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**University College Cork, Ireland**  
 Coláiste na hOllscoile Corcaigh

1 **Regulatory focus and perceptions of ageing: exploring the connections**

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## 6 Regulatory focus and perceptions of ageing: exploring the connections

7

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

25 Keywords: Perceptions of ageing, regulatory focus, stereotype threat

## 26 Introduction

27 Perceptions of ageing can be thought of in several ways: how people view ageing as a general  
28 process, how they view their own ageing, and how they view older adults as a group (Barber,  
29 2017). Societally, older adults can often be viewed negatively through stereotypes, contributing  
30 to the view that they are less valuable to society than younger adults (Ehni & Wahl, 2020). These  
31 views may be held by people of all ages, including older adults themselves. Older adults who  
32 hold these stereotypes, or negative perceptions of ageing (NPA), must contend with these views

33 becoming applicable to themselves, as they age. Despite media portrayals of older people  
34 including more positive examples of ageing, negative stereotypes persist (Robinson & Anderson,  
35 2006; Westerhof, Harink, Van Selm, Strick, & Van Baaren, 2010). Not only is this detrimental  
36 for those who are currently in the ‘older age’ demographic, but also for those who are exposed to  
37 these negative views as younger people and will age while holding those views. People who hold  
38 the most negative views of older adults, experience worse consequences of their own ageing, and  
39 this has been demonstrated in longitudinal research, as well as cohort studies (Freeman et al.,  
40 2016; Wurm et al., 2013). NPA are associated with higher incidence of physical illnesses such as  
41 poor cardiovascular health, respiratory mortality, and higher incidence of Alzheimer’s Disease  
42 (Levy et al., 2009; Levy et al., 2016; Levy & Myers, 2005) as well as mental health issues,  
43 loneliness and social disengagement (Pikhartova et al., 2015; Robertson & Kenny, 2016). A  
44 recent systematic review which included 422 journal articles across 45 countries found reliable  
45 effects of ageism, including negative self-perceptions of ageing, in 11 health domains (Chang et  
46 al., 2020).

47 How this happens is not yet fully understood, with many different processes and mechanisms  
48 theorised and synthesised in the Stereotype Embodiment Model proposed by Levy (2009) (see  
49 also Fawsitt & Setti, (2017)). Three main pathways have been proposed as the mechanisms  
50 through which NPA act. These are the physiological, the psychological and the behavioural  
51 (Fawsitt & Setti, 2017; Levy, 2009). These pathways propose that the consequences of NPA  
52 come about through a lack of engagement in different important aspects of life, including health  
53 behaviours, social interaction and the overall effort and interest into maintaining physical and  
54 mental health. In order to avoid these negative outcomes for older adults it is important to  
55 understand these mechanisms behind these pathways further. One potential mechanism is

56 stereotype threat.

57           In a review of stereotype threat and perceptions of ageing Fawsitt & Setti, (2017) have  
58 argued that the literature on stereotype threat can provide insight into the mechanisms through  
59 which NPA act as a catalyst to negative consequences. Stereotype threat was first described as  
60 “being at risk of confirming, as self-characteristic, a negative stereotype about one's group”  
61 (Steele & Aronson, 1995, p. 797). Stereotype threat is the negative impact on performance when  
62 an individual is required to perform on a task for which they are stereotyped. For example, a  
63 woman may perform worse at a maths test than she actually could, because she is reminded of  
64 the stereotype of women being considered to have poorer performance in tests of mathematical  
65 ability (Cadinu et al., 2005). This effect in older adults is moderated by whether they view  
66 themselves as older adults, and whether they think others view them as older adults (Barber,  
67 2017). Tests such as those of memory are impacted by being exposed to negative views about  
68 ageing, particularly if the individual feels they belong to the older person group or feel at risk of  
69 belonging to it. This has been reliably found in three meta-analyses on stereotype threat in older  
70 adults (Armstrong et al., 2017; Lamont et al., 2015; Meisner, 2012). The consequences of poor  
71 performance on these tests are significant, such as inaccurate results from tests of mild cognitive  
72 impairment, potentially leading to incorrect diagnoses (Barber et al., 2015) and anxiety about  
73 developing Alzheimer’s disease. The consequences may also be less immediately apparent with  
74 perceptions of ageing and stereotype threat influencing engagement with and decisions  
75 concerning healthcare (Abdou et al., 2016) as an example of the far reaching impact of being  
76 subjected to stereotype threat. Insight on the link between stereotype threat and its consequences  
77 can be drawn from the role of regulatory focus in health messaging in younger populations  
78 (Garza, 2019; Ludolph & Schulz, 2015). Two mechanisms have been proposed by which this

79 negative prompt acts, i.e. disruptive thoughts interfering with task relevant information in  
80 working memory and regulatory mismatch (Armstrong et al., 2017; Barber, 2017). This research  
81 highlights the need for a better understanding of the processes underpinning these long term  
82 consequences.

83         Regulatory mismatch is defined as a misalignment between task demands and the way  
84 the individual approaches the task itself. Regulatory Focus theory (Higgins, 2000; 1997) posits  
85 there are two ways to approach a task, a promotion focus is when someone is interested in  
86 making gains and achieving goals, and a prevention focus where someone is interested in  
87 avoiding losses and preventing negative outcomes. Tasks themselves often have a promotion or  
88 prevention focus as well, such as promoting a gain or preventing a loss. A regulatory mismatch  
89 occurs when an individual's and a task's regulatory focus are opposed, and this leads to poorer  
90 performance. For example, one may focus on accuracy to avoid a loss in performing a task that  
91 rewards speed instead. This is hypothesised to be the process through which stereotype threat in  
92 older adults works (Barber, 2017; Barber & Mather, 2013). Importantly, each individual is  
93 characterised by a trait regulatory focus, which represents a default position (Lockwood et al.,  
94 2002), while state regulatory focus is the focus one temporarily adopts in a given task, which  
95 generally corresponds with their trait regulatory focus, although not necessarily. Stereotype  
96 threat in older adults seems to act through regulatory focus mechanisms with stereotype threat  
97 inducing a prevention focus in individuals which negatively impacts performance when  
98 completing tasks that have a promotion focus (Barber et al., 2015; Gaillard et al., 2011). A large  
99 review of studies on regulatory focus suggests that it may be relatively stable across the lifespan  
100 and it may be partially based off personality traits (Lanaj et al., 2012).

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

110 The present study aims to explore cross-sectionally the association between perceptions  
111 of ageing and trait regulatory focus, We hypothesise that older adults who internalise negative  
112 stereotypes of ageing are more likely to adopt a trait prevention focus (Fawsitt & Setti, 2017).  
113 This is of relevance to understand the mechanisms behind NPA and their negative outcomes, as  
114 well as of applied relevance to establish whether trait focus is a potentially modifiable factor  
115 related to such mechanisms. In order to test this measures of trait regulatory focus and  
116 perceptions of ageing will be administered with other potential confounding factors also  
117 measured such as affect, age, medication use and cognitive failures. These factors have all been  
118 linked to perceptions of ageing. A measure of self-reported cognitive failures was included as  
119 there is evidence of links between performance on cognitive measures and perceptions of ageing  
120 (Sindi et al., 2012) although this has not been explored using self-reported measures. Affect has  
121 been found to influence scores on regulatory focus questionnaires and with negative affect being  
122 linked to a prevention focus (Gorman et al., 2012). Perceptions of ageing have also been linked

123 to affect (Bellingtier & Neupert, 2017), in order to understand any role this variable plays,  
124 participants completed the Positive and Negative Affect Scale.

## 125 **Method**

### 126 *Participants*

127 Participants were 200 adults aged 60+ recruited from across the UK and Ireland through an  
128 online site (Prolific). This sample size was chosen based on a priori power calculations carried  
129 out in G\*Power (Faul et al., 2009). A sample of 146 was required based on a six predictor  
130 variable equation with a medium effect size with an alpha = 0.05 and a power = 0.95. A sample  
131 size of 200 was chosen to ensure dropout or exclusion on other factors was not an issue. Prolific  
132 works by advertising studies to potential participants on Prolific with an estimated completion  
133 time, reward, and eligibility criteria. Participants were mostly female (n=123) and overall healthy  
134 (n= 16 took five or more medications regularly). Participants were asked their age in years, their  
135 sex with an option to not provide that information, the level of schooling achieved, their current  
136 marital status, and the number of daily medications as a measure of polypharmacy. Participants'  
137 ages ranged from 60 to 85 years. The average age of participants was 65.39 (Standard Deviation  
138 (SD)=4.43). Participants took on average of 2.72 medications a day with less than ten percent of  
139 participants taking more than five a day. Participants were reimbursed at an average of £11.25  
140 per hour. The study was approved by the School of Applied Psychology Ethics Committee,  
141 University College Cork.

142



143 **Material**

144 *Trait Regulatory Focus Questionnaire*

145 Participants completed the Promotion/Prevention Scale from (Lockwood et al., 2002) to measure  
146 participants' trait regulatory focus. This questionnaire was chosen as it targets the present time,  
147 unlike several others comprising measures which use questions about individuals childhood's  
148 which are less relevant to older adults (Haws et al., 2010; Higgins et al., 2001). This consists of  
149 two scales, with 9 items measuring promotion focus and 9 items measuring prevention focus.  
150 Each item is a description such as "In general, I am focused on preventing negative events in my  
151 life" which participants then answer with a scale ranging from 1 – not true of me at all, to 9 –  
152 very true of me. Four questions were not considered relevant for our population, as they related  
153 to desired school performance and academic success and were changed to more generally apply  
154 to an older adult's life (Lockwood et al., 2005). The modified version is available in Appendix 1.  
155 Scores from each scale are summed to give two independent scales, one indicating an  
156 individual's promotion focus, and the other their prevention focus. Both subscales were reliable  
157 (promotion  $\alpha=.89$ , prevention  $\alpha=.77$ ), and had a small correlation with one another ( $r=.198$ ,  $p$   
158  $<.01$ ).

159 *Brief-Perceptions of Ageing Questionnaire*

160 The Brief-Ageing Perceptions Questionnaire (B-APQ) is a measure of an individuals'  
161 perceptions of ageing and is made up of 17 Likert scale items where that participants are asked to  
162 select their level of agreement or disagreement, from Strongly Agree, Agree, Neither Agree nor  
163 Disagree, Disagree, Strongly Disagree). The 17 statement items are categorised into five  
164 domains, Timeline-Chronic (e.g. I feel my age in everything that I do), Consequences Positive

165 (e.g. as I get older I get wiser), Emotional Representations (e.g. I get depressed when I think  
166 about how ageing might affect the things that I can do), Consequences and Control Negative  
167 (e.g. Getting older makes me less independent), and Control Positive (e.g. Whether I continue  
168 living life to the full depends on me). An overall score for Perceptions of Ageing is created by  
169 summing all scales after reverse scoring Consequences Positive and Control Positive. This gives  
170 a range of possible scores from 17-85, the higher a participant scores the more negative their  
171 perceptions of ageing. This summing technique was used in Freeman et al.'s, (2016) paper where  
172 B-APQ scores were predictive of the onset and persistence of anxiety and depression in a large  
173 representative sample of older adults. The B-APQ has been validated previously on a large  
174 population of older adults (Sexton et al., 2014).

#### 175 *Cognitive Failures Questionnaire*

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

#### 183 *Positive and Negative Affect Scale (PANAS)*

184 Positive and negative affect were measured using the Positive and Negative Affect Scale  
185 (Watson et al., 1988) which asks participants to rate how much a word describes how they feel  
186 right now at this very moment. It consists of 20 items presenting a word (e.g. Interested, alert,

187 irritable, active) which participants endorse on a 1-5 scale from “Very slightly or not at all”, to  
188 “Extremely”. It is a combination of two, ten item scales to evaluate positive and negative affect.  
189 Scores from both scales are summed creating a positive affect and negative affect score.

### 190 *Procedure*

191 Participants who ~~met~~ the demographic requirements were notified of the availability of this  
192 study and ~~people~~ who wanted to take part were directed to a consent form and information sheet  
193 hosted on Qualtrics, and those who consented continued to complete the study. ~~The~~  
194 ~~questionnaires were presented in order of~~ Initially participants were presented with a  
195 demographics ~~questionnaire~~ to ensure ~~suitability~~ to participant selection criteria. ~~and~~ Then the  
196 regulatory focus questionnaire and the B-APQ ~~were presented~~ in counterbalanced order.  
197 ~~finishing~~ Finally participants were presented with the Positive and Negative Affect Scale and the  
198 Cognitive Failures Questionnaire. These two questionnaires were ~~administered~~ last to ensure  
199 they did not influence our main variables as ~~in theory~~ priming about forgetfulness could prompt  
200 participants to answer more negatively about their perceptions of ageing and priming negative or  
201 positive moods could influence other answers. There was no differences ~~found~~ between  
202 participants who answered the PANAS first or the B-APQ first. ~~Demographics were presented~~  
203 ~~first to ensure participants were eligible to participate in the study.~~ Following completion of the  
204 ~~questionnaires~~ participants were ~~then~~ brought to a page thanking them for their participation.

### 205 **Results**

206 Participants' CFQ mean score was 32.36 (SD = 12.36) ~~in line with data from a similar age range~~  
207 ~~(Knight et al., 2004).~~ The Positive Affect Scale (PAS) and Negative Affect Scale (NAS) means  
208 and standard deviations are normal for the population (Watson et al., 1988). ~~The Promotion~~

209 focus questionnaire with a mean of 56.77 and SD of 13.66. The Brief Perceptions of Ageing  
 210 Questionnaire which had a mean of 42.27 and SD of 9.25 which is consistent with a large  
 211 nationally representative sample in an Irish study (Freeman et al., 2016). The promotion and  
 212 prevention focus scales were standardised and then the prevention scores were taken from the  
 213 promotion scores to create a difference score [difference score = z(promotion score) –  
 214 z(prevention score)] representing the strength of promotion relative to prevention scores. This  
 215 technique was used in the original paper from Lockwood et al., (2002). Higher scores in this  
 216 difference meaning a stronger promotion focus.

217 **Table 1.**

218 *Descriptive Statistics*

219

	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

220

221 ***Correlations***

222 Exploratory correlations were run to investigate the relationships predicted in our hypotheses.

223 Spearman Correlation was used as the data was non-normally distributed. B-APQ had a large

224 negative correlation with the Promotion-Prevention difference scores  $r=-.683$ ,  $n=173$ ,  $p<.0005$ .

225 The B-APQ scores correlated with scores from the CFQ  $r=.337$ ,  $n=193$ ,  $p<.0005$ , the PAS  $r=-$   
226  $.495$ ,  $n=200$ ,  $p<.0005$  and the NAS  $r=.303$ ,  $n=200$ ,  $p<.0005$ . Only the Regulatory focus  
227 questionnaires did not have protocol for missing data so participants with missing data were not  
228 included in the final analysis using listwise exclusion.

### 229 *Multiple regression*

230 To examine these relationships further we performed a hierarchical multiple regression to  
231 investigate the contribution of B-APQ scores to the promotion-prevention difference scores,  
232 while controlling for age, gender and the PANAS scores. The factors controlled for in step 1  
233 were basic demographic characteristics, i.e. age and sex, these explained less than 1 per cent of  
234 variance in promotion-prevention difference scores and were non-significant but were retained  
235 for theoretical significance to the model. Step two controlled for affect, i.e. NAS scores and the  
236 PAS scores. The second step of the model explained 28 per cent of the variance in promotion-  
237 prevention difference scores. Finally, in the third step we examined the contribution of B-APQ  
238 scores. The total sample at this step after listwise deletion was  $n=173$ . The order of these steps  
239 was chosen as step one was controlling first to control for demographic variables, then affect  
240 which was a statistically significant confounding variable and finally our independent variable of  
241 interest. The total variance explained by the model was 51.5 per cent,  $F(5, 167) = 37.159$ ,  $p$   
242  $<.001$ . The B-APQ scores explained an additional 23 per cent of the variance in promotion-  
243 prevention difference scores, after controlling for age and gender,  $R^2$  change  $.23$ ,  $F$   
244 Change  $(1, 167) = 82.458$ ,  $p<.001$ . In the final model only the PAS scores and B-APQ were  
245 significant. In the final model, only the PAS and BAP-Q scores were significant, and BAP-Q  
246 explained a greater amount of variance ( $\beta = .584$ ,  $p<.001$  than the PAS ( $\beta = .219$ ,  $p<.001$ )).  
247 The contribution of the NAS to the model was not statistically significant in this model. With B-

248 APQ recording a higher beta value (beta=-.584,  $p < .001$ ) than PAS (beta=.219,  $p < .001$ ). The  
249 statistical significance of the NAS diminished to non-significance. We carried out tests to see if  
250 the data met the assumption of collinearity which indicated that multicollinearity was not a  
251 concern (NAS, Tolerance = .9, VIF = 1.11).  
252

253 Table 2.

254 *Table of Regression Coefficients for Standardized Regulatory Focus Scores.*

Step	Predictor	Unstandardized		Standardized		R <sup>2</sup>			
		Coefficients		Coefficients		R <sup>2</sup>	change	F	P
		B	SE	β	p.				
1						.006	.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				

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

256 **Discussion**

257 These results suggest that older adults with stronger NPA hold a more preventive regulatory

258 focus. This relationship exists independently of controlling factors including age, sex and affect.  
259 The relationship between affect, both positive and negative, and scores on the regulatory focus  
260 questionnaire is in line with previous research that has shown these two constructs to be related  
261 (Summerville & Roese, 2008). Perceptions of ageing also had a significant relationship with  
262 negative and positive affect. ~~and~~ Previous research points to an interaction between awareness of  
263 age related changes, perceptions of ageing, and daily affect (Bellintier & Neupert, 2017) ~~as well~~  
264 ~~as with~~ more positive perceptions of ageing being protective of more negative reactivity to daily  
265 stressors, measured as negative affect (Bellintier & Neupert, 2016). Perceptions of ageing can  
266 predict changes in daily affect after changes in age related awareness (Bellintier & Neupert,  
267 2017) and after serious adverse health events (Wolff et al., 2015).

268 These results provide direction for future research into the ways ~~through~~ ~~by~~ which short  
269 and long term effects of negative stereotypes in older adults are connected. ~~Older adults~~  
270 ~~experience more than one set of consequences from being exposed to negative stereotypes, short~~  
271 ~~term consequences,~~ ~~Stereotype threat can influence performance in tests and,~~ ~~which also~~  
272 contributes to treatment and support decisions, and long term which may influence their health  
273 and wellbeing through the physiological, psychological and behavioural pathways (Fawsitt &  
274 Setti, 2017; Levy et al., 2009, 2016; Levy & Myers, 2005). These results help connect these two  
275 seemingly distinct processes through the mechanism of trait regulatory focus. These results  
276 support the hypothesis that the more negative a view of ageing older adults have, the more likely  
277 they are to adopt a prevention over promotion focus style.

278 This research suggests that older adults who have internalised more negative stereotypes  
279 related to older age, the ageing process and themselves as older adults, experience stereotype  
280 threat which can cause them to adopt a more preventive dispositional focus. These results have



281 theoretical and practical applications. Theoretically, they demonstrate a link between NPA and  
282 regulatory focus that can potentially constitute a mechanism behind the long term effects of NPA  
283 on mental and physical health. Some research has found that **for** health interventions, prevention  
284 focused individuals may require more support early on for success (Fuglestad et al., 2015). One  
285 potential pathway highlighted by Fawsitt & Setti (2017) suggests that regulatory focus changes  
286 in older adults may lead to ineffective or inefficient strategies around health behaviours. There is  
287 research showing the connection between regulatory focus and health behaviours in those with  
288 type two diabetes (participants' mean age 61.66 years), finding that patients with a promotion  
289 focus had better self-management of the condition (Laroche et al., 2020). This would fit well  
290 with Levy's Stereotype Embodiment Theory within the behavioural pathway (Levy, 2009).

291 **These results can contribute to the development and tailoring of practical interventions**  
292 **with older adults who hold NPA. Lockwood et al., (2005) found that older adults respond better**  
293 **to prevention focus health messages than younger adults. There is already some evidence**  
294 **suggesting trait regulatory focus is related to health behaviours (Gomez et al., 2013) and that**  
295 **health messaging tailored to a regulatory focus is more effective (Lin & Yeh, 2017; Uskul et al.,**  
296 **2009). Future research could examine perceptions of ageing's relationship with health related**  
297 **scales of regulatory focus and if this could inform more effective health messaging as regulatory**  
298 **focus has been seen to play a role in some health messaging already (Berezowska et al., 2018).**  
299 Older adults with more negative perceptions of ageing are more likely to suffer from loneliness  
300 (Pikhartova et al., 2015). If it is the case that they also have a more dispositional prevention  
301 focus, then this is a potential avenue for intervention. Targeted **an**-awareness messages such as  
302 "In order to avoid losing a healthy social circle you should ensure you reach out to people" could  
303 be beneficial **for this group. Although further research will be needed to examine whether this**

304 form of targeted messaging could improve current approaches. Given the link between NPA and  
305 poor health behaviours, this study suggests that leveraging on regulatory focus can potentially  
306 support healthier behaviours in older adults with NPA.

307 Public health messages could be targeted to particular older adults groups (Pikhartova et  
308 al., 2015). As Older adults with more negative perceptions of ageing are more likely to suffer  
309 from loneliness if they also have a more dispositional prevention focus. Targeted an awareness  
310 messages such as “In order to avoid losing a healthy social circle you should ensure you reach  
311 out to people” could be beneficial for this group. Although further research will be needed to  
312 examine whether this form of targeted messaging would be more effective. Although these  
313 assumptions cannot be based off this research alone.

314 Understanding the association between regulatory focus and NPA can inform on the  
315 design of cognitive tests for detecting conditions such as mild cognitive impairment and the  
316 dementia. Older adults’ performance on these tests may currently be being affected by their  
317 regulatory focus and/or their perceptions of ageing. in which participants may withdraw from  
318 responding because of their prevention focus.

319 These results have implications for practical interventions with older adults who hold  
320 NPA. Lockwood et al., (2005) found that older adults respond better to prevention focus health  
321 messages than younger adults. There is already some evidence suggesting trait regulatory focus  
322 is related to health behaviours (Gomez et al., 2013) and that health messaging tailored to a  
323 regulatory focus are more effective (Lin & Yeh, 2017; Uskul et al., 2009). Future research could  
324 examine perceptions of ageing’s relationship with health related scales of regulatory focus and if  
325 this could inform more effective health messaging as regulatory focus has been seen to play a  
326 role in some health messaging already (Berezowska et al., 2018). Given the link between NPA

327 and poor health behaviours, this study suggests that leveraging on regulatory focus can  
328 potentially support healthier behaviours in older adults with NPA.

329 In addition, utilising appropriate messaging may contribute to more positive perceptions  
330 of ageing. ~~one could assume that small positive changes in may have positive consequences and~~  
331 preliminary findings ~~have found small positive changes~~ in self-perceptions of ageing may have  
332 positive consequences ~~this~~ with mental health (Beyer et al., 2019). ~~There have been~~ promising  
333 developments with using regulatory focus theory to inform interventions for depression, weight  
334 loss, and medication adherence but this research has not focused specifically on older adults  
335 (Fuglestad et al., 2015; Laroche et al., 2020; Strauman et al., 2006). Recent research on the  
336 efficacy of health messaging for older adults demonstrates potential pathways which could be  
337 used to improve older adults health behaviours(O'Connor et al., 2018; Zhang et al., 2019). More  
338 research is needed to understand regulatory focus with older adults and the interplay with  
339 perceptions of ageing.

#### 340 ***Limitations***

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

350 adults' psychological states and behaviours.

### 351 *Conclusions*

352 These results build support for the connection between regulatory focus as a mechanism of  
353 negative perceptions of ageing in older adults in a range of domains (Fawsitt & Setti, 2017).

354 Future research should explore the causal nature of this association as it will provide a clearer  
355 picture of how perceptions of ageing and stereotype threat are connected. Future research could  
356 also examine if these relationships influence the interactions between regulatory focus and  
357 perceptions of ageing in relation to health decisions and care seeking behaviours in older adults.

358 This understanding would benefit interventions aimed at improved outcomes in ageing such as  
359 health interventions (Keller, 2006) and performance on clinical tests (Barber et al., 2015).

### 360 Statement of ethical approval

361 Ethical approval was gained from the Ethics Board of The School of Applied Psychology,  
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### 365 Declaration of contribution of authors

### 366 Statement of conflict of interest

367 No conflict of interest declared.

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539  
540

541 Appendix 1:

542 Modified version of the Trait Regulatory Focus Questionnaire

543 **Trait Regulatory Focus scale**

544 **Promotion Prevention Scale**

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

546 each item





	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**	-	-.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**	1	-.129	.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	1	-.093	.079	.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	1	-.020	-.080	.039	-.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	1	.062	.028	-.045	-.129	-.001
	Sig. (2-tailed)	.801	.844	.434	.570	.381	.696	.526	.068		.985
	N	173	200	185	193	200	200	200	200	200	197
Marital Status	Pearson Correlation	.021	-.004	.166*	.089	1	-.101	-.071	-.055	.174*	-.001
	Sig. (2-tailed)	.780	.953	.025	.220	.156	.323	.442	.014	.985	
	N	172	197	182	190	197	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).