opposed to tasks that say to avoid giving incorrect answers (loss avoidance-based. The match between an individual's regulatory focus and the regulatory focus of the task is known as regulatory fit, its opposite is called regulatory mismatch (Higgins et al., 2001). Where task orientation matches that of an individual then there is a matching effect and individuals tend to perform better than when there is a mismatch, regardless of whether the match is gains based or loss avoidance based (J. Keller & Bless, 2006). Individuals can also have dispositional or state regulatory focus. When a particular regulatory focus is prompted in an individual by a particular situation, this is described as situational or state regulatory focus. Alternatively, dispositional or trait regulatory focus is defined as the default regulatory focus, promotion or prevention, an individual holds. Someone who is usually methodical and focused on avoiding mistakes likely has a dispositional prevention focus, but task parameters, such as a time limit could prompt them to adopt a more promotion focused approach. Prevention focus is characterised by a change in task strategy with a marked slowing post error, which does not occur when the individual is promotion focused (de Lange & van Knippenberg, 2009). In a comprehensive review of existing stereotype threat literature relating to older adults Barber (2017) makes the case for changes in regulatory focus as the primary mechanism for stereotype threat effects in older adults (Barber, 2017), whereby older adults tend to be more prevention focused, especially under stereotype threat.

The ERD hypothesis is based on the idea that feeling under threat puts demands on working memory resources, drawing focus away from tasks (Schmader et al., 2008). This may be caused by several different processes including physiological stress, task monitoring, and self-monitoring (emotional regulation) which reduce the availability of working memory resources leading to an impact on performance. Mind wandering may also be a process implicated in this interference (Jordano & Touron, 2017). There are two types of mind wandering: one is task-related thoughts (i.e. I hope I'm doing well at this task), the other is task unrelated thoughts (i.e. did I leave the iron on). Both of these types of thoughts can interfere with performance (McVay & Kane, 2010). Older adults can experience detriments to performance in cognitive tasks due to mind wandering when exposed to negative stereotypes of ageing. Jordano and Touron (2017) found that older adults experienced more incidents of mind wandering and more task related interference from mind wandering, under stereotype threat when compared to younger adults. Similar research found that working memory resources are consumed under stereotype threat and this results in a reduction of the ability to control processes and a strengthening of automatic responses (Mazerolle et al., 2012).

Sustained attention is a cognitive process related to the ability for an individual to maintain focus and effort on a specific task or subject (I. H. Robertson et al., 1997). Failures in executive control and sustained attention can lead to mind wandering (Hawkins et al., 2022). We have previously suggested that sustained attention could be a mechanism through which stereotype threat may operate and may have long term consequences through negative perceptions of ageing (Fawsitt & Setti, 2017). The idea that stereotype threat may impede individuals' ability to sustain attention due to ERD is in line with Schmader et al.'s, (2008) executive control interference model which suggests stereotype threat interferes with working memory processes. The executive

control interference model, however, was formulated more broadly for multiple groups which experience stereotype threat rather than specifically older adults. Providing evidence for this account in older adults, Mazerolle et al. (2012) found that controlled processes, such as those that require sustained attention, were undermined in older adults experiencing stereotype threat. Mind wandering can be a consequence of failures to sustain attention and has found to be increased under stereotype threat in older adults (Jordano & Touron, 2017) potentially connecting these areas. This link between stereotype threat processes and failures to sustain attention warrants further investigation.

Negative perceptions of ageing are negative views about older adults or the ageing process held by older adults themselves and have been linked to a series of negative outcomes (Tully-Wilson et al., 2021). Previous research has already shown that negative perceptions of ageing predict declines in sustained attention abilities (D. A. Robertson & Kenny, 2015).

To investigate the mechanisms underpinning stereotype threat in older adults we aimed to examine older adults' performance in a test of sustained attention while manipulating stereotype threat and regulatory focus independently. Using the Sustained Attention to Response Task (SART) as a measure of sustained attention (I. H. Robertson et al., 1997). Participants were divided into four groups: Those undergoing stereotype threat in a gains-based structure, those undergoing stereotype threat in a loss avoidance-based structure, those not undergoing stereotype threat in a gains-based structured task, and those not undergoing stereotype threat in a task with a loss avoidance-based structure. Potential differences in group performances should give us a clearer understanding of the underlying mechanisms in stereotype threat in older adults.

Our hypotheses are the following:

1) if regulatory match/mismatch is the main mechanism at play in determining performance under threat, participants in groups where stereotype threat and regulatory focus conditions match (no threat and promotion focus: Threat and prevention focus) should perform better (committing fewer errors) than those in mismatch conditions.

2) Alternatively, if ERD is the primary mechanism at play, stereotype threat should be associated with failures of attention independently from regulatory focus condition.

3) Given the link between stereotype threat and negative perceptions of ageing, we also hypothesised that individual's scores on a measure of perception of ageing will moderate the strength of any stereotype threat effect seen in the participants in the stereotype threat condition.

Design

The design was a between-subject design. There was a two [stereotype threat (threat, no-threat)] x two [regulatory focus (gains focused, loss focused)] post only design whereby stereotype threat and regulatory focus were manipulated between participants and performance at SART was recorded post manipulation with performance pre-manipulation to be considered as covariate. The dependent variables were SART performance RT's and errors.

In line with a review of meta-analyses on stereotype threat in older adults (Lamont et al., 2015) a control group was chosen as comparison where participants were not informed of any potential performance comparisons between age groups as this has previously shown to have the greatest effect in inducing stereotype threat. A

meta-analyses has found that studies which used stereotypes rather than fact-based prompts were more effective at inducing stereotype threat (Lamont et al., 2015). In line with this a stereotype-based threat was chosen and participants were told their performance would likely be affected by age and their results would be compared to the results of younger participants. In order to avoid fatigue effects and the potential participant awareness of stereotype threat manipulation condition we used a between groups design, which is typical in this literature (Armstrong et al., 2017; Lamont et al., 2015).

6.2 Method

Participants

Two hundred participants over the age of 65 were recruited through the website Prolific.co which recruits and handles payment to participants. This allowed for specific inclusion criteria for participants to be applied including being aged 65 or over, and being in the UK and Ireland. Participants could only take part on a laptop or desktop computer with a keyboard as the study could not be completed on mobile devices.

Sample size was based on a power analysis conducted in G*power 3.1 (Faul et al., 2009) assuming a medium effect size based on previously published research on stereotype threat effect sizes in older adults (Lamont et al., 2015), an alpha of .05, 4 groups and 1 covariate (baseline SART performance) and resulted in a sample 128. A sample of 200 participants was recruited to account for potential incomplete responses.

Materials

Demographic Questions.

Participants were asked a number of demographic questions to check for between group differences. These included: gender (gender differences in the strength of effect have been found in stereotype threat (Lamont et al., 2015)), age in years (age has been shown to have a relationship with both sustained attention and susceptibility to stereotype threat), years since retirement (retirement is often considered a milestone in ageing and when people start to self-categorise as old it may have some relationship with susceptibility to stereotype threat). Participants were also asked about their smoking status and the number of medications they take as both have been shown to have a relationship with sustained attention and cognition (Fried et al., 2014; Vossel et al., 2011).

Sustained Attention to Response Task (SART).

Sustained attention was assessed using the SART (I. H. Robertson et al., 1997). In this task, single digit numbers (1–9) were individually and consecutively presented for 250 ms on a computer screen. The font size and boldness of the digits varied to avoid habituation, and a small cross was presented for 900 ms between digits. All stimuli were presented in black on a white background. The total time for each individual trial was 1150 ms as shown in Figure 3. During this time, the participant was asked to respond by pressing the space bar on a keyboard in response to all frequent (frequency referring to the response required as all individual digits were shown equally) non-target digits i.e. all digits other than 3, in a "go" trial, and were told not to press the bar if a non-frequent target (the number 3) was presented in the "no- response" trials. All participants were presented with a graphic showing what button to push and detailed instructions and then completed a practice trial which provided written feedback on correct and incorrect responses. Following the practice trials all participants completed 270 test trials, which included 30 targets (number 3)

and 240 non-targets (all other numbers). The task lasted 405 seconds in total. During the test phase of the study, no feedback was given regarding task performance.



Figure 3. Timings for Trial

The SART has previously been delivered effectively online (Carriere et al., 2010) and other research into web browser based cognitive tasks measuring response times found this to be an equally reliable measure (de Leeuw & Motz, 2016).

Stereotype Threat Manipulation.

Instructional manipulation considered effective by meta-analysis from (Lemaire et al., 2018) were used. This entailed instructions before the second SART suggesting the tasks measures memory and the participant's results were to be compared to that of younger adults. 'You will now complete a second round of the SART. We are interested in comparing your performance here to younger adults as this test measures a type of memory which younger adults perform better in.' The words 'comparing', 'younger adults', and 'memory' were all in bold typeface.

Regulatory Focus Manipulation.

Participants were told prior to a second round of the SART they would have the opportunity to win an additional reward of up to £1. Participants in a promotion focus were told for every correct response they would receive a portion of the reward,

whereas participants in the prevention focus were told for every error they would lose a portion of their additional reward. These instructions are in Appendix 4. All participants received an £1 additional payment regardless of performance after the task was completed.

Perceptions of Ageing Questionnaire.

The Brief Ageing Perceptions Questionnaire (B-APQ) has previously been used with large samples in Ireland and is used as a measure of perceptions of ageing (Sexton et al., 2014). It consists of 17 questions related to self-perceptions of ageing answered on a five-point scale with several questions reverse scored. This allows for a single score between 17 and 85 with higher scores representing more negative perceptions of ageing. The Cronbach Alpha of the 17 items of the BAPQ among our participants was study was good at α=.850.

Procedure

Participants filled a questionnaire containing demographic questions before completing the first round of the SART to gain a measure of their baseline performance. Participants were then given a group dependent introductory message with stereotype threat or no stereotype threat and prevention or promotion focus before completing a second round of the SART. Participants completed the B-APQ. Finally, they were shown a short debriefing statement explaining the full nature of the study and thanked for their participation.

Approach to Data Analysis

The number of commission errors (responding when the target digit ‘3’ was presented), omission errors (not responding to all other non-target digits), RTs and post error slowing (RT on first correct response after an error minus RT on last correct

response prior to an error) were recorded for analysis. Commission errors were used for primary analysis as they are the most relevant measure for lapses in attention (Vallesi et al., 2021). Post error slowing could be representative of task related interference (Smallwood et al., 2004).

6.3 Results

There were no significant differences between groups in any demographic factors or their pre intervention performance in the SART after carrying out a one-way Anova as seen in table 3.

Table 3.

Group Means and Differences

	ST* Gains focus	ST Loss prevention	No ST Gains focus	No ST loss prevention	F	P value
Age in years	69.77	69.00	68.85	68.90	.474	.701
Medications taken daily	2.53	2.17	2.09	1.59	2.198	.090
B-APQ total	41.53	44.49	42.41	40.94	1.388	.248
Number of commission errors at baseline	5.68	5.08	5.11	4.86	.359	.782
Number of Errors of Omission at baseline	2.79	1.83	1.48	2.67	1.410	.241

RT of correct go at baseline (milliseconds)	602.25	578.17	595.16	624.2	1.914	.129
RT incorrect no response trial at baseline (milliseconds)	532.87	491.05	503.96	549.67	1.976	.119

*ST=Stereotype threat

We examined performance on the SART using commission errors via a 2 (stereotype threat) X 2 (regulatory focus) Analysis of Covariance (ANCOVA) using baseline commission errors as a covariate. This approach is frequently used in the older adult stereotype threat literature. Following criteria used by Carriere et al., (2010) who also administered the SART to older adults online, we removed participants who made more than 10% errors of omission (n=14) in either the pre or post stages for the primary analysis. These participants made more than 20 errors in response trials and may not have fully understood the instructions. This helped to ensure a basic level of understanding of the task by participants and also removed those with excessive reaction times (although due to the nature of the task maximum reaction time was 1150ms). Averages across groups for commission errors ranged from 0-21 in the baseline *M*=5.18 *SD*=4.02 and ranged from 0 to 18 in the post *M*=4.59 *SD*=3.93. For full groups means see appendix 5.

With relation to errors of commission there was no significant difference between regulatory focus on performance between gains- based structure and loss avoidance structure $F(1, 185)= .164$ $p = 0.69$ $\eta_p^2<.01$. There was a significant main effect of stereotype threat conditions between stereotype threat (M = 4.59) and no

stereotype threat (M = 3.97) $F(1, 185)= 5.36$ p = 0.02 η_p^2= .03. There was no interaction effect between stereotype threat conditions and regulatory focus conditions $F(1, 185)= .199$ p = 0.67 η_p^2<.01.

With relation to errors of omission there was no significant difference between regulatory focus on performance between gains- based structure and loss avoidance structure $F(1, 185)= .719$ p = 0.38 η_p^2<.01. There was a small significant main effect of stereotype threat conditions between stereotype threat and no stereotype threat $F(1, 185)= 3.92$ p = 0.049 η_p^2= .021. There was no interaction effect between stereotype threat conditions and regulatory focus conditions $F(1, 185)= .619$ p = 0.433 η_p^2<.01.

With relation to reaction times there was no significant difference between regulatory focus on performance between gains- based structure and loss avoidance $F(1, 182)= 1.597$ p = 0.21 η_p^2<.01. There was no significant main effect of stereotype threat conditions between stereotype threat and no stereotype threat $F(1, 182)= 3.56$ p = 0.06 η_p^2= .02. There was no interaction effect between stereotype threat conditions and regulatory focus conditions $F(1, 182)= .347$ p = 0.58 η_p^2<.01.

With relation to post error slowing there was no significant difference between regulatory focus on performance between gains- based structure and loss avoidance $F(1, 155)= .08$ p = 0.78 η_p^2<.01. There was no significant main effect of stereotype threat conditions between stereotype threat and no stereotype threat $F(1, 155)= .334$ p = 0.56 η_p^2<.01. There was no interaction effect between stereotype threat conditions and regulatory focus conditions $F(1, 155)= .829$ p = 0.36 η_p^2<.01.

There was no interaction between B-APQ total scores when included as a covariate in an analysis of the groups under stereotype threat when looking at their performance in errors of commission or omission in the tasks. This may have been due to the small size of the effect and a relatively underpowered sample for examining this potential effect given the effect size seen. B-APQ scores were within normal range compared to a representative Irish sample (*M*=42.33 *SD*=9.1) (Freeman et al., 2016).

6.4 Discussion

The results showed a small to medium effect of stereotype threat on commission errors in the SART. This means that participants in the stereotype threat conditions committed more errors of commission (incorrect responses in no response trials) compared to participants in non-stereotype threat conditions. This was found regardless of whether the task had a gains or loss avoidance based structure i.e. there was no evidence of a regulatory fit effect. The stereotype threat effect size was in line with those considered effective by a meta-analysis in the area (Lamont et al., 2015). The effect size typically found by Lamont et al, (2015) was *Cohens d* = .28, also small to medium. There was no evidence of a change of strategy such as changes in RTs or post error slowing under different gains or loss focused conditions.

Our results suggest that stereotype threat can cause negative impacts on performance regardless of regulatory fit. This finding provides support for the ERD model of stereotype threat but not the regulatory focus theory. Importantly these findings highlight that our current understanding of stereotype threat in older adults is incomplete. The mechanisms underpinning stereotype threat in older adults may be dependent on the stereotype threat manipulation, the type of stereotype threat experienced by the individual, the task, the age of the individual, or other factors.

Understanding the cognitive underpinnings of stereotype threat is likely necessary for designing accurate measures of cognitive assessment for older adults as well as designing potential interventions for improving older adults' performance.

The results show no evidence for the Regulatory Fit Hypothesis but they also show no evidence of a change in SART strategy due to regulatory focus condition or stereotype threat condition. Expected changes in the loss prevention condition and the stereotype threat condition would have been a slowing of reaction times and fewer errors (Barber et al., 2015; J. Keller & Bless, 2006). Although a prevention focus typically leads to a slowing of response times and promotion focus with a lack of post error slowing this was not found in our data. Previous research has found that under stereotype threat, older adults also adopt a more conservative strategy with slower reaction times (Mazerolle et al., 2024). This was not seen in this study and may have been due to a lack of feedback related to performance during the main task as has been used in other attention tasks examining regulatory focus (Files et al., 2019). Although Files et al. (2019) only found differences in response times after participants completed training in the measure of attention and, in line with our results, did not find evidence for a simple Regulatory Fit Hypothesis at least in tests of sustained attention. Their research design included using responses to stimuli which took the form of a threat (an individual holding a rifle) and no threat (an individual without a weapon) in their go/no-go tasks which may have influenced cognitive processes used in the task as gun focus can impact performance on other tasks (Yegiyan, 2012). The lack of change in strategy may also be due differences in the manipulation of regulatory focus between the present task and previous work. For example, some regulatory focus tasks can offer feedback during the task to reinforce the instructions (Barber et al., 2015).

Another possibility is that the task is less malleable to changes in strategy due to its repetitive structure.

Previous research suggests that stereotype threat works differently in different age groups (Popham & Hess, 2015). Stereotype threat in older adults is more strongly linked to regulatory fit whereas Popham and Hess (2015) found more evidence for working memory interference in stereotyped groups of younger adults. This is not in line with our results. Brown and Harkins (2016) found that in a younger sample, SART performance was not affected by direct stereotype threat, whereas we find that it is in our older group. Their experiment used a longer SART timing and therefore may have not been measuring exactly the same processes, particularly response inhibition. Response inhibition may be more relevant to stereotype threat in older adults as Mazerolle et al. (2012) found automatic response tendencies increased in older. Further research should be carried out to examine the roles of sustained attention and response inhibition in stereotype threat in older adults.

A potential avenue for the future is directly exploring mind wandering and stereotype threat. Previous research has shown older adults under stereotype threat experience more task related interference from instances of mind wandering (Jordano & Touron, 2017). A clarification of whether mind wandering is associated with changes in response strategy, or whether different forms of stereotype threat are occurring due to the task and/or the stereotype threat stimulus type. In addition, Mazerolle et al. (2012)'s research is consistent with diminished performance on the SART and a ERD model of stereotype threat (Schmader et al., 2008).

Another factor to be considered with this study is that it was conducted online. Participants may be completing multiple studies in a row, these could be causing

boredom or tiredness, introducing uncontrolled factors to the process (Rouder & Haaf, 2018). Tiredness and boredom could both influence performance on the SART, it will be important to replicate these findings in a lab or to design the online process to control for these factors by asking participants how many studies they have completed that day already (Greene & Naveh-Benjamin, 2022; I. H. Robertson et al., 1997).

Previous research has shown a connection between resistance to stereotype threat for individuals with more positive perceptions of ageing on a memory task (Fernández-Ballesteros et al., 2015)**.** Although this was not found in our research it may be due to perceptions of ageing being measured post stereotype threat intervention and the impact the task has on perceptions of ageing. This could be addressed by using two separate time points for data collection where stereotype threat manipulation and a measure of perceptions of ageing are separated to avoid influencing each other or the potential for participants become aware of the purpose of the research.

6.5 Conclusion

Our study for the first time directly tests the role of regulatory fit and stereotype threat in determining sustained attention performance in older adults; our results suggest that stereotype threat influences sustained attention in older adults independently from the gains or loss prevention structure of the task. This indicates that there is still more to understand about stereotype threat in older adults: Most literature points to induced change in regulatory focus as the underpinning mechanism but ERD better explains our results. These theories are not mutually exclusive and future research might develop the regulatory focus element of the SART to provide more in task feedback. Another possibility is examining if extrinsic vs intrinsic reward

systems influence executive resources as already suggested by Mazerolle et al. (2021). Future evidence could help create a more complete stereotype embodiment theory that demonstrates how exposure to stereotypes related to age become declines associated with negative perceptions of ageing (Fawsitt & Setti, 2017; B. Levy, 2009). This future model could further incorporate how stereotype threats influence on regulatory focus and ERD could affect older adults in the long term.

Chapter 7: Discussion

7.1 Discussion of Chapter 4: Regulatory focus and perceptions of ageing: exploring the connections

In this study we examined the correlational relationship between perceptions of ageing and one of the proposed mechanisms involved in stereotype threat in older adults, regulatory focus. Participants filled in questionnaires designed to measure their perceptions of ageing and their trait regulatory focus. Using hierarchical regressions there was a relationship between individuals with more negative perceptions of ageing developing a more prevention focused trait regulatory focus. Although this research does not provide causal information it does point to possible avenues for investigation by future research. Recent research has begun this by examining the relationship between perceptions of ageing and wellbeing longitudinally (Söllner et al., 2021). Söllner et al., (2021) found that the relationship between perceptions of ageing and wellbeing was mediated by selection (from selection, optimisation and compensation theory) as well as being attenuated by trait regulatory focus (Söllner et al., 2021).

The findings from this paper suggest that holding more negative perceptions of ageing is associated with a more prevention focused regulatory focus (Fawsitt et al., 2021). This finding is one of the first connections between one of the proposed mechanisms for stereotype threat and perceptions of ageing. The internalisation process described by Levy (B. Levy, 2009) is where people internalise negative perceptions of ageing and these persist into older adulthood where they become relevant. In a similar process, older adults who are more susceptible to stereotype threat, possibly due to more negative perceptions of ageing (Fernández-Ballesteros et

al., 2015), might be relatively more likely to endorse a prevention focused trait regulatory focus.

This relationship could conceivably be going in the other direction as well. Scales of perceptions of ageing tend to focus on gains and losses associated with age (Klusmann et al., 2020). Therefore, individuals with a stronger prevention focus could be focusing more on the losses when responding or in their day-to-day conception of ageing. However, although not presented in the previous empirical paper, further analyses show the B-APQ subscales do not all focus on gains and losses and yet all of them had strong correlations with a more dominant prevention focus. Even item breakdowns suggest it is not merely a stronger focus on losses leading to more negative perceptions of ageing scores. Item 17 in the B-APQ, part of the emotional representations subscale reads ‘I feel angry when I think about getting older’. There is no obvious connection with gains or losses in this item yet it was still significantly correlated with a relatively stronger prevention focus.

Research has also shown that as people age they may tend to adopt goals more consistent with preventing losses (Ebner et al., 2006; Gong & Freund, 2020). Holding more negative self-perceptions of ageing could lead individuals to adopt more of a prevention focus ,as found by (Söllner et al., 2021), and the mechanism may be that holding negative self-perceptions could act almost like instances of stereotype threat, although this is just a hypothesis and there is no empirical evidence of this. Those more susceptible to stereotype threat could also be adopting a state prevention focus more frequently. Unfortunately, as mentioned previously there is not a lot of research on regulatory focus and health behaviours.

Söllner et al. (2021) carried out two experiments which explored ageing stereotypes, self-regulating strategies (selection, optimisation, and compensation theory), and regulatory focus in older adults. The regulatory focus questionnaire was used as a measure of trait regulatory focus (Higgins et al., 2001). The second of these experiments was longitudinal, potentially giving some insight into causal roles involving regulatory focus in older adults. The first experiment which cross sectionally examined the relationships between perceptions of ageing (conceptualised as ageing stereotypes), self-regulation strategies, and regulatory focus, found the relationship between age stereotypes and wellbeing was attenuated for those with a promotion focus. The researchers did not create a single measure of promotion focus relative to prevention focus and strength of prevention focus alone did not appear to play any role. Promotion focus was correlated with two of the three self-regulatory strategies outlined by the researchers and the results support the idea that holding a stronger promotion focus may be protective against ageing stereotypes. An interesting limitation of this study was the use of 50 years as the cut off for older adult, although the mean ages of participants in the experiments were 69.35 and 63.39 (at wave 1) years. The second experiment used three waves of the German Ageing Survey which covers 9 years and found that self-regulation strategies partly mediated the relationship between perceptions of ageing and wellbeing. Regulatory focus was also found to moderate the relationship between perceptions of ageing and wellbeing but not with meaning which was also measured. Supporting B. Levy (2009)'s internalisation hypothesis, perceptions of ageing were predictive of self-perceptions of ageing over time, meaning those who held more negative ageing stereotypes were more likely to have more negative views of their own ageing process.

Further research should investigate links between regulatory focus and health behaviours and outcomes because some existing research suggests the link is not straightforward. Avraham et al. (2020) found that in nurses who were classed as having a low activity level promotion focus had a positive correlation with activity level, but in participants classed as very active, promotion focus had a negative correlation with activity level. Avraham et al. (2020)'s study was however, cross sectional and used a small sample of a specific professional cohort so further research is needed to build an understanding of any existing relationship between regulatory focus and exercise, as well as other health behaviours. There is no research linking regulatory focus and health behaviours in older adults that we could find. This research should look at both state and trait regulatory focus. Trait promotion focus has been linked to optimism (Hazlett et al., 2011), which has been linked to having a buffering effect from the effects of negative perceptions of ageing (Wurm & Benyamini, 2014). These links, however, are speculative and require extensive further examination.

Our study helps build our understanding of the role of stereotype threat in our extended Stereotype Embodiment Model. Our findings coupled with those of Söllner et al. (2021) suggest that perceptions of ageing, self-perceptions of ageing and regulatory focus are connected and offer a potential mechanism through which holding more negative perceptions of ageing may act in the lives of older adults.

7.2 Discussion of Chapter 5: 'Just Keep Going' Older Adults Views and Perceptions of Ageing

In our second study older adults were interviewed about their perceptions of ageing. The results show that older adult's views on ageing are complex. The themes Ageing as Decline, Challenging Ageing, The Interconnectedness of Ageing and

Feeling Free, show that while participants often defined ageing negatively, they did not see themselves as passive in this process. This helps build out the behavioural and psychological pathways in the Stereotype Embodiment Model. Participants viewed some declines as inevitable which could discourage them from action, a clear illustration of how more negative perceptions of ageing can lead to disengagement from certain health behaviours.

In Kornadt et al. (2020) the authors suggest that an unexplored area within the research on views on ageing, may be family dynamics. This is certainly present in the qualitative data, as reminders of ageing were often related to family dynamics such as participants mentioning that having grandchildren meant they had entered the next stage of life. These family dynamic markers could interact with someone's self-perceptions of ageing and self-classification. They offer a potential source of positive perceptions of ageing as well, as mentioned in the paper.

Older adults often do not self-identify as old (Ayalon et al., 2014). This is consistent with our own findings where older adults in our study did not self-describe as old but did admit that this may not be consistent with how others see them or objective markers. Barber describes this as a form of self-protection as older adults who identify as having a younger subjective age have better health outcomes (Kotter-Grühn et al., 2009).

In the same review, Barber (2017) discusses that changes in circumstance, ability or experience may push older adults to wrestle with whether the label old applies to them. This is consistent with our findings in the qualitative interviews. Participants cited external factors pushing the idea they were old on them. This came in the form of physical ability, birthdays, or external judgements from others. While

how other's see them may be a form of reputational threat, these milestones may add to an individual's worries that they are old also contributing to self-concept threat. This adds evidence to the theory that self-concept threat is what older adults are experiencing. The older adults in our study had low group identification (very few considered themselves old) but spoke about being reminded that this might not be the case and having to wonder, were they old? This pressure to reconcile not thinking they are old with other factors, is consistent with self-concept threat, where members of a group are primarily concerned with whether they will confirm to themselves they are members of the stereotyped group.

> *''So for me a lack of energy reminds me that I'm getting old… I just don't want to think I'm old but my lack of energy tells me yes you are''*
>
> *Margaret*

The opposing side of this grappling with identifying as old, is accepting it may come with benefits. Within the broader literature older-old adults aged 75+ seem to suffer less stereotype threat and this may be because they are more likely to identify with the "old" label (Eich et al., 2014; Hess et al., 2009; Kang & Chasteen, 2009). It is unclear how this relates to negative perceptions of ageing as there is no evidence that holding negative views of ageing is less harmful to older-old adults. At least one study has found that older- old adults suffer more negative consequences day to day from holding more negative stereotypes of ageing (Bodner et al., 2021). In this study older-old adults were defined as over one standard deviation above the samples mean age, in this case they were over 81.38 years old. This cohort had the most negative effects (in the case of this study, depressive symptoms) from holding negative perceptions of ageing the previous day.

Negative changes in self-perceptions of ageing could lead to increased risk of mortality (Sargent-Cox et al., 2014). These changes to self-perceptions of ageing and mortality could be a cycle of self-fulfilling prophecy where any negative changes are attributed to ageing, resulting in more negative views of ageing. In our interviews, the individuals most positive about ageing were able to point to perceived benefits and rebut stereotypes. This allowed them to describe ageing very positively, with some saying it was the best stage of their life. Further research is needed on perceptions of ageing and the role it plays across the range the older part of life, whether older-old adults have the same experiences and outcomes as younger-old adults.

Older adults' perceptions of ageing in our interviews were partly shaped by their social interactions. There has been several cross cultural studies looking at perceptions of ageing (B. Levy & Langer, 1994). Our interviews and focus groups reflect that perceptions of ageing and attitudes to ageing can be influenced by those around you. Having a supportive social circle meant that older adults were encouraged by peers to adopt new strategies, to reject certain limitations. What individuals were willing to accept or see as normal declines were challenged by other older adults. These cultural impacts on perceptions of ageing are important and deserve more attention from research.

One issue that was touched on in these interviews was how infrastructure influenced individual's experiences of ageing. Older adults who could not drive, in areas where there was poor public transport, oftentimes were more isolated and associated this isolation with ageing. In contrast, older adults living in more urban areas did not face this limitation. This demonstrates how the Stereotype Embodiment Model process of internalisation may interact with social structures whereby due to social limitations such as poor transport, stereotypes about old age such as being

lonelier or more isolated become harder to overcome or ignore. An older adult may not be able to overcome their own negative stereotypes potentially making them more salient, therefore speeding the internalisation process. A society with more negative perceptions of ageing may not invest to help older adults access services more easily because they feel these stereotypes are unavoidable. Using theories related to coping strategies may be beneficial in addressing negative beliefs about ageing as several participants expressed the desire to speak about the negatives associated with ageing but were dissuaded from doing so, which did not change their beliefs or address the negatives. In a review of measures of views of ageing Klusmann et al. (2020) calls for views on ageing to take into account an ecosystem perspective. They suggest that this ecosystem perspective should take into account how society views older adults, how they should be treated, and how they should behave.

A finding from B. Levy, Chung, et al. (2019) further examines coping strategies in relation to perceptions of ageing. B. Levy, Chung, et al. (2019) examined three waves (4 years) of the National Health and Resilience in Veterans Study which uses a nationally representative sample. The authors found that more negative perceptions of ageing at the beginning of the study predicted increased risk of onset of psychiatric conditions. This has previously been found in other samples but what is novel about this research was the inclusion of a measurement of coping strategies in individuals. The results suggest that those individuals who scored as having more active coping strategies to difficulties were less likely to develop psychiatric conditions, and this moderated the relationship between perceptions of ageing and psychiatric conditions. This moderation finding was that those with more negative perceptions of ageing were more likely to develop psychiatric diagnoses, however having more active coping strategies could partially ameliorate this relationship. This

is further evidence of the importance of further examining coping strategies and perceptions of ageing together.

These difference in experiences of ageing could also happen between social classes. One study found that positive perceptions of ageing could be protective for older adults facing precarity (Craciun et al., 2017). This suggests that older adults not in precarious circumstances may not need as positive perceptions of ageing to have similar outcomes. It further highlights the importance of perceptions of ageing for intervention.

Our qualitative research helps us understand what might make perceptions of ageing interventions more effective. The participants in our focus groups engaged in several stereotyping behaviours when it came to ageing. These involved assumptions of memory loss and physical ailments. It was also clear that while other group members sometimes combatted negative views or limitations this was not always the case, with some stereotypes considered more acceptable than others.

A recent review of interventions to improve perceptions of ageing suggests it is possible to improve perceptions of ageing, and the outcomes associated with them (R. L. Knight et al., 2021). This review found interventions were effective in improving self-perceptions of ageing, views on ageing and outcomes including physical activity, physical function and levels of depression. However, results were not clear cut due to risk of bias in seven out of ten included studies and inconsistent operationalisation of perceptions of ageing. There was no significant change in subjective well-being measures found in any of the studies. It is also not clear how long these interventions may last as long term follow ups of 7 years found no measurable differences. The types of interventions were limited to short term

psychoeducational and implicit training often used to supplement exercise-based interventions. Our interviews with older adults suggest that while negative stereotypes need dispelling there are some unavoidable changes with ageing. Therefore an acceptance-based intervention similar to acceptance-based therapy which focuses on accepting changes and focusing on value guided actions could also prove beneficial to older adults (Hayes et al., 2006) Some research has already shown the benefits of this with older adults (Chojak, 2022; Sadler, 2022) and even combining acceptance commitment therapy with selection optimisation and compensation strategies for chronic pain (Alonso-Fernández et al., 2016).

7.3 Discussion of Chapter 6: testing stereotype threat mechanisms in a sustained attention task

The final study in this thesis examined older adults' performance in a test of sustained attention under stereotype threat and as a function of the reward structure of the task. This was to further examine how the motivation and executive interference explanations work in a test of sustained attention. The regulatory fit hypothesis of stereotype threat suggests that experiencing stereotype threat induces a prevention focus in an individual and that when this happens when the individual is completing a task with a gains-based structure they experience performance interference due to a lack of regulatory fit. Likewise, if the individual has a prevention focus due to being experiencing stereotype threat they would perform better in a task where the rewards structure was loss avoidance based structure (Higgins, 2000; Seibt & Förster, 2004). The alternative theory of executive interference suggests that when experiencing stereotype threat, individuals experience a strain on their executive functioning and there is a uniform impact on performance regardless of whether a task has a gains-based or loss-avoidance-based structure (Shapiro & Neuberg, 2007). For the

regulatory fit hypothesis, we would expect to see decreases in performance only where there was a lack of fit between participant regulatory focus and task structure, while for the executive interference explanation we would expect to only see decreases in performance in the stereotype threat condition regardless of task reward structure.

The sustained attention to response task (SART) allowed us to see clear differences in motivational approach such as changes in responses times or differences in post error slowing would show. This task was chosen because multiple stereotype threat mechanisms should be observable if they are at work, with motivational changes accounting for some of the differences in performance but mind wandering accounting for other differences in performance. The study only demonstrated differences in performance due to stereotype threat manipulation and not regulatory fit manipulation.

Although no evidence for the regulatory fit hypothesis was found this does not mean that it is not at play in other measures of stereotype threat. The lack of observable difference in strategy in participants in either the gains-based or loss-avoidance-based structured conditions may mean that the SART is not a suitable instrument for measuring changes in motivation. This could be due to the instructions highlighting accuracy or that more consistent feedback is needed throughout testing to ensure that the reward structure is salient to participants, which may be necessary to observe regulatory fit effects. This study does provide evidence for a separate executive interference mechanism at play during stereotype threat in older adults.

7.4 Updates to our model

As we have gained more evidence related to the mechanisms underlying stereotype threat from the research of others and the research carried out in Chapters

4 and 6, we have decided to update our extended model discussed in Chapter 2. Figure 4 below is an updated version of this extended Stereotype Embodiment Model.

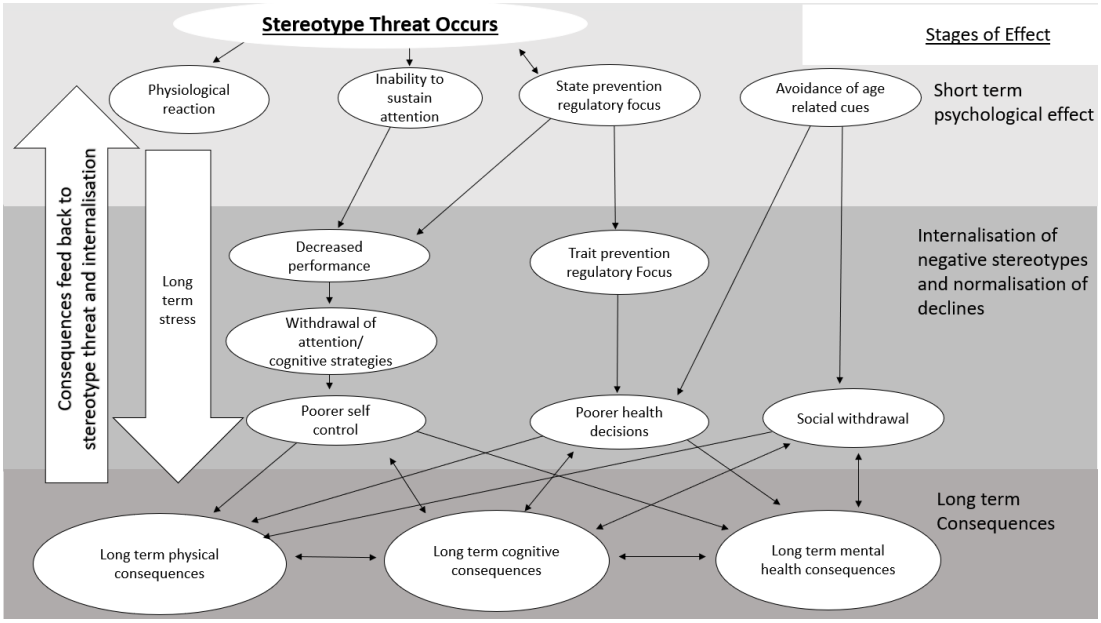


Figure 4. Updated Stereotype Embodiment Model

Originally, we suggested the effects of stereotype threat led only to decreased performance and that decreased performance had further knock-on effects. In Chapter 4 we connected trait regulatory focus and negative perceptions of ageing and we further suggest that one possible explanation is that repeated stereotype threat and adoption of a prevention focus could lead to a change in trait regulatory focus. This suggests there may be another path through which stereotype threat causes long term declines. Depending on further exploration of the area, it could be that short term state changes in regulatory focus become long term changes in trait regulatory focuses which may lead to the consequences of the withdrawal of attention/ cognitive strategies box in the model. This is consistent with some existing research on personality change but has not yet been found with relation to regulatory focus (Baumert et al., 2017). Chapter 4 demonstrated that older adults with more negative

perceptions of ageing have a higher state prevention focus compared to promotion focus.

The behavioural pathway in the Stereotype Embodiment Model is well supported by evidence showing that older adults with more negative perceptions of ageing are less likely to engage in certain health behaviours (Huy et al., 2010; B. Levy & Myers, 2004). The connection between regulatory focus and health outcomes is not clear however, with a prevention focus predicting a higher rate of vaccination in one study (Leder et al., 2015). This seems to contradict the idea that negative perceptions of ageing could induce a prevention focus and this could result in poorer health outcomes but this research was not with older adults and age could be a factor in this potential relationship. Poorer health choices have previously been linked to a prevention focus (Gomez et al., 2013). Research looking at Regulatory Focus and Self Determination theories has found connections between a promotion focus and physical activity through intrinsic motivation, suggesting those with a greater promotion focus engaged in more physical activity (Laroche et al., 2019). Self-determination theory is a theory of physical activity which breaks motivations into intrinsic (where an individual feels the activity itself is the reward), extrinsic (where the reward comes afterwards as a result of the activity) and amotivation (an individual expects no positive outcomes from the physical activity) (Laroche et al., 2019; Miller et al., 1988). This research demonstrates the connections between health behaviours and regulatory focus is not straightforward and further examination is warranted. This includes the need to further explore how perceptions of ageing and these constructs interact.

As seen in research by von Hippel et al. (2019) where individual's disengage from threatened domains, avoidance can happen in older adults in response to exposure to negative stereotypes of ageing. This may mean an avoidance of broader

age-related cues which may fit more correctly under a reaction to stereotype threat (Swift et al., 2017). This domain avoidance remains under researched in older adults though and further investigation is necessary to investigate effects outside of the workplace.

In a study on the effects of stereotype threat on recall (Barber et al., 2019) showed that stereotype threat may lead to poorer recall of positive memories. Barber et al. (2019) showed that under stereotype threat conditions, older adults' memory for negative events was unaffected but participants memory for positive events was impaired. Barber et al. (2019) suggests plausible explanations which use the executive interference and regulatory fit hypotheses of stereotype threat. However, it is worth considering that if the impairment in memory for positive events is due to regulatory focus, then trait regulatory focus may also be connected to more of a negativity bias for older adults, predicting long term negative mental health consequences. Although we have not included it in our updated model, it is a potential area for future study.

There may be more multi-directional interactions in our model. Gaillard et al. (2011) suggests that older adults could be more sensitive to age-based stereotype threat because of their increased trait prevention focus. Gaillard et al. (2011) found that older adults under stereotype threat were most worried about confirming negative stereotypes under a prevention focus, suggesting a feedback loop between susceptibility to stereotype threat and regulatory focus. Although Gaillard et al. (2011)'s study also found evidence against a stereotype fit effect for performance, with those participants in the negative stereotype and prevention focus conditions performing worst. This can in part be explained by seeing the regulatory fit hypothesis as incomplete and working in tandem with the executive interference hypothesis.

In Chapter 6 while attempting to clarify the mechanisms of stereotype threat, we found evidence for the executive interference hypothesis but not the regulatory fit hypothesis. The regulatory fit hypothesis has an abundance of evidence (Barber, 2017), and it may be that stereotype threat works through multiple independent mechanisms. The impact on sustained attention is supported by studies which have found stereotype threat affects attention such as performance on controlled tasks (Mazerolle et al., 2012), tests of self-control (Alquist et al., 2019) and increased mind wandering (Jordano & Touron, 2017).

7.4.1 Future research: testable theories under our model

Further research could be done to investigate under researched areas of our updated model. There is more research to be done to better understand the physiological pathway. Although some research has found biological markers associated with negative perceptions of ageing it is unclear if there is any physiological effect of exposure to negative stereotypes in the short term in older adults. In Ryan (2019)'s Master's thesis they found no effect on salivary cortisol levels by stereotype threat manipulation in an experiment which included a memory test. This research, however, used exposure to an article which contained negative facts about older adults, which may not be the most impactful form of stereotype threat manipulation (Lamont et al., 2015; Vailati Riboni & Pagnini, 2022). Although the literature on long term biological impacts is growing, it remains to be seen if stereotype threat has any observable short term biological effects which may be leading to long term consequences.

Another area to explore is potential avoidance of situations where older adults are subjected to negative stereotypes. Older adults who have more negative view of

ageing experience more loneliness (Pikhartova et al., 2015; D. A. Robertson & Kenny, 2016; Schwartz et al., 2021) but the mechanism for this is not understood. Two potential pathways may explain this. The first is that as older adults with more negative views experience more declines in sensory abilities, they avoid or are unable to engage in social environments as freely. Secondly, older adults with more negative views of ageing could be more susceptible to stereotype threat which they may be exposed to more in social situations.

There is still a need to investigate the change in an individual's psychology that leads to behavioural changes. The research on behavioural changes does not provide a clear answer for this yet. Our research in Chapter 4 provides some insight into a potential mechanism but it needs further research.

7.5 General Discussion

The results of these studies improve our understanding of the Stereotype Embodiment Model and Stereotype Threat in older adults. Taken together we can see that older adults' perceptions of ageing are linked to their trait regulatory focus. Although we did not find evidence of the regulatory fit explanation, there is plenty of evidence showing it occurs, although it is likely not the whole explanation for stereotype threat in older adults (for a review see Barber, 2017). If regular changes in state regulatory focus can lead to changes in trait regulatory focus this could mean that this connection links the long-term experience of stereotype threat with negative perceptions of ageing. However further research is needed to test this. This possible link builds on Levy's Stereotype Embodiment Theory, adding to the psychological pathway a potential mechanism for changes suggesting that internalisation of negative stereotypes is not the only process taking place. Chapter 5 provides insight into the

experiences of older Irish adults and provides understanding on how social interactions can influence perceptions of ageing. It also lets us see how older adults struggle with defining old, especially in relation to themselves. The framing used by older adults also gives us some direction for future interventions to add elements of interventions for coping skills. Finally, Chapter 6 provides evidence for attentional interference as a consequence of stereotype threat in older adults. This is important as executive interference could play a role in understanding why older adults performance in tests of cognitive functioning are worse under stereotype threat (Follenfant & Atzeni, 2020; Fresson et al., 2017). Although we found no evidence for a motivational explanation of stereotype threat in older adults in this study that may be due to the test not being suitable for regulatory focus manipulation. There was also no evidence found for perceptions of ageing as a moderator of stereotype threat effect but this may be due to the sample size being underpowered to detect this effect or perceptions of ageing not being related to the mechanism that causes executive interference in older adults under stereotype threat.

Older adults' experiences of and views of ageing vary but are consistent with a Stereotype Embodiment Model. The qualitative results could also inform future interventions as they point to particular issues to be addressed. Firstly, older adults framing of ageing as being defined by declines and losses. Talking to older adults about the positive aspects of ageing and the potential gains while not denying losses may help them improve their perceptions of ageing. Secondly, older adults in our study showed they were willing to challenge these perceived declines and that social support helped them to do so. Participants discussed ways to overcome the challenges of ageing with each other, seeking support and solutions. And thirdly, by not denying

older adults a place to work on accepting ageing as a part of life rather than avoiding talking about it or denying it is taking place.

7.6 Strengths and limitations

An issue that is not discussed at length in this thesis is the social impact of holding negative views of ageing. Young and middle-aged adults who hold negative views of ageing are more likely to be ageist and involved in discrimination against older adults. Reviews have found issues of ageism in work (Harris et al., 2018) and healthcare (São José et al., 2019), including mental healthcare (Kessler & Blachetta, 2020). Improving perceptions of ageing early through interventions could have the knock-on effect of reducing ageism against older adults in broader society and these issues should not be overlooked.

Prolific, the online recruitment service used to recruit participants for studies 1 and 3, has research backing its use as a reliable source of participants (Palan & Schitter, 2018; Peer et al., 2017) and allowed for the fast recruitment of participants online and for collection of a more random sample of older adults.. Prolific is not without limitations, however. A limitation of this thesis is the use of a single source of research subjects which is not independently verified. Participants are not verified in terms of their age so although participants were required to be over 60 and over 65 years old respectively, they do not have to verify this. Comparison to larger populations for the measures used suggests that our participants were the age they claimed or coincidentally managed to create similar results.

Online testing of stereotype threat in older adults could be inherently difficult due to technology being a typically stereotyped domain. Older adults are often considered to be less technologically able than younger adults and research. (Mariano,

Marques, Ramos, Gerardo, et al., 2021) found that older adults who are more likely to experience technology related stereotype threat are less likely to use technology meaning our sample may have been self-selecting. It is not clear if an older adult less likely to experience stereotype threat in one domain, is less likely to experience stereotype threat in others. This is worth further investigation as this could mean that older adults who use technology have more positive perceptions of ageing and are less susceptible to at least some types of stereotype threat. The same research from Mariano, Marques, Ramos, & de Vries (2021) found that cognitive function mediated the relationship between perceptions of ageing and technology use so more positive perceptions of ageing were associated with higher cognitive functioning, which was associated with higher levels of computer use.

7.7 Future directions

Future research could ensure better tools for measuring perceptions of ageing and trait regulatory focus in older adults. The regulatory focus questionnaire (Lockwood et al., 2002) is not designed for older adults and although the adapted measure we used retained strong internal validity, there were limitations. Trait regulatory focus is understudied in older adults outside consumer behaviours and health psychology could benefit from an understanding of how trait regulatory focus exists in older adults. Trait regulatory focus may influence what health interventions older adults are most likely to engage in and what type of messaging is most effective.

7.8 Conclusion

This thesis builds on previous theories and literature in the areas of negative perceptions of ageing and stereotype threat. We have provided new empirical

evidence which contributes to these and hopefully helps provide some direction for future research and interventions. Our first study marks the beginning of connections between perceptions of ageing and stereotype threat research in older adults. Our second study illustrates how complicated ageing and growing older is to older adults and the richness of their experience of this. Our final study provides evidence for mechanisms at play in stereotype threat in older adults hopefully helping clarify what happens to older adults exposed to negative stereotypes, demonstrating how harmful this can be. The areas of perceptions of ageing and stereotype threat still have a way to go in being understood but these contributions move us in the right direction while not neglecting the voices and experiences of older adults.

Appendices

Appendix 1: Modified regulatory focus questionnaire

Modified version of the Trait Regulatory Focus Questionnaire

Trait Regulatory Focus scale

Promotion Prevention Scale

Using the scale below, please write the appropriate number in the Blank beside each item

1 2 3 4 5 6 7 8 9

Not at all true of me — Very true of me

1._____In general, I am focused on preventing negative events in my life.

2._____ I am anxious that I will fall short of my responsibilities and obligations.

3._____I frequently imagine how I will achieve my hopes and aspirations.

4._____I often think about the person I am afraid I might become in the future.

5._____I often think about the person I would ideally like to be in the future.

6._____I typically focus on the success I hope to achieve in the future.

7._____I often worry that I will fail to accomplish my goals.

8._____I often think about how I will achieve success.

9._____I often imagine myself experiencing bad things that I fear might happen to me.

10.____I frequently think about how I can prevent failures in my life.

11.____I am more oriented toward preventing losses than I am toward achieving gains.

12.____My major goal right now is to achieve my ambitions.

13.____My major goal right now is to avoid becoming an failure.

14._____I see myself as someone who is primarily striving to reach my "ideal self" to fulfill my hopes, wishes, and aspirations.

15._____I see myself as someone who is primarily striving to become the self I

"ought" to be to fulfill my duties, responsibilities, and obligations.

16._____In general, I am focused on achieving positive outcomes in my life.

17._____I often imagine myself experiencing good things that I hope will happen to me.

18._____Overall, I am more oriented toward achieving success than preventing failure.

Appendix 2. Correlations for study 1

Correlation Table

Correlations

		Regulatory focus	B-APQ total	Polyph armacy	CFQ	PAS	NAS	Age years	Gender	Education	Marital status
Regulatory focus	Pearson Correlation	1	-.699**	-.044	-.242**	.511**	-.251**	-.077	.009	.019	.021
	Sig. (2-tailed)		<.001	.582	.002	<.001	.001	.316	.907	.801	.780
	N	173	173	160	168	173	173	173	173	173	172
B-APQ	Pearson Correlation	-.699**	1	.221**	337**	-.495**	.303**	.164*	-.064	.014	-.004
	Sig. (2-tailed)	<.001		.003	<.001	<.001	<.001	.020	.367	.844	.953
	N	173	200	185	193	200	200	200	200	200	197
Polypharmacy	Pearson Correlation	-.044	.221**	1	.156*	-.110	-.032	.152*	-.066	-.058	.166*
	Sig. (2-tailed)	.582	.003		.037	.135	.665	.038	.376	.434	.025
	N	160	185	185	179	185	185	185	185	185	182
Cognitive failure questionnaire	Pearson Correlation	.242**	-.337**	-.156*	1	.291**	-.187**	.033	-.065	-.041	-.089
	Sig. (2-tailed)	.002	<.001	.037		<.001	.009	.650	.373	.570	.220
	N	168	193	179	193	193	193	193	193	193	190
PAS	Pearson Correlation	.511**	-.495**	-.110	-.291**	1	-.129	-.093	-.020	.062	-.101
	Sig. (2-tailed)	<.001	<.001	.135	<.001		.068	.190	.777	.381	.156
	N	173	200	185	193	200	200	200	200	200	197
NAS	Pearson Correlation	-.251**	.303**	-.032	.187**	-.129	1	.079	-.080	.028	-.071
	Sig. (2-tailed)	.001	<.001	.665	.009	.068		.266	.261	.696	.323
	N	173	200	185	193	200	200	200	200	200	197
Age (years)	Pearson Correlation	-.077	.164*	.152*	-.033	-.093	.079	1	.039	-.045	-.055
	Sig. (2-tailed)	.316	.020	.038	.650	.190	.266		.586	.526	.442
	N	173	200	185	193	200	200	200	200	200	197
Gender	Pearson Correlation	.009	-.064	-.066	.065	-.020	-.080	.039	1	-.129	.174*
	Sig. (2-tailed)	.907	.367	.376	.373	.777	.261	.586		.068	.014
	N	173	200	185	193	200	200	200	200	200	197
Education	Pearson Correlation	.019	.014	-.058	.041	.062	.028	-.045	-.129	1	-.001

	Sig. (2-tailed)	.801	.844	.434	.570	.381	.696	.526	.068	.985
	N	173	200	185	193	200	200	200	200	197
Marital Status	Pearson Correlation	.021	-.004	.166*	.089	-.101	-.071	-.055	.174*	-.001	1
	Sig. (2-tailed)	.780	.953	.025	.220	.156	.323	.442	.014	.985	
	N	172	197	182	190	197	197	197	197	197	

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Appendix 3. Interview Schedule

In your own words how would you define ageing?

Would you say that thing that the words you're using to describe ageing, are they more positive or negative in your view?

At what age did you consider yourself as being old, if you do. Or what makes someone old?

How do you think others see you?

What are some of the positives of ageing?

What are some of the negatives?

Any changes you've had to make?

Did age force you to do something or stop doing something?

Is growing old what you expected?

Did you anticipate the changes of ageing?

Did anything happen that you didn't expect or that you weren't prepared for?

Has anyone else found they've lost interest in things as they've grown older or their interests have changed?

So, is there things you do to prevent things associated with age happening? Or are you working towards goals?

you saw your parents ageing, do you think you've aged the same way or better or worse?

How do you think Irish society feels about ageing?

Do you think that people around the world age the same?

Are there any other positives you've experienced?

Would you say, your relationships with sort of friends and family have changed as you've gotten older or as a result of getting older?

What advice would you have for someone about to retire?

Has anyone any general points from the discussion that came up that they wanted to say?

Appendix 4. Regulatory Focus Prompts

Loss avoidance structure

Upon completion of this study you will receive an **additional reward of up to £1** based on your performance in the next task. For every **incorrect answer you will lose a portion of the reward,** this is equally split between the go and no-go trials (3 and other numbers). Your final additional reward will be **£1 minus the errors you made.**
Please give equal attention to speed and accuracy.

Gains based structure

Upon completion of this study you will receive an **additional reward of up to £1** based on your performance in the next task. **For every correct answer you will gain a portion of the reward**, this is equally split between the go and no-go trials (3 and other numbers). Your final additional reward will be based on how many correct answers you give.
Please give equal attention to speed and accuracy.

Appendix 5. Descriptive statistics from study 3

Stereotype conditions

		Pre commission errors	Post commission errors	Pre omission errors	Post omission errors	Pre reaction times	Post reaction time	Pre-post error slowing	Post-post error slowing
No Stereotype threat	Mean	4.98	3.97	2.09	1.26	610.17	610.44	143.32	97.72
	N	95.00	95.00	95.00	95.00	95.00	95.00	89.00	78.00
	Std. Deviation	4.20	3.62	3.89	3.00	103.84	102.72	165.18	180.61
Stereotype threat	Mean	5.38	5.22	2.31	2.14	590.08	576.69	85.76	63.07
	N	95.00	95.00	95.00	95.00	95.00	92.00	92.00	87.00
	Std. Deviation	3.84	4.15	3.52	3.70	88.62	97.55	142.81	135.84
Total	Mean	5.18	4.59	2.20	1.70	600.13	593.83	114.07	79.45
	N	190.00	190.00	190.00	190.00	190.00	187.00	181.00	165.00
	Std. Deviation	4.02	3.93	3.70	3.39	96.80	101.36	156.47	159.04

Task Structure

		Pre-commission errors	Post-commission errors	Pre-omission errors	Post omission errors	Pre-reaction time	Post-reaction time	Pre-Post error slowing	Post-Post error slowing
Gains based structure	Mean	5.40	4.83	2.14	1.51	598.74	587.49	107.11	70.51
	N	93.00	93.00	93.00	93.00	93.00	91.00	88.00	80.00
	Std. Deviation	4.47	4.40	3.64	2.88	93.52	101.54	159.34	144.87
Loss avoidance structure	Mean	4.97	4.37	2.26	1.89	601.46	599.85	120.65	87.86
	N	97.00	97.00	97.00	97.00	97.00	96.00	93.00	85.00
	Std. Deviation	3.54	3.43	3.78	3.82	100.32	101.35	154.28	171.74
Total	Mean	5.18	4.59	2.20	1.70	600.13	593.83	114.07	79.45
	N	190.00	190.00	190.00	190.00	190.00	187.00	181.00	165.00
	Std. Deviation	4.02	3.93	3.70	3.39	96.80	101.36	156.47	159.04

References

Abdou, C. M., Fingerhut, A. W., Jackson, J. S., & Wheaton, F. (2016). Healthcare Stereotype Threat in Older Adults in the Health and Retirement Study. *American Journal of Preventive Medicine*, *50*(2), 191–198. https://doi.org/10.1016/j.amepre.2015.07.034

Allen, J. O. (2016). Ageism as a Risk Factor for Chronic Disease. *The Gerontologist*, *56*(4), 610–614. https://doi.org/10.1093/geront/gnu158

Alonso Debreczeni, F., & Bailey, P. E. (2021). A Systematic Review and Meta-Analysis of Subjective Age and the Association With Cognition, Subjective Well-Being, and Depression. *The Journals of Gerontology: Series B*, *76*(3), 471–482. https://doi.org/10.1093/geronb/gbaa069

Alonso-Fernández, M., López-López, A., Losada, A., González, J. L., & Wetherell, J. L. (2016). Acceptance and Commitment Therapy and Selective Optimization with Compensation for Institutionalized Older People with Chronic Pain. *Pain Medicine*, *17*(2), 264–277. https://doi.org/10.1111/pme.12885

Alquist, J. L., Price, M. M., Hancock, D., Talley, A. E., & Cukrowicz, K. (2019). Exposure to negative stereotypes impairs older adults' self-control. *Self and Identity*, *18*(2), 217–226. https://doi.org/10.1080/15298868.2018.1437069

Andrews, R. M., Tan, E. J., Varma, V. R., Rebok, G. W., Romani, W. A., Seeman, T. E., Gruenewald, T. L., Tanner, E. K., & Carlson, M. C. (2017). Positive aging expectations are associated with physical activity among urban-dwelling older adults. *The Gerontologist*, *57*(suppl_2), S178–S186.

Apriceno, M., & Levy, S. (2023). Systematic Review and Meta-Analyses of Effective Programs for Reducing Ageism Toward Older Adults. *Journal of Applied Gerontology*, *42*(6), 1356–1375. https://doi.org/10.1177/07334648231165266

Armstrong, B., Gallant, S. N., Li, L., Patel, K., & Wong, B. I. (2017). Stereotype Threat Effects on Older Adults' Episodic and Working Memory: A Meta-Analysis. *The Gerontologist*, *57*(suppl_2), S193–S205. https://doi.org/10.1093/geront/gnx056

Avorn, J., & Langer, E. (1982). Induced Disability in Nursing Home Patients: A Controlled Trial. *Journal of the American Geriatrics Society*, *30*(6), 397–400. https://doi.org/10.1111/j.1532-5415.1982.tb02839.x

Avraham, R., Simon-Tuval, T., & Van Dijk, D. (2020). The effect of regulatory focus and time preference on the dual process of physical activity: A cross-sectional study among nurses. *Journal of Advanced Nursing*, *76*(6), 1404–1415. https://doi.org/10.1111/jan.14348

Ayalon, L., Doron, I., Bodner, E., & Inbar, N. (2014). Macro-and micro-level predictors of age categorization: Results from the European Social Survey. *European Journal of Ageing*, *11*, 5–18.

Baas, M., De Dreu, C. K. W., & Nijstad, B. A. (2008). A meta-analysis of 25 years of mood-creativity research: Hedonic tone, activation, or regulatory focus? *Psychological Bulletin*, *134*(6), 779–806. https://doi.org/10.1037/a0012815

Baddeley, A. D. (2002). Is working memory still working? *European Psychologist*, *7*(2), 85–97. https://doi.org/10.1027//1016-9040.7.2.85

Bai, X. (2014). Images of Ageing in Society: A Literature Review. *Journal of Population Ageing*, *7*(3), 231–253. https://doi.org/10.1007/s12062-014-9103-x

Barber, S. J. (2017). An Examination of Age-Based Stereotype Threat About Cognitive Decline: Implications for Stereotype-Threat Research and Theory Development. *Perspectives on Psychological Science*, *12*(1), 62–90. https://doi.org/10.1177/1745691616656345

Barber, S. J. (2020). The Applied Implications of Age-Based Stereotype Threat for Older Adults. *Journal of Applied Research in Memory and Cognition*, *9*(3), 274–285. https://doi.org/10.1016/j.jarmac.2020.05.002

Barber, S. J., Ching Tan, S., Seliger, J., & Niblett, S. (2017). INTERVENING TO REDUCE THE NEGATIVE IMPACT OF STEREOTYPE THREAT ON OLDER ADULTS' MEMORY PERFORMANCE. *Innovation in Aging*, *1*(Suppl 1), 639. https://doi.org/10.1093/geroni/igx004.2254

Barber, S. J., Hamel, K., Ketcham, C., Lui, K., & Taylor-Ketcham, N. (2020). The effects of stereotype threat on older adults' walking performance as a function of task difficulty and resource evaluations. *Psychology and Aging*, *35*(2), 250–266. https://doi.org/10.1037/pag0000440

Barber, S. J., & Lee, S. R. (2015). Stereotype Threat Lowers Older Adults' Self-Reported Hearing Abilities. *Gerontology*, *62*(1), 81–85. https://doi.org/10.1159/000439349

Barber, S. J., & Mather, M. (2013). Stereotype Threat Can Both Enhance and Impair Older Adults' Memory. *Psychological Science*, 0956797613497023. https://doi.org/10.1177/0956797613497023

Barber, S. J., & Mather, M. (2014, June 1). *Stereotype Threat in Older Adults*. The Oxford Handbook of Emotion, Social Cognition, and Problem Solving in Adulthood. https://doi.org/10.1093/oxfordhb/9780199899463.013.008

Barber, S. J., Mather, M., & Gatz, M. (2015). How Stereotype Threat Affects Healthy Older Adults' Performance on Clinical Assessments of Cognitive Decline: The Key Role of Regulatory Fit. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences*, gbv009. https://doi.org/10.1093/geronb/gbv009

Barber, S. J., Seliger, J., Yeh, N., & Tan, S. C. (2019). Stereotype Threat Reduces the Positivity of Older Adults' Recall. *The Journals of Gerontology: Series B*, *74*(4), 585–594. https://doi.org/10.1093/geronb/gby026

Baumert, A., Schmitt, M., Perugini, M., Johnson, W., Blum, G., Borkenau, P., Costantini, G., Denissen, J. J. A., Fleeson, W., Grafton, B., Jayawickreme, E., Kurzius, E., MacLeod, C., Miller, L. C., Read, S. J., Roberts, B., Robinson, M. D., Wood, D., & Wrzus, C. (2017). Integrating Personality Structure, Personality Process, and Personality Development. *European Journal of Personality*, *31*(5), 503–528. https://doi.org/10.1002/per.2115

Beilock, S. L., & Gray, R. (2012). Why Do Athletes Choke Under Pressure? In G. Tenenbaum & R. C. Eklund (Eds.), *Handbook of Sport Psychology* (pp. 425–444). John Wiley & Sons, Inc. http://doi.wiley.com/10.1002/9781118270011.ch19

Beilock, S. L., Jellison, W. A., Rydell, R. J., McConnell, A. R., & Carr, T. H. (2006). On the Causal Mechanisms of Stereotype Threat: Can Skills That Don't Rely Heavily on Working Memory Still Be Threatened? *Personality and Social Psychology Bulletin*, *32*(8), 1059–1071. https://doi.org/10.1177/0146167206288489

Beilock, S. L., Rydell, R. J., & McConnell, A. R. (2007). Stereotype threat and working memory: Mechanisms, alleviation, and spillover. *Journal of Experimental Psychology: General*, *136*(2), 256–276. https://doi.org/10.1037/0096-3445.136.2.256

Bellingtier, J. A., & Neupert, S. D. (2016). Negative Aging Attitudes Predict Greater Reactivity to Daily Stressors in Older Adults. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences*, gbw086. https://doi.org/10.1093/geronb/gbw086

Bellingtier, J. A., & Neupert, S. D. (2017). Aging Attitudes and Daily Awareness of Age-Related Change Interact to Predict Negative Affect. *The Gerontologist*, *57*(suppl_2), S187–S192. https://doi.org/10.1093/geront/gnx055

Bellingtier, J. A., & Neupert, S. D. (2020). Feeling Young and in Control: Daily Control Beliefs Are Associated With Younger Subjective Ages. *The Journals of Gerontology: Series B*, *75*(5), e13–e17. https://doi.org/10.1093/geronb/gbz015

Berezowska, A., Fischer, A. R. H., & Trijp, H. C. M. van. (2018). The interplay between regulatory focus and temporal distance in the health context. *British Journal of Health Psychology*, *23*(1), 22–37. https://doi.org/10.1111/bjhp.12272

Berger, R. (2015). Now I see it, now I don't: Researcher's position and reflexivity in qualitative research. *Qualitative Research*, *15*(2), 219–234. https://doi.org/10.1177/1468794112468475

Bergland, A., Nicolaisen, M., & Thorsen, K. (2014). Predictors of subjective age in people aged 40–79 years: A five-year follow-up study. The impact of mastery, mental and physical health. *Aging & Mental Health*, *18*(5), 653–661. https://doi.org/10.1080/13607863.2013.869545

Berman, R. L., & Iris, M. A. (1998). Approaches to self-care in late life. *Qualitative Health Research*, *8*(2), 224–236. https://doi.org/10.1177/104973239800800206

Berton-Scarlet, B. (2019). *Is a Positive Attitude Towards Ageing Associated with Diet in Middle-aged Cantabrians?* [Thesis, University of Otago]. https://ourarchive.otago.ac.nz/handle/10523/9122

Beyer, A.-K., Wolff, J. K., Freiberger, E., & Wurm, S. (2019). Are self-perceptions of ageing modifiable? Examination of an exercise programme with vs. without a self-perceptions of ageing-intervention for older adults. *Psychology & Health*, *34*(6), 661–676. https://doi.org/10.1080/08870446.2018.1556273

Beyer, A.-K., Wolff, J. K., Warner, L. M., Schüz, B., & Wurm, S. (2015). The role of physical activity in the relationship between self-perceptions of ageing and self-rated health in older adults. *Psychology & Health*, *0*(0), 1–15. https://doi.org/10.1080/08870446.2015.1014370

Bleidorn, W., Hopwood, C. J., Back, M. D., Denissen, J. J. A., Hennecke, M., Jokela, M., Kandler, C., Lucas, R. E., Luhmann, M., Orth, U., Roberts, B. W., Wagner, J., Wrzus, C., & Zimmermann, J. (2020). Longitudinal Experience–Wide Association Studies—A Framework for Studying Personality Change. *European Journal of Personality*, *34*(3), 285–300. https://doi.org/10.1002/per.2247

Blöchl, M., Nestler, S., & Weiss, D. (2021). A limit of the subjective age bias: Feeling younger to a certain degree, but no more, is beneficial for life satisfaction. *Psychology and Aging*, *36*(3), 360.

Bodner, E., Shrira, A., Hoffman, Y., & Bergman, Y. S. (2021). Day-to-Day Variability in Subjective Age and Ageist Attitudes and Their Association With Depressive Symptoms. *The Journals of Gerontology: Series B*, *76*(5), 836–844. https://doi.org/10.1093/geronb/gbaa125

Boeder, J., & Tse, D. C. K. (2021). Measuring Self-Perceptions of Aging: Differences Between Measures When Predicting Health Outcomes. *The Journals of Gerontology: Series B*, *76*(5), 825–835. https://doi.org/10.1093/geronb/gbaa064

Bordone, V., Arpino, B., & Rosina, A. (2020). Forever young? An analysis of the factors influencing perceptions of ageing. *Ageing & Society*, *40*(8), 1669–1693. https://doi.org/10.1017/S0144686X19000084

Bouazzaoui, B., Follenfant, A., Ric, F., Fay, S., Croizet, J.-C., Atzeni, T., & Taconnat, L. (2015). Ageing-related stereotypes in memory: When the beliefs come true. *Memory*, *0*(0), 1–10. https://doi.org/10.1080/09658211.2015.1040802

Bowen, C. E., & Skirbekk, V. (2013). National Stereotypes of Older People's Competence Are Related to Older Adults' Participation in Paid and Volunteer Work. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences*, *68*(6), 974–983. https://doi.org/10.1093/geronb/gbt101

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, *3*(2), 77–101.

Braun, V., & Clarke, V. (2020). One size fits all? What counts as quality practice in (reflexive) thematic analysis? *Qualitative Research in Psychology*, *0*(0), 1–25. https://doi.org/10.1080/14780887.2020.1769238

Brier, M. J., Chambless, D. L., Chen, J., & Mao, J. J. (2018). Ageing perceptions and non-adherence to aromatase inhibitors among breast cancer survivors. *European Journal of Cancer*, *91*, 145–152. https://doi.org/10.1016/j.ejca.2017.12.006

Broadbent, D. E., Cooper, P. F., FitzGerald, P., & Parkes, K. R. (1982). The Cognitive Failures Questionnaire (CFQ) and its correlates. *The British Journal of Clinical Psychology*, *21 (Pt 1)*, 1–16.

Brothers, A., Kornadt, A. E., Nehrkorn-Bailey, A., Wahl, H.-W., & Diehl, M. (2021). The Effects of Age Stereotypes on Physical and Mental Health Are Mediated by Self-perceptions of Aging. *The Journals of Gerontology: Series B*, *76*(5), 845–857. https://doi.org/10.1093/geronb/gbaa176

Brown, A. J., & Harkins, S. G. (2016). Threat does not make the mind wander: Reconsidering the effect of stereotype threat on mind-wandering. *Motivation Science*, *2*(2), 85–96. https://doi.org/10.1037/mot0000032

Bunn, F., Dickinson, A., Barnett-Page, E., Mcinnes, E., & Horton, K. (2008). A systematic review of older people's perceptions of facilitators and barriers to participation in falls-prevention interventions. *Ageing & Society*, *28*(4), 449–472.

Burton, A. E., Dean, S. E., Demeyin, W., & Reeves, J. (2021). Questionnaire measures of self-directed ageing stereotype in older adults: A systematic review of measurement properties. *European Journal of Ageing*, *18*(1), 117–144. https://doi.org/10.1007/s10433-020-00574-7

Cadinu, M., Maass, A., Rosabianca, A., & Kiesner, J. (2005). Why Do Women Underperform Under Stereotype Threat?: Evidence for the Role of Negative Thinking. *Psychological Science*, *16*(7), 572–578. https://doi.org/10.1111/j.0956-7976.2005.01577.x

Cary, L. A., & Chasteen, A. L. (2015). Age Stereotypes and Age Stigma: Connections to Research on Subjective Aging. *Annual Review of Gerontology and Geriatrics*, *35*(1), 99–119. https://doi.org/10.1891/0198-8794.35.99

Cassarino, M., & Setti, A. (2016). Complexity As Key to Designing Cognitive-Friendly Environments for Older People. *Frontiers in Psychology*, *7*. https://doi.org/10.3389/fpsyg.2016.01329

Caughie, C., Kronenberger, O., Cobb, J., Margaris, H., McFarland, C., & Hall, S. (2023). Age-based stereotype threat and neuropsychological performance in older adults. *Aging, Neuropsychology, and Cognition*, *30*(4), 620–637. https://doi.org/10.1080/13825585.2022.2068498

Census 2016 Profile 3—An Age Profile of Ireland—CSO - Central Statistics Office. (2017). https://www.cso.ie/en/csolatestnews/presspages/2017/census2016profile3-anageprofileofireland/

Chalabaev, A., Palluel, E., & Ruchaud, F. (2020). "The threat is in the head, not in the legs": Activating negative age stereotypes generates extra cognitive load during walking. *Psychology of Sport and Exercise*, *51*, 101740. https://doi.org/10.1016/j.psychsport.2020.101740

Chang, E.-S., Kannoth, S., Levy, S., Wang, S.-Y., Lee, J. E., & Levy, B. (2020). Global reach of ageism on older persons' health: A systematic review. *PLOS ONE*, *15*(1), e0220857. https://doi.org/10.1371/journal.pone.0220857

Chapman, L., Sargent-Cox, K., Horswill, M. S., & Anstey, K. J. (2014). The Impact of Age Stereotypes on Older Adults' Hazard Perception Performance and Driving

Confidence. *Journal of Applied Gerontology*, 0733464813517505. https://doi.org/10.1177/0733464813517505

Chen, Y.-T., McDonough, I. M., Faig, K. E., Norman, G. J., & Gallo, D. A. (2022). Impact of stereotype threat on brain activity during memory tasks in older adults. *NeuroImage*, *260*, 119413. https://doi.org/10.1016/j.neuroimage.2022.119413

Chiesa, R., Zaniboni, S., Guglielmi, D., & Vignoli, M. (2019). Coping With Negative Stereotypes Toward Older Workers: Organizational and Work-Related Outcomes. *Frontiers in Psychology*, *10*. https://doi.org/10.3389/fpsyg.2019.00649

Chojak, A. (2022). Effectiveness of a training programme based on acceptance and commitment therapy aimed at older adults – no moderating role of cognitive functioning. *Neuropsychiatria i Neuropsychologia/Neuropsychiatry and Neuropsychology*, *16*(3), 138–146. https://doi.org/10.5114/nan.2021.113314

Chrisler, J. C., Barney, A., & Palatino, B. (2016). Ageism can be Hazardous to Women's Health: Ageism, Sexism, and Stereotypes of Older Women in the Healthcare System. *Journal of Social Issues*, *72*(1), 86–104. https://doi.org/10.1111/josi.12157

Christoff, K., Irving, Z. C., Fox, K. C., Spreng, R. N., & Andrews-Hanna, J. R. (2016). Mind-wandering as spontaneous thought: A dynamic framework. *Nature Reviews Neuroscience*, *17*(11), 718–731.

Coudin, G., & Alexopoulos, T. (2010). 'Help me! I'm old!' How negative aging stereotypes create dependency among older adults. *Aging & Mental Health*, *14*(5), 516–523. https://doi.org/10.1080/13607861003713182

Craciun, C., Gellert, P., & Flick, U. (2017). Aging in Precarious Circumstances: Do Positive Views on Aging Make a Difference? *The Gerontologist*, *57*(3), 517–528. https://doi.org/10.1093/geront/gnv135

Cuddy, A. J. C., Norton, M. I., & Fiske, S. T. (2005). This Old Stereotype: The Pervasiveness and Persistence of the Elderly Stereotype. *Journal of Social Issues*, *61*(2), 267–285. https://doi.org/10.1111/j.1540-4560.2005.00405.x

Da Silva, J. C., De Araujo, C. M., Lüders, D., Santos, R. S., Moreira De Lacerda, A. B., José, M. R., & Guarinello, A. C. (2023). The Self-Stigma of Hearing Loss in Adults and Older Adults: A Systematic Review. *Ear & Hearing*, *Publish Ahead of Print*. https://doi.org/10.1097/AUD.0000000000001398

de Lange, M. A., & van Knippenberg, A. (2009). To err is human: How regulatory focus and action orientation predict performance following errors. *Journal of Experimental Social Psychology*, *45*(6), 1192–1199. https://doi.org/10.1016/j.jesp.2009.07.009

de Leeuw, J. R., & Motz, B. A. (2016). Psychophysics in a Web browser? Comparing response times collected with JavaScript and Psychophysics Toolbox in a visual search task. *Behavior Research Methods*, *48*(1), 1–12. https://doi.org/10.3758/s13428-015-0567-2

Deshayes, M., Palermo, A., Korchi, K., & Philippe, A. G. (2022). Influence of negative stereotype on physical activity level among older adults during a training session. *Frontiers in Sports and Active Living*, *4*. https://www.frontiersin.org/articles/10.3389/fspor.2022.998724

Deshayes, M., Zory, R., Radel, R., & Clément-Guillotin, C. (2022). Does the Effect of Stereotypes in Older People Depend Upon Task Intensity? *Research on Aging*, *44*(3–4), 254–264. https://doi.org/10.1177/01640275211020680

Desrichard, O., Heiser, N., Renaud, O., Zuber, S., Oris, M., & Kliegel, M. (2022). Contextual variation in cognitive performance of older adults: Demonstration of an age-of-examiner effect. *The Clinical Neuropsychologist*, *0*(0), 1–13. https://doi.org/10.1080/13854046.2022.2150689

Diamond, A. (2013). Executive Functions. *Annual Review of Psychology*, *64*(1), 135–168. https://doi.org/10.1146/annurev-psych-113011-143750

Diehl, M., Nehrkorn-Bailey, A., & Tseng, H.-Y. (2022). Psychological interventions targeting adults' subjective views of aging. *Subjective Views of Aging: Theory, Research, and Practice*, 309–327.

Diehl, M., Rebok, G. W., Roth, D. L., Nehrkorn-Bailey, A., Rodriguez, D., Tseng, H.-Y., & Chen, D. (2023). Examining the Malleability of Negative Views of Aging, Self-Efficacy Beliefs, and Behavioral Intentions in Middle-Aged and Older Adults. *The Journals of Gerontology: Series B*, *78*(12), 2009–2020. https://doi.org/10.1093/geronb/gbad130

Diehl, M., & Wahl, H. W. (2010). Awareness of Age-Related Change: Examination of a (Mostly) Unexplored Concept. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences*, *65B*(3), 340–350. https://doi.org/10.1093/geronb/gbp110

Diehl, M., Wahl, H.-W., Barrett, A. E., Brothers, A. F., Miche, M., Montepare, J. M., Westerhof, G. J., & Wurm, S. (2014). Awareness of aging: Theoretical considerations on an emerging concept. *Developmental Review*, *34*(2), 93–113. https://doi.org/10.1016/j.dr.2014.01.001

Diehl, M., Wettstein, M., Spuling, S. M., & Wurm, S. (2021). Age-related change in self-perceptions of aging: Longitudinal trajectories and predictors of change. *Psychology and Aging*, *36*(3), 344–359. https://doi.org/10.1037/pag0000585

Dijksterhuis, A., Aarts, H., Bargh, J. A., & van Knippenberg, A. (2000). On the Relation between Associative Strength and Automatic Behavior. *Journal of Experimental Social Psychology*, *36*(5), 531–544. https://doi.org/10.1006/jesp.2000.1427

Donlon, M. M., Ashman, O., & Levy, B. (2005). Re-Vision of Older Television Characters: A Stereotype-Awareness Intervention. *Journal of Social Issues*, *61*(2), 307–319. https://doi.org/10.1111/j.1540-4560.2005.00407.x

Donoghue, O. A., McGarrigle, C. A., Foley, M., Fagan, A., Meaney, J., & Kenny, R. A. (2018). Cohort profile update: The Irish longitudinal study on ageing (TILDA). *International Journal of Epidemiology*, *47*(5), 1398–1398l.

Ebner, N. C., Freund, A. M., & Baltes, P. B. (2006). Developmental changes in personal goal orientation from young to late adulthood: From striving for gains to maintenance and prevention of losses. *Psychology and Aging*, *21*(4), 664–678. https://doi.org/10.1037/0882-7974.21.4.664

Ehni, H.-J., & Wahl, H.-W. (2020). Six Propositions against Ageism in the COVID-19 Pandemic. *Journal of Aging & Social Policy*, *32*(4–5), 515–525. https://doi.org/10.1080/08959420.2020.1770032

Eich, T. S., Murayama, K., Castel, A. D., & Knowlton, B. J. (2014). The Dynamic Effects of Age-Related Stereotype Threat on Explicit and Implicit Memory Performance in Older Adults. *Social Cognition*, *32*(6), 559–570. https://doi.org/10.1521/soco.2014.32.6.559

Emile, M., Chalabaev, A., Stephan, Y., Corrion, K., & d'Arripe-Longueville, F. (2014). Aging stereotypes and active lifestyle: Personal correlates of stereotype internalization and relationships with level of physical activity among older adults. *Psychology of Sport and Exercise*, *15*(2), 198–204. https://doi.org/10.1016/j.psychsport.2013.11.002

Faul, F., Erdfelder, E., Buchner, A., & Lang, A.-G. (2009). Statistical power analyses using G* Power 3.1: Tests for correlation and regression analyses. *Behavior Research Methods*, *41*(4), 1149–1160.

Fawsitt, F., Dockray, S., & Setti, A. (2021). Regulatory focus and perceptions of ageing: Exploring the connections. *Aging & Mental Health*, 1–9. https://doi.org/10.1080/13607863.2021.1952550

Fawsitt, F., & Setti, A. (2017a). Extending the stereotype embodiment model: A targeted review. *Translational Issues in Psychological Science*, *3*(4), 357–369. https://doi.org/10.1037/tps0000136

Fawsitt, F., & Setti, A. (2017b). Extending the stereotype embodiment model: A targeted review. *Translational Issues in Psychological Science*, *3*(4), 357–369. https://doi.org/10.1037/tps0000136

Fawsitt, F., Setti, A., & Cassarino, M. (2015). *Self-Perceptions of Ageing are Linked to Inappropriate Multisensory Integration.* The international Association of Gerontology and Geriatrics European Region Congress, Dublin Ireland. http://www.iaggdublin2015.org/downloads/IAGGER2015_CongressAbstracts_update.pdf

Fernández-Ballesteros, R., Bustillos, A., & Huici, C. (2015a). Positive Perception of Aging and Performance in a Memory Task: Compensating for Stereotype Threat? *Experimental Aging Research*, *41*(4), 410–425. https://doi.org/10.1080/0361073X.2015.1053757

Fernández-Ballesteros, R., Bustillos, A., & Huici, C. (2015b). Positive Perception of Aging and Performance in a Memory Task: Compensating for Stereotype Threat? *Experimental Aging Research*, *41*(4), 410–425. https://doi.org/10.1080/0361073X.2015.1053757

Fernández-Ballesteros, R., Olmos, R., Pérez-Ortiz, L., & Sánchez-Izquierdo, M. (2020). Cultural aging stereotypes in European Countries: Are they a risk to Active Aging? *PLOS ONE*, *15*(5), e0232340. https://doi.org/10.1371/journal.pone.0232340

Ferris, A. C. (2013). *Stop Interfering! Understanding how Stereotype Threat reduces Working Memory Capacity by using the Dual Processes Model.* http://scholarworks.montana.edu/xmlui/handle/1/479

Files, B. T., Pollard, K. A., Oiknine, A. H., Passaro, A. D., & Khooshabeh, P. (2019). Prevention Focus Relates to Performance on a Loss-Framed Inhibitory Control Task. *Frontiers in Psychology*, *10*. https://doi.org/10.3389/fpsyg.2019.00726

Follenfant, A., & Atzeni, T. (2020). True performance: Reducing stereotype threat effect in older adults' clinical assessment of memory. *Aging, Neuropsychology, and Cognition*, *27*(6), 935–948. https://doi.org/10.1080/13825585.2019.1703893

Fratiglioni, L., Paillard-Borg, S., & Winblad, B. (2004). An active and socially integrated lifestyle in late life might protect against dementia. *The Lancet Neurology*, *3*(6), 343–353. https://doi.org/10.1016/S1474-4422(04)00767-7

Freeman, A. T., Santini, Z. I., Tyrovolas, S., Rummel-Kluge, C., Haro, J. M., & Koyanagi, A. (2016). Negative perceptions of ageing predict the onset and persistence of depression and anxiety: Findings from a prospective analysis of the Irish Longitudinal Study on Ageing (TILDA). *Journal of Affective Disorders*, *199*, 132–138. https://doi.org/10.1016/j.jad.2016.03.042

Fresson, M., Dardenne, B., Geurten, M., & Meulemans, T. (2017). The effect of stereotype threat on older people's clinical cognitive outcomes: Investigating the moderating role of dementia worry. *The Clinical Neuropsychologist*, *31*(8), 1306–1328. https://doi.org/10.1080/13854046.2017.1307456

Fried, T. R., O'Leary, J., Towle, V., Goldstein, M. K., Trentalange, M., & Martin, D. K. (2014). Health Outcomes Associated with Polypharmacy in Community-Dwelling Older Adults: A Systematic Review. *Journal of the American Geriatrics Society*, *62*(12), 2261–2272. https://doi.org/10.1111/jgs.13153

Fuglestad, P. T., Rothman, A. J., Jeffery, R. W., & Sherwood, N. E. (2015). Regulatory Focus, Proximity to Goal Weight, and Weight Loss Maintenance. *American Journal of Health Behavior*, *39*(5), 709–720. https://doi.org/10.5993/AJHB.39.5.12

Fung, H. H., Carstensen, L. L., & Lutz, A. M. (1999). Influence of time on social preferences: Implications for life-span development. *Psychology and Aging*, *14*(4), 595–604. https://doi.org/10.1037/0882-7974.14.4.595

Gaillard, M., Desmette, D., & Keller, J. (2011). Regulatory focus moderates the influence of age-related stereotypic expectancies on older adults' test performance and threat-based concerns. *Revue Européenne de Psychologie Appliquée/European Review of Applied Psychology*, *61*(1), 23–29. https://doi.org/10.1016/j.erap.2010.11.001

Gale, C. R., Čukić, I., Chastin, S. F., Dall, P. M., Dontje, M. L., Skelton, D. A., Deary, I. J., & Team, for the S. U. (2018). Attitudes to ageing and objectively-measured sedentary and walking behaviour in older people: The Lothian Birth Cohort 1936. *PLOS ONE*, *13*(5), e0197357. https://doi.org/10.1371/journal.pone.0197357

Gallo, V. (2019). Ageism in nursing education: A review of the literature. *Teaching and Learning in Nursing*, *14*(3), 208–215.

Garza, M. (2019). An Examination of the Relationships Between Message Framing, Regulatory Focus, and Psychological Reactance on Risky Health Decision-Making Among College Students. *Doctoral Dissertations*. https://digitalcommons.latech.edu/dissertations/838

Gendron, T. L., Inker, J., & Welleford, A. (2018). "How Old Do You Feel?" The Difficulties and Ethics of Operationalizing Subjective Age. *The Gerontologist*, *58*(4), 618–624. https://doi.org/10.1093/geront/gnx098

Giasson, H. L., Queen, T. L., Larkina, M., & Smith, J. (2017). Age Group Differences in Perceived Age Discrimination: Associations With Self-Perceptions of Aging. *The Gerontologist*, *57*(suppl_2), S160–S168. https://doi.org/10.1093/geront/gnx070

Gomez, P., Borges, A., & Pechmann, C. (Connie). (2013). Avoiding poor health or approaching good health: Does it matter? The conceptualization, measurement, and consequences of health regulatory focus. *Journal of Consumer Psychology*, *23*(4), 451–463. JSTOR.

Gong, X., & Freund, A. M. (2020). It Is What You Have, Not What You Lose: Effects of Perceived Gains and Losses on Goal Orientation Across Adulthood. *The Journals of Gerontology: Series B*, *75*(10), 2106–2111. https://doi.org/10.1093/geronb/gbz163

Gorman, C. A., Meriac, J. P., Overstreet, B. L., Apodaca, S., McIntyre, A. L., Park, P., & Godbey, J. N. (2012). A meta-analysis of the regulatory focus nomological network: Work-related antecedents and consequences. *Journal of Vocational Behavior*, *80*(1), 160–172. https://doi.org/10.1016/j.jvb.2011.07.005

Greene, N. R., & Naveh-Benjamin, M. (2022). Online experimentation and sampling in cognitive aging research. *Psychology and Aging*, *37*(1), 72–83. https://doi.org/10.1037/pag0000655

Grimm, L. R., Markman, A. B., Maddox, W. T., & Baldwin, G. C. (2009). Stereotype Threat Reinterpreted as a Regulatory Mismatch. *Journal of Personality and Social Psychology*, *96*(2), 288–304. https://doi.org/10.1037/a0013463

Hajek, A., & König, H.-H. (2021). Self-perceptions of ageing, GP visits and frequent attendance. Longitudinal findings from the German Ageing Survey. *Aging & Mental Health*, *25*(8), 1493–1498. https://doi.org/10.1080/13607863.2020.1742659

Harris, K., Krygsman, S., Waschenko, J., & Laliberte Rudman, D. (2018). Ageism and the Older Worker: A Scoping Review. *The Gerontologist*, *58*(2), e1–e14. https://doi.org/10.1093/geront/gnw194

Hasher, L., Stoltzfus, E. R., Zacks, R. T., & Rypma, B. (1991). Age and inhibition. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, *17*(1), 163–169. https://doi.org/10.1037/0278-7393.17.1.163

Haslam, C., Morton, T. A., Haslam, S. A., Varnes, L., Graham, R., & Gamaz, L. (2012). "When the age is in, the wit is out": Age-related self-categorization and deficit expectations reduce performance on clinical tests used in dementia assessment. *Psychology and Aging*, *27*(3), 778–784. https://doi.org/10.1037/a0027754

Hawkins, G. E., Mittner, M., Forstmann, B. U., & Heathcote, A. (2022). Self-reported mind wandering reflects executive control and selective attention. *Psychonomic Bulletin & Review*, *29*(6), 2167–2180. https://doi.org/10.3758/s13423-022-02110-3

Haws, K. L., Dholakia, U. M., & Bearden, W. O. (2010). An Assessment of Chronic Regulatory Focus Measures. *Journal of Marketing Research*, *47*(5), 967–982. https://doi.org/10.1509/jmkr.47.5.967

Hayes, S. C., Luoma, J. B., Bond, F. W., Masuda, A., & Lillis, J. (2006). Acceptance and commitment therapy: Model, processes and outcomes. *Behaviour Research and Therapy*, *44*(1), 1–25.

Hazlett, A., Molden, D. C., & Sackett, A. M. (2011). Hoping for the Best or Preparing for the Worst? Regulatory Focus and Preferences for Optimism and Pessimism in Predicting Personal Outcomes. *Social Cognition*, *29*(1), 74–96. https://doi.org/10.1521/soco.2011.29.1.74

Hess, T. M., Auman, C., Colcombe, S. J., & Rahhal, T. A. (2003). The Impact of Stereotype Threat on Age Differences in Memory Performance. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences*, *58*(1), P3–P11. https://doi.org/10.1093/geronb/58.1.P3

Hess, T. M., Hinson, J. T., & Hodges, E. A. (2009). Moderators of and Mechanisms Underlying Stereotype Threat Effects on Older Adults' Memory Performance. *Experimental Aging Research*, *35*(2), 153–177. https://doi.org/10.1080/03610730802716413

Hess, T. M., Hinson, J. T., & Statham, J. A. (2004). Explicit and Implicit Stereotype Activation Effects on Memory: Do Age and Awareness Moderate the Impact of Priming? *Psychology and Aging*, *19*(3), 495–505. https://doi.org/10.1037/0882-7974.19.3.495

Higgins, E. T. (1997). Beyond pleasure and pain. *American Psychologist*, *52*(12), 1280–1300. https://doi.org/10.1037/0003-066X.52.12.1280

Higgins, E. T. (2000). Making a good decision: Value from fit. *American Psychologist*, *55*(11), 1217–1230. https://doi.org/10.1037/0003-066X.55.11.1217

Higgins, E. T., Friedman, R. S., Harlow, R. E., Idson, L. C., Ayduk, O. N., & Taylor, A. (2001). Achievement orientations from subjective histories of success: Promotion pride versus prevention pride. *European Journal of Social Psychology*, *31*(1), 3–23. https://doi.org/10.1002/ejsp.27

Hooker, K., Mejía, S. T., Phibbs, S., Tan, E. J., & Stevens, J. (2019). Effects of Age Discrimination on Self-perceptions of Aging and Cancer Risk Behaviors. *The Gerontologist*, *59*(Supplement_1), S28–S37. https://doi.org/10.1093/geront/gny183

Hu, R. X., Luo, M., Zhang, A., & Li, L. W. (2021). Associations of Ageism and Health: A Systematic Review of Quantitative Observational Studies. *Research on Aging*, *43*(7–8), 311–322. https://doi.org/10.1177/0164027520980130

Hughes, M. L., Geraci, L., & Forrest, R. L. D. (2013). Aging 5 Years in 5 Minutes The Effect of Taking a Memory Test on Older Adults' Subjective Age. *Psychological Science*, 0956797613494853. https://doi.org/10.1177/0956797613494853

Hummert, M. L. (1999). A social cognitive perspective on age stereotypes. In *Social cognition and aging* (pp. 175–196). Elsevier.

Huy, C., Schneider, S., & Thiel, A. (2010). Perceptions of aging and health behavior: Determinants of a healthy diet in an older german population. *The Journal of Nutrition, Health & Aging*. https://doi.org/10.1007/s12603-010-0037-6

Inzlicht, M., & Kang, S. K. (2010). Stereotype threat spillover: How coping with threats to social identity affects aggression, eating, decision making, and attention. *Journal of Personality and Social Psychology*, *99*(3), 467–481. https://doi.org/10.1037/a0018951

Isaacs, L. W., & Bearison, D. J. (1986). The development of children's prejudice against the aged. *International Journal of Aging & Human Development*, *23*(3), 175–194.

Joanisse, M., Gagnon, S., & Voloaca, M. (2013). The impact of Stereotype Threat on the simulated driving performance of older drivers. *Accident Analysis & Prevention*, *50*, 530–538. https://doi.org/10.1016/j.aap.2012.05.032

John-Henderson, N. A., Rheinschmidt, M. L., & Mendoza-Denton, R. (2015). Cytokine responses and math performance: The role of stereotype threat and anxiety reappraisals. *Journal of Experimental Social Psychology*, *56*, 203–206. https://doi.org/10.1016/j.jesp.2014.10.002

John-Henderson, N. A., Rheinschmidt, M. L., Mendoza-Denton, R., & Francis, D. D. (2014). Performance and inflammation outcomes are predicted by different facets of SES under stereotype threat. *Social Psychological and Personality Science*, *5*(3), 301–309.

Johns, M., Inzlicht, M., & Schmader, T. (2008). Stereotype Threat and Executive Resource Depletion: Examining the Influence of Emotion Regulation. *Journal of Experimental Psychology. General*, *137*(4), 691–705. https://doi.org/10.1037/a0013834

Jordano, M. L., & Touron, D. R. (2017). Stereotype threat as a trigger of mind-wandering in older adults. *Psychology and Aging*, *32*(3), 307–313. https://doi.org/10.1037/pag0000167

Kang, S. K., & Chasteen, A. L. (2009). The moderating role of age-group identification and perceived threat on stereotype threat among older adults. *International Journal of Aging & Human Development*, *69*(3), 201–220.

Kaspar, R., Gabrian, M., Brothers, A., Wahl, H.-W., & Diehl, M. (2019). Measuring Awareness of Age-Related Change: Development of a 10-Item Short Form for Use in Large-Scale Surveys. *The Gerontologist*, *59*(3), e130–e140. https://doi.org/10.1093/geront/gnx213

Keller, J., & Bless, H. (2006). Regulatory fit and cognitive performance: The interactive effect of chronic and situationally induced self-regulatory mechanisms on test performance. *European Journal of Social Psychology*, *36*(3), 393–405. https://doi.org/10.1002/ejsp.307

Keller, P. A. (2006). Regulatory Focus and Efficacy of Health Messages. *Journal of Consumer Research*, *33*(1), 109–114. https://doi.org/10.1086/504141

Kessler, E.-M., & Blachetta, C. (2020). Age cues in patients' descriptions influence treatment attitudes. *Aging & Mental Health*, *24*(1), 193–196. https://doi.org/10.1080/13607863.2018.1515889

Kim, Y. K., Kim, K., Neupert, S. D., & Boerner, K. (2021). Changes in married older adults' self-perceptions of aging: The role of gender. *Psychology and Aging*, *36*(3), 383–393. https://doi.org/10.1037/pag0000507.supp

Kite, M. E., Stockdale, G. D., Whitley, B. E., & Johnson, B. T. (2005). Attitudes Toward Younger and Older Adults: An Updated Meta-Analytic Review. *Journal of Social Issues*, *61*(2), 241–266. https://doi.org/10.1111/j.1540-4560.2005.00404.x

Klusmann, V., Notthoff, N., Beyer, A.-K., Blawert, A., & Gabrian, M. (2020). The assessment of views on ageing: A review of self-report measures and innovative extensions. *European Journal of Ageing*, *17*(4), 403–433. https://doi.org/10.1007/s10433-020-00556-9

Klusmann, V., Sproesser, G., Wolff, J. K., & Renner, B. (2019). Positive Self-perceptions of Aging Promote Healthy Eating Behavior Across the Life Span via Social-Cognitive Processes. *The Journals of Gerontology: Series B*, *74*(5), 735–744. https://doi.org/10.1093/geronb/gbx139

Knight, R. G., McMahon, J., Green, T. J., & Skeaff, C. M. (2004). Some normative and psychometric data for the geriatric depression scale and the cognitive failures questionnaire from a sample of healthy older persons. *New Zealand Journal of Psychology*, *33*(3), 163.

Knight, R. L., Chalabaev, A., McNarry, M. A., Mackintosh, K. A., & Hudson, J. (2021). Do age stereotype-based interventions affect health-related outcomes in older adults? A systematic review and future directions. *British Journal of Health Psychology*, bjhp.12548. https://doi.org/10.1111/bjhp.12548

Kornadt, A. E., Kessler, E.-M., Wurm, S., Bowen, C. E., Gabrian, M., & Klusmann, V. (2020). Views on ageing: A lifespan perspective. *European Journal of Ageing*, *17*(4), 387–401. https://doi.org/10.1007/s10433-019-00535-9

Kornadt, A. E., & Rothermund, K. (2011). Contexts of Aging: Assessing Evaluative Age Stereotypes in Different Life Domains. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences*, *66B*(5), 547–556. https://doi.org/10.1093/geronb/gbr036

Kornadt, A. E., Voss, P., & Rothermund, K. (2017). Age Stereotypes and Self-Views Revisited: Patterns of Internalization and Projection Processes Across the Life Span. *The Journals of Gerontology: Series B*, *72*(4), 582–592. https://doi.org/10.1093/geronb/gbv099

Kotter-Grühn, D., Kleinspehn-Ammerlahn, A., Gerstorf, D., & Smith, J. (2009). Self-perceptions of aging predict mortality and change with approaching death: 16-year

longitudinal results from the Berlin Aging Study. *Psychology and Aging*, *24*(3), 654–667. https://doi.org/10.1037/a0016510

Kotter-Grühn, D., Kornadt, A. E., & Stephan, Y. (2015). Looking beyond chronological age: Current knowledge and future directions in the study of subjective age. *Gerontology*, *62*(1), 86–93.

Lachman, M. E., & Agrigoroaei, S. (2010). Promoting functional health in midlife and old age: Long-term protective effects of control beliefs, social support, and physical exercise. *PloS One*, *5*(10), e13297.

Lakra, D. C., Ng, R., & Levy, B. (2012). Increased longevity from viewing retirement positively. *Ageing & Society*, *null*(08), 1418–1427. https://doi.org/10.1017/S0144686X11000985

Lambert, A. E., Watson, J. M., Stefanucci, J. K., Ward, N., Bakdash, J. Z., & Strayer, D. L. (2015). Stereotype threat impairs older adult driving. *Applied Cognitive Psychology*. https://doi.org/10.1002/acp.3162

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. *Psychology and Aging*, *30*(1), 180–193. https://doi.org/10.1037/a0038586

Lanaj, K., Chang, C.-H., & Johnson, R. E. (2012). Regulatory focus and work-related outcomes: A review and meta-analysis. *Psychological Bulletin*, *138*(5), 998.

Langer, E., Djikic, M., Pirson, M., Madenci, A., & Donohue, R. (2010). Believing is seeing: Using mindlessness (mindfully) to improve visual acuity. *Psychological Science*, *21*(5), 661–666. https://doi.org/10.1177/0956797610366543

Langer, E., & Rodin, J. (1976). The effects of choice and enhanced personal responsibility for the aged: A field experiment in an institutional setting. *Journal of Personality and Social Psychology*, *34*(2), 191–198. https://doi.org/10.1037/0022-3514.34.2.191

Laroche, M., Roussel, P., & Cury, F. (2020). Identifying a motivational process surrounding adherence to exercise and diet among adults with type 2 diabetes. *The Physician and Sportsmedicine*, *48*(1), 68–74. https://doi.org/10.1080/00913847.2019.1632154

Laroche, M., Roussel, P., Cury, F., & Boiché, J. (2019). Understanding the dynamics of physical activity practice in the health context through Regulatory Focus and Self-Determination theories. *PLOS ONE*, *14*(8), e0216760. https://doi.org/10.1371/journal.pone.0216760

Leder, S., Florack, A., & Keller, J. (2015). Self-regulation and protective health behaviour: How regulatory focus and anticipated regret are related to vaccination decisions. *Psychology & Health*, *30*(2), 165–188. https://doi.org/10.1080/08870446.2014.954574

Lemaire, P., Brun, F., & Régner, I. (2018). Negative Aging Stereotypes Disrupt both the Selection and Execution of Strategies in Older Adults. *Gerontology*, *64*(4), 373–381. https://doi.org/10.1159/000486756

Levy, B. (1996). Improving memory in old age through implicit self-stereotyping. *Journal of Personality and Social Psychology*, *71*(6), 1092–1107. https://doi.org/10.1037/0022-3514.71.6.1092

Levy, B. (2003). Mind Matters: Cognitive and Physical Effects of Aging Self-Stereotypes. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences*, *58*(4), P203–P211. https://doi.org/10.1093/geronb/58.4.P203

Levy, B. (2008). RIGIDITY AS A PREDICTOR OF OLDER PERSONS' AGING STEREOTYPES AND AGING SELF-PERCEPTIONS. *Social Behavior and Personality: An International Journal*, *36*(4), 559–570. https://doi.org/10.2224/sbp.2008.36.4.559

Levy, B. (2009). Stereotype Embodiment: A Psychosocial Approach to Aging. *Current Directions in Psychological Science (Wiley-Blackwell)*, *18*(6), 332–336. https://doi.org/10.1111/j.1467-8721.2009.01662.x

Levy, B., & Bavishi, A. (2018). Survival Advantage Mechanism: Inflammation as a Mediator of Positive Self-Perceptions of Aging on Longevity. *The Journals of Gerontology: Series B*, *73*(3), 409–412. https://doi.org/10.1093/geronb/gbw035

Levy, B., Chang, E.-S., Lowe, S. R., Provolo, N., & Slade, M. D. (2022). Impact of Media-Based Negative and Positive Age Stereotypes on Older Individuals' Mental Health. *The Journals of Gerontology: Series B*, *77*(4), e70–e75. https://doi.org/10.1093/geronb/gbab085

Levy, B., Chung, P. H., Bedford, T., & Navrazhina, K. (2014). Facebook as a Site for Negative Age Stereotypes. *The Gerontologist*, *54*(2), 172–176. https://doi.org/10.1093/geront/gns194

Levy, B., Chung, P. H., Slade, M. D., Van Ness, P. H., & Pietrzak, R. H. (2019). Active coping shields against negative aging self-stereotypes contributing to psychiatric conditions. *Social Science & Medicine*, *228*, 25–29. https://doi.org/10.1016/j.socscimed.2019.02.035

Levy, B., Ferrucci, L., Zonderman, A. B., Slade, M. D., Troncoso, J., & Resnick, S. M. (2016). A culture–brain link: Negative age stereotypes predict Alzheimer's disease biomarkers. *Psychology and Aging*, *31*(1), 82–88. https://doi.org/10.1037/pag0000062

Levy, B., Hausdorff, J., Hencke, R., & Wei, J. Y. (2000). Reducing Cardiovascular Stress With Positive Self-Stereotypes of Aging. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences*, *55*(4), P205–P213. https://doi.org/10.1093/geronb/55.4.P205

Levy, B., Kasl, S. V., & Gill, T. M. (2004). Image of Aging Scale. *Perceptual & Motor Skills*, *99*(1), 208–210.

Levy, B., & Langer, E. (1994). Aging free from negative stereotypes: Successful memory in China among the American deaf. *Journal of Personality and Social Psychology*, *66*(6), 989–997. https://doi.org/10.1037//0022-3514.66.6.989

Levy, B., & Leifheit-Limson, E. (2009). The Stereotype-Matching Effect: Greater Influence on Functioning When Age Stereotypes Correspond to Outcomes. *Psychology & Aging*, *24*(1), 230–233. https://doi.org/10.1037/a0014563

Levy, B., Moffat, S., Resnick, S. M., Slade, M. D., & Ferrucci, L. (2016). Buffer against Cumulative Stress. *GeroPsych*, *29*(3), 141–146. https://doi.org/10.1024/1662-9647/a000149

Levy, B., & Myers, L. M. (2004). Preventive health behaviors influenced by self-perceptions of aging. *Preventive Medicine*, *39*(3), 625–629. https://doi.org/10.1016/j.ypmed.2004.02.029

Levy, B., & Myers, L. M. (2005). Relationship between respiratory mortality and self-perceptions of aging. *Psychology & Health*, *20*(5), 553–564. https://doi.org/10.1080/14768320500066381

Levy, B., Pilver, C., Chung, P. H., & Slade, M. D. (2014). Subliminal Strengthening Improving Older Individuals' Physical Function Over Time With an Implicit-Age-Stereotype Intervention. *Psychological Science*, *25*(12), 2127–2135. https://doi.org/10.1177/0956797614551970

Levy, B., Provolo, N., Chang, E., & Slade, M. D. (2021). Negative Age Stereotypes Associated with Older Persons' Rejection of COVID-19 Hospitalization. *Journal of the American Geriatrics Society*, *69*(2), 317–318. https://doi.org/10.1111/jgs.16980

Levy, B., Slade, M. D., Chung, P. H., & Gill, T. M. (2014). Resiliency Over Time of Elders' Age Stereotypes After Encountering Stressful Events. *The Journals of Gerontology Series*

B: Psychological Sciences and Social Sciences, gbu082. https://doi.org/10.1093/geronb/gbu082

Levy, B., Slade, M. D., & Gill, T. M. (2006). Hearing Decline Predicted by Elders' Stereotypes. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences*, *61*(2), P82–P87. https://doi.org/10.1093/geronb/61.2.P82

Levy, B., Slade, M. D., & Kasl, S. V. (2002). Longitudinal Benefit of Positive Self-Perceptions of Aging on Functional Health. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences*, *57*(5), P409–P417. https://doi.org/10.1093/geronb/57.5.P409

Levy, B., Slade, M. D., Kunkel, S. R., & Kasl, S. V. (2002). Longevity increased by positive self-perceptions of aging. *Journal of Personality and Social Psychology*, *83*(2), 261–270. https://doi.org/10.1037/0022-3514.83.2.261

Levy, B., Slade, M. D., & Lampert, R. (2019). Idealization of youthfulness predicts worse recovery among older individuals. *Psychology and Aging*, *34*(2), 202–207. https://doi.org/10.1037/pag0000330

Levy, B., Slade, M. D., Pietrzak, R. H., & Ferrucci, L. (2018). Positive age beliefs protect against dementia even among elders with high-risk gene. *PLOS ONE*, *13*(2), e0191004. https://doi.org/10.1371/journal.pone.0191004

Levy, B., Slade MD, Murphy TE, & Gill TM. (2012). Association between positive age stereotypes and recovery from disability in older persons. *JAMA*, *308*(19), 1972–1973. https://doi.org/10.1001/jama.2012.14541

Levy, B., Zonderman, A. B., Slade, M. D., & Ferrucci, L. (2009). Age Stereotypes Held Earlier in Life Predict Cardiovascular Events in Later Life. *Psychological Science*, *20*(3), 296–298. https://doi.org/10.1111/j.1467-9280.2009.02298.x

Levy, S., & Macdonald, J. L. (2016). Progress on Understanding Ageism. *Journal of Social Issues*, *72*(1), 5–25. https://doi.org/10.1111/josi.12153

Liang, J., & Bollen, K. A. (1983). The structure of the Philadelphia Geriatric Center Morale scale: A reinterpretation. *Journal of Gerontology*, *38*(2), 181–189.

Lin, C.-Y., & Yeh, W.-J. (2017). How Does Health-Related Advertising with a Regulatory Focus and Goal Framing Affect Attitudes toward Ads and Healthy Behavior Intentions? *International Journal of Environmental Research and Public Health*, *14*(12), Article 12. https://doi.org/10.3390/ijerph14121507

Lindsay, J., Laurin, D., Verreault, R., Hébert, R., Helliwell, B., Hill, G. B., & McDowell, I. (2002). Risk Factors for Alzheimer's Disease: A Prospective Analysis from the Canadian Study of Health and Aging. *American Journal of Epidemiology*, *156*(5), 445–453. https://doi.org/10.1093/aje/kwf074

Liu, B., Hu, X., Zhang, Q., Fan, Y., Li, J., Zou, R., Zhang, M., Wang, X., & Wang, J. (2016). Usual walking speed and all-cause mortality risk in older people: A systematic review and meta-analysis. *Gait & Posture*, *44*, 172–177. https://doi.org/10.1016/j.gaitpost.2015.12.008

Lockenhoff, C. E., De Fruyt, F., Terracciano, A., McCrae, R. R., De Bolle, M., Costa, P. T., Aguilar-Vafaie, M. E., Ahn, C., Ahn, H., Alcalay, L., Allik, J., Avdeyeva, Tatyana. V., Barbaranelli, C., Benet-Martinez, V., Blatny, M., Bratko, D., Brunner-Sciarra, M., Cain, T. R., Crawford, J. T., … Yik, M. (2009). Perceptions of Aging across 26 Cultures and their Culture-Level Associates. *Psychology and Aging*, *24*(4), 941–954. https://doi.org/10.1037/a0016901

Lockwood, P., Chasteen, A. L., & Wong, C. (2005). Age and Regulatory Focus Determine Preferences for Health-Related Role Models. *Psychology and Aging*, *20*(3), 376–389. https://doi.org/10.1037/0882-7974.20.3.376

Lockwood, P., Jordan, C. H., & Kunda, Z. (2002). Motivation by positive or negative role models: Regulatory focus determines who will best inspire us. *Journal of*

Personality and Social Psychology, *83*(4), 854–864. https://doi.org/10.1037//0022-3514.83.4.854

Ludolph, R., & Schulz, P. J. (2015). Does regulatory fit lead to more effective health communication? A systematic review. *Social Science & Medicine*, *128*, 142–150. https://doi.org/10.1016/j.socscimed.2015.01.021

Lyons, I., Drennan, J., Treacy, M. P., Phelan, A., Quin, S., Lafferty, A., O'Loughlin, A., Fealy, G., McNamara, C. N., & Bury, G. (2009). *Public Perceptions of Older People and Ageing: A Literature Review November 2009*.

Lytle, A., Nowacek, N., & Levy, S. R. (2020). Instapals: Reducing ageism by facilitating intergenerational contact and providing aging education. *Gerontology & Geriatrics Education*, *41*(3), 308–319. https://doi.org/10.1080/02701960.2020.1737047

Mallett, J., Redican, E., Doherty, A. S., Shevlin, M., & Adamson, G. (2022). Depression trajectories among older community dwelling adults: Results from the Irish Longitudinal Study on Ageing (TILDA). *Journal of Affective Disorders*, *298*, 345–354. https://doi.org/10.1016/j.jad.2021.10.114

Mansson, D. H. (2016). The Joy of Grandparenting: A Qualitative Analysis of Grandparents. *Journal of Intergenerational Relationships*, *14*(2), 135–145. https://doi.org/10.1080/15350770.2016.1160738

Mariano, J., Marques, S., Ramos, M. R., & de Vries, H. (2021). Cognitive functioning mediates the relationship between self-perceptions of aging and computer use behavior in late adulthood: Evidence from two longitudinal studies. *Computers in Human Behavior*, *121*, 106807. https://doi.org/10.1016/j.chb.2021.106807

Mariano, J., Marques, S., Ramos, M. R., Gerardo, F., Cunha, C. L. da, Girenko, A., Alexandersson, J., Stree, B., Lamanna, M., Lorenzatto, M., Mikkelsen, L. P., Bundgård-Jørgensen, U., Rêgo, S., & de Vries, H. (2021). Too old for technology?

Stereotype threat and technology use by older adults. *Behaviour & Information Technology*, 1–12. https://doi.org/10.1080/0144929X.2021.1882577

Markov, Č., & Yoon, Y. (2020). Diversity and age stereotypes in portrayals of older adults in popular American primetime television series. *Ageing & Society*, 1–21. https://doi.org/10.1017/S0144686X20000549

Marquet, M., Missotten, P., Dardenne, B., & Adam, S. (2019). Interactions between stereotype threat, subjective aging, and memory in older adults. *Aging, Neuropsychology, and Cognition*, *26*(1), 121–143. https://doi.org/10.1080/13825585.2017.1413166

Marsiske, M., Lang, F. R., Baltes, P. B., & Baltes, M. M. (1995). Selective optimization with compensation: Life-span perspectives on successful human development. *Compensating for Psychological Deficits and Declines: Managing Losses and Promoting Gains*, 35–79.

Mazerolle, M., Régner, I., Barber, S. J., Paccalin, M., Miazola, A.-C., Huguet, P., & Rigalleau, F. (2016). Negative Aging Stereotypes Impair Performance on Brief Cognitive Tests Used to Screen for Predementia. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences*, gbw083. https://doi.org/10.1093/geronb/gbw083

Mazerolle, M., Regner, I., Morisset, P., Rigalleau, F., & Huguet, P. (2012). Stereotype Threat Strengthens Automatic Recall and Undermines Controlled Processes in Older Adults. *Psychological Science*, *23*(7), 723–727. https://doi.org/10.1177/0956797612437607

Mazerolle, M., Rotolo, L., & Maquestiaux, F. (2024). Overcoming age differences in memory retrieval by reducing stereotype threat. *Memory & Cognition*, *52*(3), 622–631. https://doi.org/10.3758/s13421-023-01488-2

Mazerolle, M., Smith, A. M., Torrance, M., & Thomas, A. K. (2021). Understanding Older Adults' Memory Distortion in the Light of Stereotype Threat. *Frontiers in Psychology*, *12*, 656. https://doi.org/10.3389/fpsyg.2021.628696

McVay, J. C., & Kane, M. J. (2010). Does mind wandering reflect executive function or executive failure? Comment on Smallwood and Schooler (2006) and Watkins (2008). *Psychological Bulletin*, *136*(2), 188–197. https://doi.org/10.1037/a0018298

McVay, J. C., Meier, M. E., Touron, D. R., & Kane, M. J. (2013). Aging ebbs the flow of thought: Adult age differences in mind wandering, executive control, and self-evaluation. *Acta Psychologica*, *142*(1), 136–147. https://doi.org/10.1016/j.actpsy.2012.11.006

Meisner, B. A. (2012). A Meta-Analysis of Positive and Negative Age Stereotype Priming Effects on Behavior Among Older Adults. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences*, *67B*(1), 13–17. https://doi.org/10.1093/geronb/gbr062

Miller, K. A., Deci, E. L., & Ryan, R. M. (1988). Intrinsic motivation and self-determination in human behavior. *Contemporary Sociology*, *17*(2), 253.

Mooneyham, B. W., & Schooler, J. W. (2013). The Costs and Benefits of Mind-Wandering: A Review. *Canadian Journal of Experimental Psychology*, *67*(1), 11–18. https://doi.org/10.1037/a0031569

Moriello, G., Cotter, J. J., Shook, N., Dodd-McCue, D., & Welleford, E. A. (2013). The Effect of Implicit Stereotypes on the Physical Performance of Older Adults. *Educational Gerontology*, *39*(8), 599–612. https://doi.org/10.1080/03601277.2012.704241

Mrazek, M. D., Chin, J. M., Schmader, T., Hartson, K. A., Smallwood, J., & Schooler, J. W. (2011). Threatened to distraction: Mind-wandering as a consequence of stereotype threat. *Journal of Experimental Social Psychology*, *47*(6), 1243–1248. https://doi.org/10.1016/j.jesp.2011.05.011

Newman, S., Faux, R., & Larimer, B. (1997). Children's views on aging: Their attitudes and values. *The Gerontologist*, *37*(3), 412–417.

Ng, R., Allore, H. G., Monin, J. K., & Levy, B. (2016). Retirement as meaningful: Positive retirement stereotypes associated with longevity. *Journal of Social Issues*, *72*(1), 69–85.

Ng, R., Allore, H. G., Trentalange, M., Monin, J. K., & Levy, B. (2015). Increasing Negativity of Age Stereotypes across 200 Years: Evidence from a Database of 400 Million Words. *PLoS ONE*, *10*(2), e0117086. https://doi.org/10.1371/journal.pone.0117086

Ng, R., & Indran, N. (2022). Not Too Old for TikTok: How Older Adults Are Reframing Aging. *The Gerontologist*, *62*(8), 1207–1216. https://doi.org/10.1093/geront/gnac055

Nguyen, H.-H. D., & Ryan, A. M. (2008). Does stereotype threat affect test performance of minorities and women? A meta-analysis of experimental evidence. *The Journal of Applied Psychology*, *93*(6), 1314–1334. https://doi.org/10.1037/a0012702

Ní Léime, Á., Callan, A., Finn, C., & Healy, R. (2012). *Evaluating the impact of membership of Active Retirement Ireland on the lives of older people*.

North, M. S., & Fiske, S. T. (2015). Modern attitudes toward older adults in the aging world: A cross-cultural meta-analysis. *Psychological Bulletin*, *141*(5), 993–1021. https://doi.org/10.1037/a0039469

O'Brien, E. L., Torres, G. E., & Neupert, S. D. (2021). Cognitive Interference in the Context of Daily Stressors, Daily Awareness of Age-Related Change, and General Aging Attitudes. *The Journals of Gerontology: Series B*, *76*(5), 920–929. https://doi.org/10.1093/geronb/gbaa155

O'Brien, L. T., & Hummert, M. L. (2006). Memory Performance of Late Middle–Aged Adults: Contrasting Self–Stereotyping and Stereotype Threat Accounts of Assimilation to Age Stereotypes. *Social Cognition*, *24*(3), 338–358. https://doi.org/10.1521/soco.2006.24.3.338

O'Connor, A., Ladebue, A., Peterson, J., Davis, R., Grant, S. J., McCreight, M., & Lambert-Kerzner, A. (2018). Creating and testing regulatory focus messages to enhance medication adherence: *Chronic Illness*. https://doi.org/10.1177/1742395317753882

Osborne, J. W., & Walker, C. (2006). Stereotype Threat, Identification with Academics, and Withdrawal from School: Why the most successful students of colour might be most likely to withdraw. *Educational Psychology*, *26*(4), 563–577. https://doi.org/10.1080/01443410500342518

Palan, S., & Schitter, C. (2018). Prolific.ac—A subject pool for online experiments. *Journal of Behavioral and Experimental Finance*, *17*, 22–27. https://doi.org/10.1016/j.jbef.2017.12.004

Pearman, A., Neupert, S. D., & Hughes, M. L. (2020). State Anxiety Is Related to Cortisol Response During Cognitive Testing for Older Adults. *Gerontology and Geriatric Medicine*, *6*, 2333721420914776. https://doi.org/10.1177/2333721420914776

Pedroso-Chaparro, M. del S., Antón-López, J. C., Cabrera, I., Márquez-González, M., Martínez-Huertas, J. Á., & Losada-Baltar, A. (2022). 'I feel old and have aging stereotypes'. Internalized aging stereotypes and older adults' mental health: The mediational role of loneliness. *Aging & Mental Health*, 1–8.

Peer, E., Brandimarte, L., Samat, S., & Acquisti, A. (2017). Beyond the Turk: Alternative platforms for crowdsourcing behavioral research. *Journal of Experimental Social Psychology*, *70*, 153–163. https://doi.org/10.1016/j.jesp.2017.01.006

Pennington, C. R., Heim, D., Levy, A., & Larkin, D. T. (2016). Twenty Years of Stereotype Threat Research: A Review of Psychological Mediators. *PLOS ONE*, *11*(1), e0146487. https://doi.org/10.1371/journal.pone.0146487

Petersen, S. E., & Posner, M. I. (2012). The Attention System of the Human Brain: 20 Years After. *Annual Review of Neuroscience*, *35*(1), 73–89. https://doi.org/10.1146/annurev-neuro-062111-150525

Phibbs, S., & Hooker, K. (2018). An Exploration of Factors Associated With Ageist Stereotype Threat in a Medical Setting. *The Journals of Gerontology: Series B*, *73*(7), 1160–1165. https://doi.org/10.1093/geronb/gbx034

Pikhartova, J., Bowling, A., & Victor, C. (2015). Is loneliness in later life a self-fulfilling prophecy? *Aging & Mental Health*, *0*(0), 1–7. https://doi.org/10.1080/13607863.2015.1023767

Pinquart, M., & Wahl, H.-W. (2021). Subjective age from childhood to advanced old age: A meta-analysis. *Psychology and Aging*, *36*(3), 394–406. https://doi.org/10.1037/pag0000600

Popham, L. E., & Hess, T. M. (2015). Age Differences in the Underlying Mechanisms of Stereotype Threat Effects. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences*, *70*(2), 223–232. https://doi.org/10.1093/geronb/gbt093

Régner, I., Mazerolle, M., Alescio-Lautier, B., Clarys, D., Michel, B., Paccalin, M., Piolino, P., Rigalleau, F., Sambuchi, N., & Huguet, P. (2016). Aging Stereotypes Must be Taken Into Account for the Diagnosis of Prodromal and Early Alzheimer Disease: *Alzheimer Disease & Associated Disorders*, *30*(1), 77–79. https://doi.org/10.1097/WAD.0000000000000129

Reichstadt, J., Sengupta, G., Depp, C. A., Palinkas, L. A., & Jeste, D. V. (2010). Older Adults' Perspectives on Successful Aging: Qualitative Interviews. *The American Journal of Geriatric Psychiatry*, *18*(7), 567–575. https://doi.org/10.1097/JGP.0b013e3181e040bb

Robertson, D. A., & Kenny, R. A. (2015). Negative perceptions of aging modify the association between frailty and cognitive function in older adults. *Personality and Individual Differences*. https://doi.org/10.1016/j.paid.2015.12.010

Robertson, D. A., & Kenny, R. A. (2016). "I'm too old for that"—The association between negative perceptions of aging and disengagement in later life. *Personality and Individual Differences*, *100*, 114–119. https://doi.org/10.1016/j.paid.2016.03.096

Robertson, D. A., King-Kallimanis, B. L., & Kenny, R. A. (2015). Negative Perceptions of Aging Predict Longitudinal Decline in Cognitive Function. *Psychology and Aging*. https://doi.org/10.1037/pag0000061

Robertson, D. A., Savva, G. M., King-Kallimanis, B. L., & Kenny, R. A. (2015). Negative perceptions of aging and decline in walking speed: A self-fulfilling prophecy. *PloS One*, *10*(4), e0123260. https://doi.org/10.1371/journal.pone.0123260

Robertson, I. H., Manly, T., Andrade, J., Baddeley, B. T., & Yiend, J. (1997). `Oops!': Performance correlates of everyday attentional failures in traumatic brain injured and normal subjects. *Neuropsychologia*, *35*(6), 747–758. https://doi.org/10.1016/S0028-3932(97)00015-8

Robinson, S., & Howatson-Jones, L. (2014). Children's Views of Older People. *Journal of Research in Childhood Education*, *28*(3), 293–312. https://doi.org/10.1080/02568543.2014.912995

Rouder, J. N., & Haaf, J. M. (2018). Power, Dominance, and Constraint: A Note on the Appeal of Different Design Traditions. *Advances in Methods and Practices in Psychological Science*, *1*(1), 19–26. https://doi.org/10.1177/2515245917745058

Rupp, D. E., Vodanovich, S. J., & Credé, M. (2005). The multidimensional nature of ageism: Construct validity and group differences. *The Journal of Social Psychology*, *145*(3), 335–362.

Ryan, A. D. (2019). *The effect of stereotype-threat on memory and cortisol in older adults*. https://dr.library.brocku.ca/handle/10464/14505

Sadler, P. (2022). Age with ACT: A pilot acceptance and commitment therapy group for older adults receiving a community mental health service. *Psychotherapy and Counselling Journal of Australia*, *10*(1).

Sánchez Palacios, C., Trianes Torres, M. V., & Blanca Mena, M. J. (2009). Negative aging stereotypes and their relation with psychosocial variables in the elderly population. *Archives of Gerontology and Geriatrics*, *48*(3), 385–390. https://doi.org/10.1016/j.archger.2008.03.007

Santini, Z. I., Koyanagi, A., Tyrovolas, S., Haro, J. M., & Koushede, V. (2019). The association of social support networks and loneliness with negative perceptions of ageing: Evidence from the Irish Longitudinal Study on Ageing (TILDA). *Ageing and Society*, *39*(5), 1070–1090. https://doi.org/10.1017/S0144686X17001465

São José, J. M. S., Amado, C. A. F., Ilinca, S., Buttigieg, S. C., & Taghizadeh Larsson, A. (2019). Ageism in Health Care: A Systematic Review of Operational Definitions and Inductive Conceptualizations. *The Gerontologist*, *59*(2), e98–e108. https://doi.org/10.1093/geront/gnx020

Sargent-Cox, K., & Anstey, K. J. (2015). The relationship between age-stereotypes and health locus of control across adult age-groups. *Psychology & Health*, *30*(6), 652–670. https://doi.org/10.1080/08870446.2014.974603

Sargent-Cox, K., Anstey, K. J., & Luszcz, M. A. (2014). Longitudinal Change of Self-Perceptions of Aging and Mortality. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences*, *69*(2), 168–173. https://doi.org/10.1093/geronb/gbt005

Sarkisian, C. A., Hays, R. D., & Mangione, C. M. (2002). Do Older Adults Expect to Age Successfully? The Association Between Expectations Regarding Aging and Beliefs

Regarding Healthcare Seeking Among Older Adults. *Journal of the American Geriatrics Society*, *50*(11), 1837–1843. https://doi.org/10.1046/j.1532-5415.2002.50513.x

Sarkisian, C. A., Liu, H., Ensrud, K. E., Stone, K. L., & Mangione, C. M. (2001). Correlates of Attributing New Disability to Old Age. *Journal of the American Geriatrics Society*, *49*(2), 134–141. https://doi.org/10.1046/j.1532-5415.2001.49033.x

Sarkisian, C. A., Steers, W. N., Hays, R. D., & Mangione, C. M. (2005). Development of the 12-Item Expectations Regarding Aging Survey. *The Gerontologist*, *45*(2), 240–248. https://doi.org/10.1093/geront/45.2.240

Sarter, M., Givens, B., & Bruno, J. P. (2001). The cognitive neuroscience of sustained attention: Where top-down meets bottom-up. *Brain Research Reviews*, *35*(2), 146–160. https://doi.org/10.1016/S0165-0173(01)00044-3

Schmader, T., Johns, M., & Forbes, C. (2008). An integrated process model of stereotype threat effects on performance. *Psychological Review*, *115*(2), 336–356. https://doi.org/10.1037/0033-295X.115.2.336

Schroyen, S., Adam, S., Jerusalem, G., & Missotten, P. (2014). Ageism and its clinical impact in oncogeriatry: State of knowledge and therapeutic leads. *Clinical Interventions in Aging*, *10*, 117–125. https://doi.org/10.2147/CIA.S70942

Schwartz, E., Ayalon, L., & Huxhold, O. (2021). Exploring the Reciprocal Associations of Perceptions of Aging and Social Involvement. *The Journals of Gerontology: Series B*, *76*(3), 563–573. https://doi.org/10.1093/geronb/gbaa008

Seeman, T. E., Lusignolo, T. M., Albert, M., & Berkman, L. (2001). Social relationships, social support, and patterns of cognitive aging in healthy, high-functioning older adults: MacArthur Studies of Successful Aging. *Health Psychology*, *20*(4), 243–255. https://doi.org/10.1037/0278-6133.20.4.243

Segel-Karpas, D., Shrira, A., Cohn-Schwartz, E., & Bodner, E. (2022). Daily fluctuations in subjective age and depressive symptoms: The roles of attitudes to ageing and chronological age. *European Journal of Ageing*, *19*(3), 741–751. https://doi.org/10.1007/s10433-021-00681-z

Seibt, B., & Förster, J. (2004). Stereotype Threat and Performance: How Self-Stereotypes Influence Processing by Inducing Regulatory Foci. *Journal of Personality and Social Psychology*, *87*(1), 38–56. https://doi.org/10.1037/0022-3514.87.1.38

Seifert, A. (2021). Impact of the COVID-19 Pandemic on Self-Perception of Aging Among Older Adults. *Gerontology and Geriatric Medicine*, *7*, 233372142199932. https://doi.org/10.1177/2333721421999320

Sexton, E., King-Kallimanis, B. L., Morgan, K., & McGee, H. (2014). Development of the Brief Ageing Perceptions Questionnaire (B-APQ): A confirmatory factor analysis approach to item reduction. *BMC Geriatrics*, *14*(1), 44. https://doi.org/10.1186/1471-2318-14-44

Shapiro, J. R., & Neuberg, S. L. (2007). From Stereotype Threat to Stereotype Threats: Implications of a Multi-Threat Framework for Causes, Moderators, Mediators, Consequences, and Interventions. *Personality and Social Psychology Review*, *11*(2), 107–130. https://doi.org/10.1177/1088868306294790

Shaw, R., & Langman, M. (2017). Perceptions of Being Old and the Ageing Process. *Ageing International*, *42*(1), 115–135. https://doi.org/10.1007/s12126-017-9279-5

Sindi, S., Juster, R. P., Wan, N., Nair, N. P. V., Ying Kin, N., & Lupien, S. J. (2012). Depressive symptoms, cortisol, and cognition during human aging: The role of negative aging perceptions. *Stress (Amsterdam, Netherlands)*, *15*(2), 130–137. https://doi.org/10.3109/10253890.2011.599047

Skinner, E. A., Edge, K., Altman, J., & Sherwood, H. (2003). Searching for the structure of coping: A review and critique of category systems for classifying ways of coping.

Psychological Bulletin, *129*(2), 216–269. https://doi.org/10.1037/0033-2909.129.2.216

Skoblow, H. F., & Proulx, C. M. (2022). C-Reactive Protein, Subjective Aging, and Incident Cardiovascular Disease: A Mediation Model. *The Journals of Gerontology: Series B*, *77*(9), 1654–1658. https://doi.org/10.1093/geronb/gbac051

Smallwood, J., Davies, J. B., Heim, D., Finnigan, F., Sudberry, M., O'Connor, R., & Obonsawin, M. (2004). Subjective experience and the attentional lapse: Task engagement and disengagement during sustained attention. *Consciousness and Cognition*, *13*(4), 657–690. https://doi.org/10.1016/j.concog.2004.06.003

Söllner, M., Dürnberger, M., Keller, J., & Florack, A. (2021). The Impact of Age Stereotypes on Well-being: Strategies of Selection, Optimization, and Compensation as Mediator and Regulatory Focus as Moderator: Findings from a Cross-Sectional and a Longitudinal Study. *Journal of Happiness Studies*. https://doi.org/10.1007/s10902-021-00417-x

Solomon, K. (1990). Learned Helplessness in the Elderly: Theoretic and Clinical Considerations. *Occupational Therapy in Mental Health*, *10*(3), 31–51. https://doi.org/10.1300/J004v10n03_02

Spuling, S. M., Klusmann, V., Bowen, C. E., Kornadt, A. E., & Kessler, E.-M. (2020). The uniqueness of subjective ageing: Convergent and discriminant validity. *European Journal of Ageing*, *17*(4), 445–455. https://doi.org/10.1007/s10433-019-00529-7

Steele, C. M., & Aronson, J. (1995). Stereotype threat and the intellectual test performance of African Americans. *Journal of Personality and Social Psychology*, *69*(5), 797–811. https://doi.org/10.1037/0022-3514.69.5.797

Steele, C. M., Spencer, S. J., & Aronson, J. (2002). Contending with group image: The psychology of stereotype and social identity threat. In *Advances in experimental social psychology* (Vol. 34, pp. 379–440). Elsevier.

Stein, R., Blanchard-Fields, F., & Hertzog, C. (2002). The Effects of Age-Stereotype Priming on the Memory Performance of Older Adults. *Experimental Aging Research*, *28*(2), 169–181. https://doi.org/10.1080/03610730252800184

Strauman, T. J., Vieth, A. Z., Merrill, K. A., Kolden, G. G., Woods, T. E., Klein, M. H., Papadakis, A. A., Schneider, K. L., & Kwapil, L. (2006). Self-system therapy as an intervention for self-regulatory dysfunction in depression: A randomized comparison with cognitive therapy. *Journal of Consulting and Clinical Psychology*, *74*(2), 367–376. https://doi.org/10.1037/0022-006X.74.2.367

Strough, J., Bruin, W. B. de, & Peters, E. (2015). New perspectives for motivating better decisions in older adults. *Cognition*, 783. https://doi.org/10.3389/fpsyg.2015.00783

Summerville, A., & Roese, N. J. (2008). Self-report measures of individual differences in regulatory focus: A cautionary note. *Journal of Research in Personality*, *42*(1), 247–254. https://doi.org/10.1016/j.jrp.2007.05.005

Swift, H. J., Abrams, D., Lamont, R. A., & Drury, L. (2017). The Risks of Ageism Model: How Ageism and Negative Attitudes toward Age Can Be a Barrier to Active Aging: Risks of Ageism Model. *Social Issues and Policy Review*, *11*(1), 195–231. https://doi.org/10.1111/sipr.12031

Taylor, P., Morin, R., Parker, K., Cohn, D., & Wang, W. (2009). *Growing Old in America: Expectations vs. Reality* (Social & Demographic Trends Project). Pew Research Centre.

Terracciano, A., Stephan, Y., Aschwanden, D., Lee, J. H., Sesker, A. A., Strickhouser, J. E., Luchetti, M., & Sutin, A. R. (2021). Changes in subjective age during COVID-19. *The Gerontologist*, *61*(1), 13–22.

The World Bank. (2019). *Population ages 65 and above (% of total population) | Data*. https://data.worldbank.org/indicator/SP.POP.65UP.TO.ZS

Thomas, A. K., Smith, A. M., & Mazerolle, M. (2018). The Unexpected Relationship Between Retrieval Demands and Memory Performance When Older Adults Are Faced With Age-Related Stereotypes. *The Journals of Gerontology: Series B*. https://doi.org/10.1093/geronb/gby031

Tudoran, A. A., Scholderer, J., & Brunsø, K. (2012). Regulatory focus, self-efficacy and outcome expectations as drivers of motivation to consume healthy food products. *Appetite*, *59*(2), 243–251. https://doi.org/10.1016/j.appet.2012.05.002

Tully-Wilson, C., Bojack, R., Millear, P. M., Stallman, H. M., Allen, A., & Mason, J. (2021). Self-perceptions of ageing: A systematic review of longitudinal studies. *Psychology and Aging*. https://doi.org/10.1037/pag0000638

United Nations, Department of Economic and Social Affairs, & Population Division. (2020). *World population ageing, 2019 highlights.*

Uskul, A. K., Sherman, D. K., & Fitzgibbon, J. (2009). The cultural congruency effect: Culture, regulatory focus, and the effectiveness of gain- vs. loss-framed health messages. *Journal of Experimental Social Psychology*, *45*(3), 535–541. https://doi.org/10.1016/j.jesp.2008.12.005

Vailati Riboni, F., & Pagnini, F. (2022). Age-based stereotype threat: A scoping review of stereotype priming techniques and their effects on the aging process. *Aging & Mental Health*, *26*(7), 1444–1450. https://doi.org/10.1080/13607863.2021.1932741

Vallesi, A., Tronelli, V., Lomi, F., & Pezzetta, R. (2021). Age differences in sustained attention tasks: A meta-analysis. *Psychonomic Bulletin & Review*. https://doi.org/10.3758/s13423-021-01908-x

Veenstra, M., Daatland, S. O., & Aartsen, M. (2020). The role of subjective age in sustaining wellbeing and health in the second half of life. *Ageing and Society*, 1–21. https://doi.org/10.1017/S0144686X2000032X

Velaithan, V., Tan, M.-M., Yu, T.-F., Liem, A., Teh, P.-L., & Su, T. T. (2023). The Association of Self-Perception of Aging and Quality of Life in Older Adults: A Systematic Review. *The Gerontologist*, gnad041. https://doi.org/10.1093/geront/gnad041

Villiers-Tuthill, A., Copley, A., McGee, H., & Morgan, K. (2016). The relationship of tobacco and alcohol use with ageing self-perceptions in older people in Ireland. *BMC Public Health*, *16*(1), 627. https://doi.org/10.1186/s12889-016-3158-y

von Hippel, C., Kalokerinos, E. K., Haanterä, K., & Zacher, H. (2019). Age-based stereotype threat and work outcomes: Stress appraisals and rumination as mediators. *Psychology and Aging*, *34*, 68–84. https://doi.org/10.1037/pag0000308

Vossel, S., Warbrick, T., Mobascher, A., Winterer, G., & Fink, G. R. (2011). Spatial and sustained attention in relation to smoking status: Behavioural performance and brain activation patterns. *Journal of Psychopharmacology (Oxford, England)*, *25*(11), 1485–1495. https://doi.org/10.1177/0269881110391830

Warmoth, K., Lang, I. A., Phoenix, C., Abraham, C., Andrew, M. K., Hubbard, R. E., & Tarrant, M. (2016). 'Thinking you're old and frail': A qualitative study of frailty in older adults. *Ageing & Society*, *36*(7), 1483–1500. https://doi.org/10.1017/S0144686X1500046X

Warmoth, K., Tarrant, M., Abraham, C., & Lang, I. A. (2016). Older adults' perceptions of ageing and their health and functioning: A systematic review of observational studies. *Psychology, Health & Medicine*, *21*(5), 531–550. https://doi.org/10.1080/13548506.2015.1096946

Warmoth, K., Tarrant, M., Abraham, C., & Lang, I. A. (2018). Relationship between perceptions of ageing and frailty in English older adults. *Psychology, Health & Medicine*, *23*(4), 465–474. https://doi.org/10.1080/13548506.2017.1349325

Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: The PANAS scales. *Journal of Personality and Social Psychology*, *54*(6), 1063–1070.

Weiss, D. (2018). On the Inevitability of Aging: Essentialist Beliefs Moderate the Impact of Negative Age Stereotypes on Older Adults' Memory Performance and Physiological Reactivity. *The Journals of Gerontology: Series B*, *73*(6), 925–933. https://doi.org/10.1093/geronb/gbw087

Weiss, D., & Diehl, M. (2021). Measuring (Non)Essentialist Beliefs About the Process of Aging. *The Journals of Gerontology: Series B*, *76*(7), 1340–1348. https://doi.org/10.1093/geronb/gbaa113

Weiss, D., & Lang, F. R. (2012). "They" are old but "I" feel younger: Age-group dissociation as a self-protective strategy in old age. *Psychology and Aging*, *27*(1), 153–163. https://doi.org/10.1037/a0024887

Westerhof, G. J., Harink, K., Van Selm, M., Strick, M., & Van Baaren, R. (2010). Filling a missing link: The influence of portrayals of older characters in television commercials on the memory performance of older adults. *Ageing & Society*, *30*(05), 897–912. https://doi.org/10.1017/S0144686X10000152

Wheeler, S. C., & Petty, R. E. (2001). The effects of stereotype activation on behavior: A review of possible mechanisms. *Psychological Bulletin*, *127*(6), 797–826.

Williamson, J. D., & Fried, L. P. (1996). Characterization of Older Adults Who Attribute Functional Decrements to "Old Age". *Journal of the American Geriatrics Society*, *44*(12), 1429–1434. https://doi.org/10.1111/j.1532-5415.1996.tb04066.x

Wilson, D. M., Nam, M. A., Murphy, J., Victorino, J. P., Gondim, E. C., & Low, G. (2017). A critical review of published research literature reviews on nursing and healthcare ageism. *Journal of Clinical Nursing*, *26*(23–24), 3881–3892. https://doi.org/10.1111/jocn.13803

Wilton-Harding, B., Weber, N., & Windsor, T. D. (2022). Awareness of age-related gains and losses as moderators of daily stress reactivity in middle- and older-adulthood. *Frontiers in Psychiatry*, *13*, 929657. https://doi.org/10.3389/fpsyt.2022.929657

Wolff, J. K., Schüz, B., Ziegelmann, J. P., Warner, L. M., & Wurm, S. (2015). Short-Term Buffers, but Long-Term Suffers? Differential Effects of Negative Self-Perceptions of Aging Following Serious Health Events. *The Journals of Gerontology. Series B, Psychological Sciences and Social Sciences*. https://doi.org/10.1093/geronb/gbv058

Wolff, J. K., Warner, L. M., Ziegelmann, J. P., & Wurm, S. (2014). What do targeting positive views on ageing add to a physical activity intervention in older adults? Results from a randomised controlled trial. *Psychology & Health*, *29*(8), 915–932. https://doi.org/10.1080/08870446.2014.896464

Wurm, S., & Benyamini, Y. (2014). Optimism buffers the detrimental effect of negative self-perceptions of ageing on physical and mental health. *Psychology & Health*, *29*(7), 832–848. https://doi.org/10.1080/08870446.2014.891737

Wurm, S., Diehl, M., Kornadt, A. E., Westerhof, G. J., & Wahl, H.-W. (2017). How do views on aging affect health outcomes in adulthood and late life? Explanations for an established connection. *Developmental Review*, *46*, 27–43. https://doi.org/10.1016/j.dr.2017.08.002

Wurm, S., & Schäfer, S. K. (2022). Gain- but not loss-related self-perceptions of aging predict mortality over a period of 23 years: A multidimensional approach. *Journal of Personality and Social Psychology*, *123*, 636–653. https://doi.org/10.1037/pspp0000412

Wurm, S., Tesch-Römer, C., & Tomasik, M. J. (2007). Longitudinal Findings on Aging-Related Cognitions, Control Beliefs, and Health in Later Life. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences*, *62*(3), P156–P164.

Wurm, S., Tomasik, M. J., & Tesch-Romer, C. (2010). On the importance of a positive view on ageing for physical exercise among middle-aged and older adults: Cross-sectional and longitudinal findings. *Psychology & Health*, *25*(1), 25–42. https://doi.org/10.1080/08870440802311314

Wurm, S., Warner, L. M., Ziegelmann, J. P., Wolff, J. K., & Schüz, B. (2013). How do negative self-perceptions of aging become a self-fulfilling prophecy? *Psychology and Aging*, *28*(4), 1088–1097. https://doi.org/10.1037/a0032845

Yegiyan, N. S. (2012). Gun Focus Effect Revisited: Emotional Tone Modulates Information Processing Strategy. *Communication Research*, *39*(6), 724–737. https://doi.org/10.1177/0093650211400900

Zavagnin, M., Borella, E., & De Beni, R. (2014). When the mind wanders: Age-related differences between young and older adults. *Acta Psychologica*, *145*, 54–64. https://doi.org/10.1016/j.actpsy.2013.10.016

Zhang, R., Lu, X., Wu, W., & Shang, X. (2019). Why do patients follow physicians' advice? The influence of patients' regulatory focus on adherence: an empirical study in China. *BMC Health Services Research*, *19*(1). https://doi.org/10.1186/s12913-019-4127-9

Zhang, S., & Neupert, S. D. (2021). Within- and Between-Person Relationships Among Health, Awareness of Aging, and Control Beliefs: A Microlongitudinal Study. *The Journals of Gerontology: Series B*, *76*(5), 858–870. https://doi.org/10.1093/geronb/gbaa180