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## **Financial Decision Making in the United Kingdom: Changing saving behaviours with light-touch interventions**

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**Financial Decision Making in the  
United Kingdom: Changing saving  
behaviours with light-touch  
interventions**

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# Abstract

The extent to which people save for retirement is a key component in determining well-being in later life and, in the UK, policy makers have been concerned at the low level of retirement saving. In 2012, this led to the introduction of automatic enrolment into defined contribution pensions for all eligible employees with an aim of boosting illiquid retirement saving. Despite its success, the tendency to remain at the default minimum contribution rate means that, for many, the risk of not achieving saving adequacy in retirement is considerable. Therefore, the need to encourage people to save more has been widely acknowledged.

This thesis consists of five studies all of which look at whether different light-touch interventions could be effective at increasing pension saving rates among employees in the UK. The first study examines the role of a questionnaire that boosts future self-relevance to determine whether it improves the efficacy of primes to increase retirement saving. The second study looks at future self-relevance and the emotional intensity of vignettes to explore whether these are effective at improving retirement saving contribution levels. The third study looks at whether the phenomenon of inaction inertia - which decreases uptake of saving now because opportunities were missed in the past - is likely to exist in the UK retirement saving context; and, how state-action orientation and regulatory mode mindsets may affect the propensity to save. In the fourth study, a quasi-experiment using a large data set from the National Employment Savings Trust was conducted to investigate whether the Freedom and Choice legislation introduced in 2015 decreased the rate of opt out amongst the over 55s (given the new cash access options provided the

opportunity for employees to receive employer matches and tax relief without losing the liquidity of their money). Finally, in a field study, I looked at the broader notion of financial capability (the building blocks for financial decision making) to see whether a text-message intervention providing useful resources and financial tips was effective at improving the financial capability of widening participation students in English higher education institutions.

The primary contribution of this thesis is that it provides evidence on the efficacy of several theoretically-grounded and easily scalable approaches to ‘nudge’ retirement saving (and financial capability in the case of the final study), that could be implemented at a very low-cost and without personalisation. A consideration of the value of replication and the importance of validity for the self-report measures used to explore many psychological concepts is also contributed to within this thesis. Together the findings in this thesis point to the likelihood that light-touch interventions alone will not solve the pension saving ‘crisis’.

# Contents

<b>1</b>	<b>Introduction</b>	<b>1</b>
1.1	Research questions . . . . .	10
1.2	Thesis structure . . . . .	12
<b>2</b>	<b>Literature review</b>	<b>14</b>
2.1	Introduction . . . . .	14
2.2	The policy context . . . . .	15
2.2.1	The role of the state . . . . .	15
2.2.2	The role of the employer and individual . . . . .	16
2.3	Retirement saving adequacy . . . . .	18
2.3.1	Measuring saving adequacy . . . . .	20
2.4	Explanations for under saving . . . . .	25
2.4.1	A focus on the present . . . . .	26
2.4.2	Inaction inertia . . . . .	44
2.4.3	Arbitrage gains . . . . .	52
2.4.4	Financial capability . . . . .	54
2.5	Summary . . . . .	62
<b>3</b>	<b>Methodology</b>	<b>64</b>
3.1	Introduction . . . . .	64
3.2	Methodological framework . . . . .	65
3.2.1	Research paradigm . . . . .	65

3.2.2	Research design . . . . .	67
3.2.3	Research methods . . . . .	74
3.3	Ethical considerations . . . . .	77
3.3.1	Do people want to save more for retirement? . . . . .	78
3.3.2	Do people want to be nudged? . . . . .	79
3.4	Conclusion . . . . .	80
<b>4</b>	<b>Is future self-relevance necessary to increase saving for retirement?</b>	<b>82</b>
4.1	Introduction . . . . .	82
4.2	Literature review . . . . .	83
4.2.1	Rationale for the present research . . . . .	87
4.2.2	Value of replication studies . . . . .	89
4.3	Method . . . . .	91
4.3.1	Participants . . . . .	91
4.3.2	Materials and procedure . . . . .	92
4.4	Results . . . . .	94
4.4.1	Demographic balance . . . . .	94
4.4.2	Interest in financial product . . . . .	95
4.4.3	Primary analysis: Money allocation task . . . . .	96
4.5	Discussion . . . . .	98
4.6	Conclusion . . . . .	102
<b>5</b>	<b>Emotion, future self-relevance and retirement saving decisions</b>	<b>104</b>
5.1	Introduction . . . . .	104
5.2	Literature review . . . . .	104
5.3	Methods . . . . .	114
5.3.1	Pre-test . . . . .	114
5.3.2	Participants . . . . .	116
5.3.3	Procedure and materials . . . . .	117
5.4	Results . . . . .	122

5.4.1	Demographic balance . . . . .	122
5.4.2	Main analysis . . . . .	124
5.4.3	Additional analysis: The role of mediators and moderators . . . . .	125
5.5	Discussion . . . . .	126
5.6	Conclusion . . . . .	129
<b>Chapter 5b</b>		<b>131</b>
5.1	Introduction . . . . .	131
5.2	Literature review . . . . .	132
5.3	Method . . . . .	134
5.3.1	Participants . . . . .	134
5.3.2	Procedure and materials . . . . .	135
5.4	Results . . . . .	137
5.4.1	Wave 1 analysis . . . . .	138
5.4.2	Main analysis . . . . .	140
5.5	Discussion . . . . .	143
5.6	Conclusion . . . . .	144
<b>6 Stuck in the past? Inaction inertia and the role of action-state orientation, time perspective, regulatory mode and regret in the UK retirement saving context</b>		<b>146</b>
6.1	Introduction . . . . .	146
6.2	Literature review . . . . .	147
6.3	Experiment 1 . . . . .	155
6.3.1	Method . . . . .	155
6.3.2	Results . . . . .	158
6.3.3	Experiment 1: Discussion . . . . .	162
6.4	Experiment 2 . . . . .	165
6.4.1	Method . . . . .	167
6.4.2	Results . . . . .	170



6.4.3	Experiment 2: Discussion . . . . .	174
6.5	Conclusion . . . . .	176
<b>7</b>	<b>How does the introduction of the money purchase annual allowance affect pension opt-out behaviour?</b>	<b>179</b>
7.1	Introduction . . . . .	179
7.2	Literature review . . . . .	181
7.3	Data, variables and empirical model . . . . .	184
7.3.1	Sample . . . . .	184
7.3.2	Outcome variable . . . . .	185
7.3.3	Empirical strategy . . . . .	188
7.3.4	Tests for validity of the identification strategy . . . . .	190
7.4	Results . . . . .	195
7.4.1	Primary analysis . . . . .	195
7.4.2	Secondary analysis . . . . .	196
7.4.3	Robustness check . . . . .	200
7.5	Discussion . . . . .	203
7.6	Conclusion . . . . .	205
<b>8</b>	<b>Financial wellbeing and capability of widening participation students and a text message intervention to improve it</b>	<b>207</b>
8.1	Introduction . . . . .	207
8.2	Literature review . . . . .	209
8.2.1	Financial wellbeing . . . . .	213
8.2.2	Financial capability . . . . .	214
8.2.3	Financial knowledge . . . . .	215
8.2.4	Financial self-beliefs . . . . .	216
8.2.5	Financial behaviour . . . . .	219
8.2.6	The present research . . . . .	219
8.2.7	Research question and hypotheses . . . . .	223

8.3	Method . . . . .	225
8.3.1	Participants and procedure . . . . .	225
8.3.2	Measures . . . . .	229
8.3.3	Messages . . . . .	234
8.4	Results . . . . .	235
8.4.1	Balance checks . . . . .	235
8.4.2	Main analysis . . . . .	235
8.4.3	Additional analyses . . . . .	239
8.5	Discussion . . . . .	242
8.6	Conclusion . . . . .	244
<b>9</b>	<b>Conclusion</b>	<b>246</b>
9.1	Introduction . . . . .	246
9.2	Summary of findings . . . . .	247
9.2.1	Chapter 4 . . . . .	247
9.2.2	Chapter 5 . . . . .	249
9.2.3	Chapter 5b . . . . .	250
9.2.4	Chapter 6 . . . . .	252
9.2.5	Chapter 7 . . . . .	253
9.2.6	Chapter 8 . . . . .	253
9.3	Study limitations . . . . .	254
9.3.1	Context . . . . .	255
9.3.2	Participants . . . . .	258
9.3.3	Cost effectiveness . . . . .	259
9.4	Implications of the findings for public policy . . . . .	260
9.5	The future direction of research . . . . .	265
9.5.1	The future self . . . . .	265
9.5.2	Consideration of a holistic financial picture . . . . .	267
9.5.3	Nudge plus . . . . .	269
9.6	Final conclusion . . . . .	270

<b>References</b>	<b>272</b>
<b>A Chapter 4: Appendices</b>	<b>349</b>
<b>B Chapter 5: Appendices</b>	<b>353</b>
<b>C Chapter 6: Appendices</b>	<b>363</b>
<b>D Chapter 7: Appendices</b>	<b>373</b>
<b>E Chapter 8: Appendices</b>	<b>390</b>

# List of Figures

2.1	The life cycle model of consumption and saving sourced from Hardcastle (2012). . . . .	22
5.1	A flow diagram of the experimental design of Chapter 5 and 5b, Wave 1 (n is from final sample) . . . . .	118
5.2	A flow diagram of the experimental design of Chapter 5 and 5b, Wave 3 (n is from final sample) . . . . .	119
5.3	A flow diagram of the experimental design of Chapter 5b, Wave 2 . . . . .	136
7.1	Pearsons correlation between age and probability of opting out. . . . .	187
7.2	Parallel trends for probability of opt out pre-intervention. Control = 45-54 years old, Treatment = 55-64 years old. . . . .	194
7.3	Parallel trends for probability of opt out pre-intervention. Control = 54 years old, Treatment = 55 years old. . . . .	194
7.4	Parallel trends for probability of opt out pre-intervention with a triple difference. Control 53 = 53 years old, Control 54 = 54 years old, Treatment 55 = 55 years old. . . . .	195
7.5	Parallel trends for probability of opt out pre-intervention with a triple difference. Control 53 = 53 years old, Control 54 = 54 years old, Treatment 55 = 55 years old. . . . .	197
7.6	Difference-in-difference regression for those that leave/cease contributing (treatment group = 55 years old). . . . .	199

7.7	Difference-in-difference regression for those that leave/cease contributing (treatment group = 55 - 64 year olds). . . . .	200
7.8	Difference-in-difference for probability of opt out pre 6 July 2016. Control = 54 years old, Treatment = 55 years old. . . . .	201
7.9	Triple difference for probability of leaving or ceasing pre 6 July 2016. Control 53 = 53 year olds, Control 54 = 54 year olds, Treatment = 55 year old. . . . .	202
A.1	Webpage shown to participants in the future ageing condition. . . . .	349
A.2	Webpage shown to participants in the future condition. . . . .	350
A.3	Webpage shown to participants in the control condition. . . . .	351
A.4	The effect of priming condition on the money allocated (£) to current accounts and retirement saving under high future self-relevance (left) or low future self-relevance (right). . . . .	352
B.1	Mean emotional valence scores by self-relevance group. Note: NSR = not self-relevant, SR = self-relevant. One is 'extremely positive' and nine is 'extremely negative'. . . . .	356
B.2	Mean emotional valence scores for each negative vignette. One is 'extremely positive' and nine is 'extremely negative'. . . . .	357
B.3	Mean emotional valence scores for each positive vignette. One is 'extremely positive' and nine is 'extremely negative'. . . . .	358
B.4	Mean emotional valence scores for each neutral vignette. One is 'extremely positive' and nine is 'extremely negative'. . . . .	359
B.5	Mean vividness scores by self-relevance group. Note: NSR = not self-relevant, SR = self-relevant. One is 'not at all vivid picture' and seven is 'very vivid picture'. . . . .	360
B.6	Mean pre-experiencing scores by self-relevance group. Note: NSR = not self-relevant, SR = self-relevant. One is 'not at all' and seven is 'completely'. . . . .	361

B.7	Example scale and slider participants saw. Different emotional vignettes appeared below the scale when the slider was moved to different contribution levels. . . . .	362
C.1	The scenario letter seen by all participants in Experiment 1. . . . .	363
C.2	The letter seen by participants in the control condition in Experiment 1. . . . .	364
C.3	The letter seen by participants in the prospective condition in Experiment 1. . . . .	365
C.4	The letter seen by participants in the retrospective condition in Experiment 1. . . . .	366
D.1	Difference in Difference regression for opt outs (treatment group = 55 to 64 years old). . . . .	373
D.2	Difference in Difference regression for opt outs (treatment group = 55 years old). . . . .	374
D.3	Difference in Difference parallel trends for those that opt out (treatment group = 55 - 64 year olds). . . . .	375
D.4	Difference in Difference parallel trends for those that opt out (treatment group = 55 years old). . . . .	376
D.5	Difference in Difference robustness test for those that opt out (treatment group = 55 - 64 year olds). . . . .	377
D.6	Difference in Difference robustness test for those that opt out (treatment group = 55 years old). . . . .	378
D.7	Parallel trends for probability of leaving or ceasing pre 6 July 2016. Control = 54 years old, Treatment = 55 years old ( $\beta = -.0036$ , $p < .001$ , 95% CI [-.0068, -.0004]). . . . .	379
D.8	Parallel trends for probability of leaving or ceasing pre 6 July 2016. Control = 45-54 years old, Treatment = 55-64 years old ( $\beta = -.0191$ , $p < .001$ , 95% CI [-.0202, -.0181]). . . . .	380

D.9	Parallel trends for probability of leaving or ceasing pre 6 July 2016. Control 53 = 53 year olds, Control 54 = 54 year olds, Treatment = 55 year old ( $\beta = .0008$ , $p = .600$ , 95% CI [-.0023, -.0040]). . . . .	381
D.10	Parallel trends for probability of opt out pre 6 July 2016. Control = 45-54 year olds, Treatment = 55-64 year olds. . . . .	382
D.11	Parallel trends for probability of opt out pre 6 July 2016. Control = 54 years old, Treatment = 55 years old. . . . .	383
D.12	Difference in Difference parallel trends for those that leave or cease contributing in July 2016 (treatment group = 55 - 64 year olds). . . . .	384
D.13	Difference in Difference parallel trends for those that leave or cease contributing in July 2016 (treatment group = 55 years old). . . . .	385
D.14	Difference in Difference for those that leave or cease contributing in July 2016 (treatment group = 55 - 64 year olds). . . . .	386
D.15	Difference in Difference for those that leave or cease contributing in July 2016 (treatment group = 55 years old). . . . .	387
D.16	Parallel trends for probability of leaving/ceasing pre-intervention. Control = 45-54 years old, Treatment = 55-64 years old. $\beta = .0012$ , $p = .175$ , 95% CI [-.0005, .0028] . . . . .	389
D.17	Parallel trends for probability of leaving/ceasing pre-intervention. Control = 54 years old, Treatment = 55 years old. $\beta = .0017$ , $p = .459$ , 95% CI [-.0028, .0063] . . . . .	389

# List of Tables

2.1	The Pension Commission benchmark proportional targets sourced from the Pensions and Lifetime Savings Association (2016). . . . .	23
3.1	The four research ‘worldviews’ as set out by Creswell (2014). . . . .	66
3.2	Summary of the research questions, topics and design used in each chapter of this thesis. . . . .	81
4.1	Changes to the money allocation options between the original (Marques et al. 2018) and the present study . . . . .	94
4.2	Regression and Chi square balance checks for multiple demographic variables on condition. . . . .	96
4.3	Means and standard deviations for the money allocated (£) to each money allocation option in each of the future self-relevance and priming conditions. . . . .	97
5.1	OLS regressions and Chi Square for balance checks for multiple demographic variables of the conditions in Wave 1 and 3 combined. . . . .	123
5.2	OLS regression of retirement contributions on self-relevance and emotional valance for Wave 1 and 3 combined . . . . .	124
5.3	OLS regressions of retirement contributions on self-relevance (column 1) and emotion (column 2) for Wave 1 and 3 combined . . . . .	126
5.4	Pearsons correlation between FSCS (10 years and aged 70) and the FSCQ (and its subscales) in Wave 1 . . . . .	139
5.5	Pearsons correlation between FSCS (10 years and aged 70) and the FSCQ (and its subscales) in all three waves. . . . .	142



6.1	Number of participants in each treatment condition in Experiment 1. . .	156
6.2	Messages seen by participants in the control, retrospective and prospective conditions in Experiment 1. . . . .	157
6.3	OLS regressions and Chi Square for balance checks for multiple demographic variables of the conditions in Experiment 1. . . . .	159
6.4	OLS regression of treatment group on inaction inertia also controlling for the influence of demographic factors. . . . .	161
6.5	Messages seen by participants in each of the four conditions in Experiment 2. . . . .	169
6.6	OLS regression of the conditions on inaction inertia, regret and attractiveness. . . . .	171
6.7	OLS regression of inaction inertia on the conditions when including locomotion and assessment orientations in the model. . . . .	173
7.1	Sample size and demographics for the main analysis on opt out behaviour in April 2015. . . . .	186
7.2	Opt-out rates in the Nest Corporation pension scheme between 2012/13 and 2017/18 taken from National Employment Savings Trust (2022a) and reflective of the period of employer staging where automatic enrolment was being introduced. The opt-out rates between 6 October 2014 and 5 October 2015 are taken from the present sample. Both are presented by age and gender. . . . .	187
7.3	Probability of opt out in broad and restricted age bands in the triple difference analysis. . . . .	196
7.4	Probability of leaving or ceasing contributing in broad and restricted age bands in a difference-in-difference analysis. . . . .	198
8.1	Participant demographic summary statistics in Wave 1 by university. . .	227
8.2	Balance of treatment and control in baseline and follow up. . . . .	228
8.3	Four measures of personal wellbeing in the ONS4. . . . .	229

8.4	OLS regression balance checks for treatment and control group. . . . .	236
8.4	OLS regression balance checks for treatment and control group (continued)	236
8.5	OLS regression for the financial wellbeing of participants (the multidimensional subjective survey for emerging adults) in Wave 2. . . . .	237
8.6	OLS regression examining the effectiveness of the text message intervention on subjective wellbeing. . . . .	238
8.7	OLS regression examining the effectiveness of the text message intervention on financial capability. . . . .	240
8.8	OLS regression of information seeking on the treatment group. . . . .	241
C.1	Means and standard deviation of likelihood to increase contributions (1 - Extremely unlikely, 7 - Extremely likely) in Experiment 1. . . . .	367
C.2	The effect of treatment condition on the level of regret at missing the initial offer (0 = no regret, 10 = very much regret) in Experiment 1. . . . .	369
C.3	The effect of treatment condition on the level of perceived attractiveness of the initial offer (0 = extremely unattractive, 10 = extremely attractive) in Experiment 1. . . . .	372
D.1	Sample size and demographics for the main analysis in July 2016. . . . .	384
D.2	Difference in Difference regression probability of opt out in broad and restricted age bands. . . . .	388

# Chapter 1

## Introduction

“If I were to characterise the direction of pensions in the UK, the best analogy would be a slow-motion car crash”

Sir Steve Webb, former UK Pensions Minister  
(Work and Pensions Select Committee 2022)

The UK, and much of the developed world, stand at the precipice of what is described by some as a retirement saving time bomb, with millions facing a retirement of financial stress, poverty or no retirement at all (Department of Work and Pensions 2017a; Pensions and Lifetime Savings Association 2021). Many employers have closed generous, guaranteed final salary pensions,<sup>1</sup> the state pension kicks in at a later age, and personal contributions are low; all of which have considerable ramifications for retirement saving levels. Amongst those closer to retirement (born between 1965 and 1980) and with a defined contribution (DC) pension,<sup>2</sup> it is estimated that 93 percent are not saving enough to achieve a ‘moderate’ lifestyle in retirement (Dimitriadis et al. 2022). When looking at the workforce in its totality, 38 percent of people are thought to be under saving (Department of Work and Pensions 2017a). Given this, in recent years, considerable time and money has gone into determining the level of under saving, who under saves, and what

---

<sup>1</sup>Final salary (a type of defined benefit pension) provide a guaranteed income in retirement based on a calculation of years of service, final salary and an accrual rate.

<sup>2</sup>A DC pension is one where you build up a pot of money from your contributions, employer contributions and investment returns that you can use to provide an income in retirement.

can be done to encourage greater rates of retirement contributions (e.g. Hardcastle 2012; Office for National Statistics 2022b). This thesis adds to this literature and is primarily concerned the impact various light-touch interventions may have on encouraging greater levels of saving for life after work.

Automatic enrolment was introduced in 2012 to increase the level of pension coverage in the United Kingdom (UK) in light of low, and decreasing, pension membership (Office for National Statistics 2022a). Part of one of the most radical overhauls to the UK pension system in a generation,<sup>3</sup> it involved automatically enrolling eligible employees into a workplace pension scheme unless they opted out.<sup>4</sup> This means that individuals automatically start saving at a default minimum of 8 percent<sup>5</sup> unless they notified their pension provider within 30 days.<sup>6</sup> Also heralded as one of the greatest successes for the application of behavioural economics, workplace pension participation is now at 79 percent of workers (as of April 2021; Office for National Statistics 2022a), and 90 percent for those who are automatically enrolled (Bourquin et al. 2020a). Yet, saving adequacy remains concerningly low (Pensions and Lifetime Savings Association 2022), in part because “having an occupational pension [is] often perceived as being sufficient for providing for...retirement (without taking into account what it [is] likely to generate)” (Kotecha et al. 2010, p. 26) and in part because of an influx of new savers who are no longer in the early stages of their working life (Office for National Statistics 2022b).

This is not to say that automatic enrolment has not gone some way to solving the saving adequacy problem. In a 2017 review, the Department for Work and Pensions (DWP) suggested that 2 million additional people were now on track for an adequate pension (as defined by the Pension Commission) thanks to automatic enrolment; although, this still left 12 million people expected to fall short (Department of Work and Pensions

---

<sup>3</sup>Following this change, in 2016, another seminal change was made to the system that affected how savings can be used during retirement. This is the Freedom and Choice legislation that is introduced in Chapter 7.

<sup>4</sup>For full eligibility criteria, see <https://www.gov.uk/workplace-pensions/joining-a-workplace-pension>.

<sup>5</sup>Including employee and employer contributions and tax relief.

<sup>6</sup>If they do notify their pension provider that they wish to opt out of saving, they will be automatically enrolled again if they move employer or within 6 months of the 3 year anniversary of their employers' staging date.

2017b). Almost half of those who fall short are expected to do so by a small amount (5.7 million), 4.8 million by a modest amount and 1.5 million by a substantial amount. While these figures have not since been updated publicly, the Minister for Pensions and Financial Inclusion<sup>7</sup> has said that the level of under saving remains “clearly substantial” (House of Commons Work and Pensions Committee 2022, p. 16). This is supported by the fact think tanks and other organisations overwhelmingly report widespread under saving, including the The People’s Pension (2022) and Pensions Policy Institute (2021) who suggest that 39 percent of households will not achieve an adequate income, and 27 percent of those aged between 50 and the state pension age would not achieve even a minimum income.

The decline of Defined Benefit (DB) pensions, market volatility and stagnant pay all provide explanations for the overall level of inadequacy seen. However, for those eligible for automatic enrolment and regularly saving towards retirement, defaults provide one compelling explanations for the low levels of contributions seen and have a hand in the overall low saving balances. The reason: they are notoriously sticky (Choi et al. 2005b), with some people never getting around to editing them despite an intention to do so (Chetty et al. 2014a), and others perceiving it to be a recommendation from government or employers on how much to save (Beshears et al. 2009). Amongst some there is a notion that the government would not set the default at a rate that will not support a reasonable standard of living, and for others the reassurance they are saving *something* is enough: “In my head, it’s job done. I got pension, tick. It’s job done, move on”<sup>8</sup> (Robertson-Rose 2021, p. 28).

Default contribution rates are currently 8 percent of qualifying earnings, with many savers contributing the default minimum of 5 percent (91%) and employers doing the same with most (91%) contributing just 3 percent (National Employment Savings Trust 2022a)). However, in order to achieve an ‘adequate’ retirement income it is estimated that anyone earning over £12,700 (2020) per annum would need to save more than the

---

<sup>7</sup>Guy Opperman MP.

<sup>8</sup>See also “I am paying into the pension then I am sorted”.

default minimum to meet their target replacement rate (an income in retirement that would replicate the standard of living while working). For those earning the median income of £24,900 (2020), the total contribution needed is estimated to be closer to a minimum of 20 percent of qualifying earnings (Pensions Policy Institute 2021). This analysis is, however, based on starting to save at 22 and continuously saving until the state pension age, a criterion that many will struggle to meet (Corna et al. 2016), and therefore a likely underestimate. Ultimately, despite these estimates, and similar ones like them, there remains some ambiguity about the magnitude of under saving with a general consensus that a non-trivial amount of people are not saving sufficiently to meet their retirement needs (House of Commons Work and Pensions Committee 2022).

The solution to this pension black hole is three-fold: “higher private pension saving, higher average retirement ages, and an increased percentage of national income spent on state pensions” (The Pension Committee 2006). It is the first of these three actions that I focus on in this thesis given the latter two can arguably be best achieved by a legislative change to public policy and the extent and necessity of these changes would be determined by the level of private pension saving. I also focus specifically on light-touch interventions that have the potential to influence behaviour. By ‘light touch’ I mean ‘nudge’ (Thaler et al. 2009) type interventions which are defined as “any aspect of the choice architecture that alters people’s behavior in a predictable way without forbidding any options or significantly changing their economic incentives... the intervention must be easy and cheap to avoid” (Thaler et al. 2009, p. 6). Specifically within this, I focus on those that are easy to scale,<sup>9</sup> but require no personalisation and would have a low cost for implementation.<sup>10</sup>

In the last two decades, behavioural researchers have increasingly explored so called ‘nudge’ interventions (Thaler et al. 2009) designed to increase saving by modifying social and physical environments to change behaviour in a predictable way, without actively

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<sup>9</sup>Nudges are typically easy to scale but in the this context I mean that they require no additional legislation to be implemented.

<sup>10</sup>Nudges are often low cost; however, in the pension domain any change that involves amendments to payroll can be expensive. For example, automatic escalation would require widespread changes to payroll systems as would hybrid saving accounts.

restricting options. Automatic enrolment is a notable example with its use of opt out (e.g. Cribb et al. 2019) but default contributions (e.g. Choi et al. 2003; Madrian et al. 2001), anchors (e.g. Hulseley 2012), active choice (e.g. Carroll et al. 2009), messaging (e.g. Goldin et al. 2020; Krijnen et al. 2020) and informational interventions (e.g. Patterson et al. 2020) have all been shown to have some effect in the retirement domain. Such interventions are often appealing to governments as they maintain the philosophy of free markets, go with the grain of consumerism (by not blocking consumption but encouraging ‘less bad’ choices), and reducing the need for unpopular taxes. They are also often cheaper to implement than making legislative or regulatory change which, when the public purse is squeezed, is often attractive.<sup>11</sup> Therefore, perhaps unsurprisingly, their acceptance and use has become more ubiquitous, as seen in the growth of the Behavioural Insights Team and the What Works Network in the UK.

Repeatedly, automatic enrolment is demonstrated to be the most effective nudge tool to improve pension contributions purely because those that may have saved nothing, save *something* under its implementation (Patterson et al. 2020). However, while no one can deny its impact on pension coverage – a 32 percentage point increase (Department for Work and Pensions 2019) - there is more that needs to be added to it or amended if retirement saving contributions and balances are to approach an adequate level. In addition to automatic enrolment, the UK Government also utilise a number of other approaches that contribute to encouraging saving: primarily tax incentives, mandated employer matches and education. Neither tax incentives nor employer contributions would be considered ‘light touch’ due to their considerable cost, and neither is thought to have a substantial impact on the level of saving either (see, Disney et al. 2010; Engelhardt et al. 2007; Leibfritz et al. 1997). However, their presence within the pension system, alongside education, is important to consider as it may have an impact on other proposed nudges.

For tax incentives, the government provide tax relief at the highest marginal rate up to a maximum of £40,000 per year<sup>12</sup> or £1,073,100 across the lifetime (2022/23)<sup>13</sup>. Higher-

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<sup>11</sup>Although note that the introduction of automatic enrolment was mandated in law (Pension Act, 2008).

<sup>12</sup>Although, this is tapered in some instances.

<sup>13</sup>Abolished in April 2023.

rate taxpayers can receive 40 percent of relief and basic-rate tax payers receive 20 percent (2022/23).<sup>14</sup> The cost to government of this offering is considerable with estimates from 2010/11 (pre-automatic enrolment and therefore likely a sizeable under estimate based on current enrolment rates) suggesting that £26.1 billion is given in tax relief on contributions as well as a further £22.5 billion in tax exemptions on 25 percent of savings withdrawn during retirement, loss of NI contributions, and tax relief on investment income (Johnson 2012). These benefits represent an expected average tax advantage (compared to a traditional savings account) of over 24 percent the value of present contributions across the lifetime of an individual (OECD 2018). Yet, despite this considerable advantage they have little impact on saving rates.

While some find that there is a net increase in retirement saving with tax incentives (Gelber 2011), most suggest that any increase found is actually a substitution effect (i.e. moving money from one type of saving to another; Attanasio et al. 2004; Blundell 2006; Chetty et al. 2014b; Chung et al. 2008; Engen et al. 1994). The Organisation for Economic Cooperation and Development (OECD) has previously suggested that removing all capital tax across their member states (at an average of 40 percent at the time of the research) would only increase private saving by .5 percent of GDP (Leibfritz et al. 1997), suggesting tax relief has little to impact behaviour. Overall, tax incentives are broadly considered an ineffective measure (Chetty et al. 2014b) in part because “it is difficult to target incentives on the marginal saver” (Disney et al. 2010, p. 213). Indeed, discussions more frequently consider a change in the tax relief to a blanket 25 percent on contributions (a reduction in cost for the government) rather than introducing any increases to motivate saving.

Mandated employer contributions are another intervention from the government introduced at the time of automatic enrolment and currently worth 3 percent of qualifying earnings for employees who also contribute to their pension (2022/23). They are a notable part of the pension infrastructure with some evidence of their effect on both participation and contribution rates in retirement saving (Madrian 2013; Munnell et al. 2001). One

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<sup>14</sup>Those earning below £12,500 (but eligible for automatic enrolment) and therefore paying no income tax, can also receive 20 percent of tax relief if they are in a net pay pension arrangement.



study also found them to be more important than changes in the default minimum contributions for employees (Falk et al. 2019), although others do not (Blumenstock et al. 2018).

There are two components of matching: the rate and the threshold. The rate is how much the employer will contribute for each additional percent contributed by the employee and the threshold is the maximum match an employer will make. Madrian (2013) found that increasing the match rate only had a small effect on contribution rates but that changing the threshold had a substantial impact. This is arguably because it provides a natural reference point (or anchor) when deciding what to contribute (similar to the effect of the default minimum). Alternatively, individuals may realise that the increase in threshold makes the cost of consuming now more costly compared to putting the money in a pension where compound interest and investment returns may also increase its value. The same should be true of increases in the rates although it generally has less impact on behaviour and so is perhaps less salient to the saver than the threshold (particularly given compound interest and even the fact their pension is invested are concepts not all people saving for retirement are aware of).

Despite some evidence of employer matches (particularly thresholds) increasing saving behaviour, they are generally considered “a rather poor policy instrument with which to raise retirement saving” (Engelhardt et al. 2007, p. 1921).<sup>15</sup> This is partly because it has a small effect on behaviour relative to its cost and to other, often cheaper, interventions like automatic enrolment, simplification and commitment strategies like Save More Tomorrow (Benartzi 2012). Also, matching has not been found to affect the behaviour of people already enrolled in a pension (Madrian 2013), a considerable issue when everyone eligible in the UK context is automatically enrolled in a default baseline.

Matching can also backfire in some instances; for example, Choi et al. (2005b) found that the introduction of a match can *reduce* contributions. Prior to its implementation in one company contributions tended to be in multiples of five: 5 percent, 10 percent and 15

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<sup>15</sup>Although it should be acknowledged that raising employer contributions would increase retirement saving adequacy and so should arguably be encouraged regardless of the effect on employees’ behaviour.

percent. When a 4 percent match threshold was then introduced, many continued saving at the multiples of five however there was a substantial increase in people contributing at the 4 percent mark, resulting in a lower saving rate overall (see also, Choi et al. 2002; Choi et al. 2005a). In the case of automatic enrolment in the UK, the match is similarly low and has the potential to encourage lower saving. Yet, even in studies where the match is generous, the impact is minimal. Duflo et al. (2006) offered the opportunity for employees of a US company to use their federal tax refund to open an Individual Retirement Account with no match, a 20 percent match or a 50 percent match on contributions up to \$1,000. Only 3, 8, and 14 percent of people respectively chose to open an account despite the substantial benefit (see also, Engelhardt et al. 2007). While collectively this evidence may suggest that matching does not have a substantial impact on saving behaviour, this is not to say that it does not have a place in the pension infrastructure. First, they can have a substantial impact on overall retirement preparedness (Creaven 2022); second, they may implicitly add value to the action of pension saving which may encourage people not to opt out; and third, it may be seen as an important benefit when recruiting new employees (The People’s Pension 2017).

The final tool frequently used by the government to increase pension contributions is education or informational resources. The DWP arguably has three main websites for the provision of financial information; first, the DWP and The Pensions Regulator website called ‘Get to know your pension’<sup>16</sup> that provides high-level information on workplace and state pensions. Second, MoneyHelper, a government-backed source of impartial financial guidance on a range of issues that include retirement saving along with benefits, debt, everyday money management and house purchases (it is the consumer facing brand of the Money and Pension Service, an arms-length body set up by DWP). Finally, Pension Wise, which is a government service (delivered by MoneyHelper) that offers impartial and free guidance to the over 50s about their pension and options for taking their DC pension. Together, these sites provide a wealth of information *if* you know they exist and have the confidence to use them. Yet, the British public are generally low in financial

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<sup>16</sup>[www.workplacepensions.gov.uk](http://www.workplacepensions.gov.uk)

knowledge (Atkinson et al. 2016) and those with lower incomes, and therefore potentially more financially vulnerable, have been found to have lower levels of financial literacy (e.g. Monticone 2010). Lusardi et al. (2010) also found that those who are more educated have greater levels of financial literacy even when controlling for demographic factors (see also Lusardi et al. 2007b; Lusardi et al. 2014) suggesting that those with greater financial literacy tend to be those with education.<sup>17</sup>

As a result, it is perhaps more probable that the government’s media campaigns are more salient for the public than their websites. In 2015, the DWP embarked on a campaign to increase the public awareness of pensions. The blue monster called ‘Workie’ appeared in adverts with the slogan ‘don’t ignore the workplace pension’ and was specifically targeted at small and micro employers and their employees as their automatic enrolment duty started to take effect. More recently, the 2017 campaign: ‘you work, your pension works’ (which is still live in 2022) emphasises that having a pension is like having another version of yourself helping you save money for when you retire. It encourages viewers to ‘get to know your pension’. To my knowledge, neither campaign has resulted in publicly available information on their success in terms of awareness about pensions and engagement with the online resources, enrolment or saving contributions. Although, recent evidence from one pension scheme suggests that people are generally not aware that they have a pension, or do not know how much they contribute (e.g. Dunstan 2022), suggesting the education and information provided to date is not very effective.

Having set out some of the strategies the government use to increase retirement saving rates, and having previously acknowledged that saving rates, in spite of these efforts, remain low, the motivation for suggesting further light-touch interventions seems clear. There is a need to build on the structure already in place to increase engagement with pension and encourage individuals to actively consider how much they should be saving for retirement. With this motivation in mind, in the next section I present the research questions studied in this thesis and briefly introduce the interventions studied in this thesis.

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<sup>17</sup>The causal direction of this is debated.

## 1.1 Research questions

As set out in the previous section, this thesis is primarily concerned with how light-touch interventions can be used to encourage individuals in the UK to act to increase their retirement saving. This is born out of the finding that many Brits are woefully underprepared for retirement (Pensions and Lifetime Savings Association 2021). The economic and societal impacts could be extensive with interventions needed to be carefully implemented to avoid social exclusion and disparity (Bridgen et al. 2007). The House of Lords Select Committee on Science and Technology has previously stated that non-regulatory behavioural measures, used in conjunction with the economic measures and regulation already in place, is likely to be the best way to incentivise and encourage retirement saving (Science and Technology Select Committee 2011). Given the need to save more and the appetite by government to do this using behavioural measures, the primary research question explored in this thesis is: Can light-touch interventions be used to help increase retirement saving contributions in the UK?

The empirical chapters that seek to shed light on this question (Chapters 4 to 6) are disparate in their nature and come at the question from a variety of different angles, each presenting a different intervention. While a sizeable literature exists on interventions, many of which are ‘nudges’, there is a consideration in this thesis of specific options that are simple to implement and, crucially, do not require individual personalisation. The interventions tested have also not been, to my knowledge, used in other studies in the retirement domain (with the exception of Chapter 4 which is a replication and Chapter 7 where the intervention is already implemented), and therefore add to the behavioural literature on the impact of nudge interventions on long-term saving. In addition to this, a contribution to the broader scientific debate on the value of replication and validity of psychological measures is also included in Chapter 4 and 5b respectively.

In Chapters 4 and 5, the first two empirical chapters, the primary research question is explored with light-touch interventions based on the episodic future thinking literature - the notion that the capacity to imagine or simulate the possible experiences of one’s

future self, may change retirement saving behaviour. Chapter 4 focuses specifically on how future self-relevance can impact saving behaviour using a questionnaire stimulus and future ageing primes. Chapter 5 looks at future self-relevance and emotional valance using vignettes of retirement experiences as the stimulus. There is also an exploration of how future self-continuity (similarity) is measured which is explored in more detail in Chapter 5b.

In Chapter 6, the focus on temporal perspectives remains but moves away from episodic future thinking that is thought to affect present bias and towards inaction inertia, a phenomenon whereby an individual forgoes an attractive opportunity having missed an even more attractive opportunity previously. Chapter 6 includes two studies that explore inaction inertia in the UK retirement context whereby the missed opportunity is only partial (rather than complete) because of automatic enrolment,<sup>18</sup> and also looks at the impact of prospective thinking, action-state orientation and regulatory mode have on contribution behaviour.

Chapter 7 differs from the chapters included earlier in the thesis. First, while it still looks at the primary research question, the intervention explored has already been implemented in the UK policy context (F&C), differentiating it from the others that have not. Second, the other chapters look at increasing contributions for those already enrolled, but this intervention has the potential to work by trying to increase contributions by encouraging people not to opt out of their workplace pension. Finally, the study is also the only one not to include primary data collection or experimental manipulation and instead utilises a large sample of all members in the National Employment Savings Trust (Nest) pension in April 2015. Consequently, this chapter contributes to the thesis by exploring the impact of a fairly light-touch intervention which has already been added to the pension infrastructure and therefore requires no effort to continue offering.

Finally, Chapter 8 moves away from the primary research question and explores the broader issue of financial capability and wellbeing. Financial capability and wellbeing

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<sup>18</sup>I.e. in the UK context an individual can miss an attractive opportunity to save and know that they still saved *something*.

have a massive impact on our lives and this can also have a long lasting effect (Taylor 2011) which has the potential to impact retirement saving. Therefore, in the final chapter I broaden the research question out and explore how financial capability may be strengthened using a light-touch intervention. While not directly studied, any intervention that improves financial capability has a possibility of being beneficial across the financial domains, and therefore is relevant to the research conducted in the rest of this thesis as individuals do not make financial decisions in a silo (i.e. short-term savings interact with long-term savings and debt and home ownership are issues that affect retirement saving adequacy). The primary research question in this chapter is therefore: Can a light-touch intervention be used to increase the financial capability of widening participation students in English higher education institutions?<sup>19</sup>

Education is utilised by the government already in regards to pension saving but also a wealth of other financial domains. There is an overwhelming amount of information and education online, free educational programmes, advice etc. Arguably the issue is not in creating financial education but in getting people to engage in what already exists. Therefore, in Chapter 8 the intervention tested signposts students to informational resources rather than providing education itself. In doing this, it is hoped that a greater level of financial capability is achieved, including in areas of perceived financial control, financial confidence, financial behaviour, and financial attitudes.

## 1.2 Thesis structure

This introduction has provided the groundwork for the rest of the thesis by considering the primary motivation for the research: under saving for retirement. Moreover, it has considered the background to the research in terms of what is currently done by the state and how nudge interventions have been and utilised. As mentioned in Section 1.1, this thesis primarily seeks to explore whether light-touch interventions can be utilised to encourage greater levels of retirement saving in the UK (and, in the case of Chapter 8,

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<sup>19</sup>Widening participation is a government policy in higher education that attempts to increase the numbers of students from under-represented backgrounds in higher education.

whether a light-touch intervention can improve financial capability). To consider these questions, this thesis has the following structure:

In Chapter 2, an overview of the literature relevant to the empirical chapters is presented. The content of this is disparate because the interventions presented in the rest of this thesis have different theoretical bases. Therefore, Chapter 2 provides an introduction to the relevant literature that is used to position the research within each empirical chapter. Each individual chapter then provides a more specific look at the literature relevant for the hypotheses it addresses.

In Chapter 3, I set out the methodological approach to answering the research questions set out in Chapter 1. This includes a rationale for the use of randomised controlled trials used in most chapters and where this design is not used, in Chapter 7, an explanation for this is presented. I also summarise some of the key ethical issues that are overarching considerations in the entirety of the thesis.

Chapters 4 to 8 are the empirical chapters in this thesis. They include a number of light-touch interventions (see Section 1.1 for an overview) including a questionnaire in Chapter 4, vignette framing in Chapter 5 (and 5b), framing of a letter in Chapter 6, a small policy change in Chapter 7 and finally a text message intervention in Chapter 8.

Finally, in Chapter 9, an overview of the contribution of this thesis to the literature, the limitations of the work and some suggestions for future research are presented. I also include some of the overarching policy implications not referred to in the empirical chapters.

# Chapter 2

## Literature review

### 2.1 Introduction

In the introduction chapter, the motivation for the need to better understand the influence light-touch interventions could have on long-term saving in the UK was introduced. The primary research question is ‘Can light-touch interventions be used to help increase retirement saving contributions in the UK?’ and in the following chapters, different interventions are tested with the aim of improving financial decision making and developing easily scalable and cost-effective solutions (Chapters 4, 5, 6, 7 and 8). Given the interventions are disparate, the literature specific to each is provided where appropriate in the data chapter. In this Chapter, a broad review of the literature is provided as a background as well as a context to understand the following chapters.

The chapter begins with an overview of the policy context in regards to retirement saving (Section 2.2) which is followed by a discussion on the literature around saving adequacy and whether there is in fact and need for individuals to save more (Section 2.3). This is particularly important given the money that is saved for retirement through a pension is illiquid and so in encouraging individuals to save more into these accounts, there should be a consideration of whether this is something that is needed for future financial resilience and wellbeing. In Section 2.4 an overview of the two main theoretical concepts



pertinent to this thesis are presented: present bias and inaction inertia. Both arguably affect all retirement saving decisions however it is present bias that is explicitly addressed in Chapter 4, 5, and 5b and inaction inertia that is addressed in Chapter 6. The concept of arbitrage gains is also introduced which is relevant to the intervention presented in Chapter 7. There is an opportunity in parts of the pension system to make risk-free gains without restricting the liquidity of your savings, and I explore whether people make use of this. In Section 2.4, the concept of financial capability is also addressed given it is known to impact different types of financial decision and is addressed specifically in Chapter 8. Finally, the chapter ends with a conclusion of the literature and an identification of the gaps in the literature that this thesis addresses.

## **2.2 The policy context**

In order to understand the issues of under saving, and the interventions suggested to improve it, it is necessary to understand the pension saving context in which such retirement saving and wealth accumulation decisions sit. The purpose of this is to understand how its evolution may have impacted the perception and expectations young people have for retirement saving and the role they play in ensuring their own adequate retirement income. I broadly follow the three pillars the World Bank proposes (The World Bank 2008); the role of the state, the workplace and the individual.

### **2.2.1 The role of the state**

The first pillar in the UK is the publicly funded state pension provision which is financed by pay-as-you-go contributions from employers and employees through National Insurance (or credits). The New State Pension is a flat-rate single tier pension worth £203.85 per week (2023/24) for those with a minimum of 35 years of qualifying activities and was reformed in 2016 with the aim to reduce confusion as to how much an individual would receive from the government in retirement (Crawford et al. 2013; Cribb et al.

2016).<sup>1</sup> At the equivalent of around 29 percent of median full-time weekly earnings (OECD 2017b), unlike many European counterparts (e.g. Greece, Austria, Spain and Luxembourg; OECD 2017b), the state provision is not provided at a level near that which affords a sufficient replacement income in retirement (European Trade Union Institute 2016).<sup>2</sup> To maintain the standard of living one has been accustomed to while working, most individuals must therefore save privately for their retirement too. Yet, almost 30 percent of people aged 45 and over (but not yet retired) expect the state pension to provide their main source of income in retirement, and 12 percent of these individuals have no other pension provision at all (Financial Conduct Authority 2017c).

### **2.2.2 The role of the employer and individual**

The second tier of savings is formed of occupational pensions of which there are two main types: defined benefit (DB) and defined contribution (DC). Typically, DB schemes offer a guaranteed annuity in retirement (a fixed sum of money paid annually for the entirety of retirement) based on a calculation of years of service, accrual rates and final salary, or career average revalued earnings (CARE) in some schemes. On the other hand, DC schemes provide a pension ‘pot’ based on the contributions from employees, employers, and the investment returns they generate.

Increased life expectancy, market volatility and poor financial returns have made the cost of running DB schemes untenable for many organisations resulting in a continued decline in their popularity in the private sector (Office for National Statistics 2019a). The common alternative, DC schemes, place an individual at the centre of their financial wellbeing where the high degree of structure and income certainty of DB schemes is no longer guaranteed. Instead, the financial risk is shifted from the employer to the individual employee and it is their role to navigate the complex array of investment decisions,

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<sup>1</sup>The new single-tier pension replaced a previous basic state pension (worth £129.20 per week, 2019/20) and additional state pension (either the Second State Pension or SERPs) in 2016, providing a flat-rate pension above the previous basic level of means-tested support. For details of the changes, see (Crawford et al. 2013).

<sup>2</sup>Means-tested benefits are also available to supplement the state pension for the most financially vulnerable pensioners.

economic risk and contribution rates. As a result, people frequently make decisions which are unsuited to their future financial needs (Clark et al. 2010). Moreover, many employers used the shift from DB to DC to simultaneously lower the contributions they made to employees' retirement, resulting in lower projected pensions for some employees (Bridgen et al. 2005).

With this shift towards DC schemes, membership in occupational pensions fell from a peak of 12.2 million in 1967 to around 7.8 million in 2012 (Office for National Statistics 2014). This change was partly due to the closure of DB schemes with many of those affected choosing not to join alternative DC arrangements. Those with low incomes were the most likely to have no retirement account and had the greatest risk of running out of money in retirement (VanDerhei et al. 2010). Therefore, automatic enrolment was introduced to tackle the low, and falling, saving rates as well as the generally low participation rates (Pension Commission 2006), particularly among low- and mid-income households. The Pensions Act 2008 legislated that employers would be gradually obligated from October 2012<sup>3</sup> to automatically enrol eligible employees into a workplace pension with default minimum contribution rates for both employees and employers. These workplace pensions were facilitated by the employer but did not necessarily have to be run by the employer.<sup>4</sup> The phased introduction of automatic enrolment has completed, and employers now have a duty to enrol all eligible employees into a pension. Additionally, two minimum contribution rate increases have occurred: one in 2018 and the final one in 2019. Consequently, the minimum employee contribution is now 5 percent of qualifying earnings (including tax relief) making an aggregate total minimum contribution of 8 percent when accounting for employer contributions.<sup>5 6</sup>

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<sup>3</sup>Actual start date depended on organisational size.

<sup>4</sup>To this end, the government created the National Employment Saving Trust (Nest) which provides a high-quality, all-in-one, affordable savings option for employers who required a scheme for their employees.

<sup>5</sup>Included in the employee contribution is tax relief at the highest marginal rate. Therefore, someone earning between £12,500 and £50,000 (2019/20) only has to pay 80p for every £1 contributed, and anyone earning between £50,001 and £150,000 (2019/20) only have to pay 60p for every £1 contributed (GOV.UK n.d.). People earning below £12,500 (but above £10,000), and therefore paying no income tax, can also receive tax relief of 20 percent if they are in a net pay arrangement.

<sup>6</sup>Individuals can also save into private pensions however these are less common amongst those in employment and therefore is not discussed here.

Employers and employees have different interactions with the pension market that can influence how much is saved for the individual. First it is the employer's responsibility to choose a pension scheme for employees and determine a match rate and threshold and therefore they can have a substantial impact on their employees' savings. This is because most individuals will need to remain in the scheme chosen by their employer to receive the match and will often remain at the default investment strategy which can have an impact down the line on the level of saving. Equally, employers are often looking for a scheme that is easy to process, open to their staff, and will work with their payroll system. They will also need to think about the investment options and charges that affect employees. These two factors are likely to be most important to an employee (even if they are not explicitly aware of their value).

Employees interact differently with the pension market. They have no choice over the scheme but are responsible for ensuring that the employer match, their contributions, the tax relief they receive,<sup>7</sup> and expected investment returns will result in a sufficient income for retirement. This places a considerable responsibility (and pressure) on the individual to ensure their needs are met in retirement. In this thesis, I look at the impact of light-touch interventions on the employee and their personal contributions in particular (rather than employer decisions). However, it is perhaps important to note that this decision happens within a context where the employer has already made choices that could meaningfully affect level of saving (e.g. scheme provider, match rate and threshold, scheme type [DB Vs. DC] and scheme contribution method [salary sacrifice, relief at source, net pay]).

## **2.3 Retirement saving adequacy**

Having established how the context of the UK pension scheme has driven the responsibility for making suitable retirement saving decisions to the individual, I now present the case that such a move has resulted in insufficient levels of saving for many people.

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<sup>7</sup>Which in some instances they have to apply for.

Indeed, there is an abundance of academic articles (e.g. Campbell et al. 2015; Skinner 2007) and stories in the popular press (e.g. Hill 2017; O'Connor 2019) devoted to the topic of adequacy in retirement saving, or more accurately - inadequacy. The growing problem has not escaped the attention of policy makers nor savers themselves, and the general consensus is that the average Brit is underprepared (Pensions Policy Institute 2021). This assumption is central to the research included in this thesis, as there is only a need to encourage greater retirement saving if current levels are deemed inadequate for a non-trivial proportion of the population.

Without a doubt, the introduction of automatic enrolment has contributed to strengthening saving adequacy through the increase of coverage, with more individuals enrolled in DC schemes than ever before. However, people often contribute at the default minimum, and stay there because of the power of the default (Choi et al. 2004; Madrian et al. 2001) or because “having an occupational pension [is] often perceived as being sufficient for providing for... retirement (without taking into account what it was likely to generate)” (Kotecha et al. 2010, p. 26). Chetty et al. (2014b) suggests, using Danish data, that 85 percent of savers are passive in that they only increase their saving rates when it is done automatically for them. The same is true of the UK, with average contribution rates initially decreasing to levels lower than pre-automatic enrolment rates when the defaults were first introduced. Only increasing when the minimums were raised in 2018 and again in 2019. Less than 10 percent of pension members contribute more than 7 percent (Office for National Statistics 2019a), and the average pension pot is worth just £61,897 (Financial Conduct Authority 2019).<sup>8</sup>

People are also often unaware that they are under saving due to difficulties judging their own financial needs against the amount of money necessary to achieve the retirement they want (Hershey et al. 1998). In other cases they believe contributions to be a government or employer recommendations on how much to save (Nest Insight 2022b). Inertia and present bias also play a role too with people simply never getting round to saving or

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<sup>8</sup>Although, this does not account for multiple pension pots and of course those earlier in their working life will have lower balances.

prioritising the present over the future. The combination of low saving rates and biases and a lack of awareness for the need to save more raises a number of concerns for the individuals currently saving at the minimum default contribution level, and has led to researchers increasingly looking for ways to boost retirement saving.

The extent of this under saving in pensions is widely debated, partly due to the difficulties measuring adequacy (Beshears et al. 2019b; Biggs 2019; Knoef et al. 2016; Munnell et al. 2014; Munnell et al. 2018). Indeed, defining what constitutes an ‘adequate’ retirement income is somewhat complex due to its relative (as opposed to absolute) nature. To the state, having an income in retirement above the poverty line<sup>9</sup> that minimises the need for an individual to fall back on means-tested benefits may be sufficient. For individuals, the focus can differ from avoiding deprivation or maintaining dignity, to comfort and active participation in society, to happiness and wellbeing (Pensions and Lifetime Savings Association 2021). Commonly, the ability to continue the same standard of living from working life through into retirement is cited as being ‘adequate’ (Department of Work and Pensions 2017b; Pensions Commission 2004). In the next section, using the latter definition, I summarise the ways in which ‘adequacy’ can be measured and provide a case for the need to encourage greater levels of retirement saving in the UK.

### 2.3.1 Measuring saving adequacy

There are two common approaches to measuring the adequacy of retirement saving. First is the fixed-income target (also known as the ‘basket of goods’ approach). This method, used by the Joseph Rowntree Foundation (JRF), and Pensions and Lifetime Savings Association (PLSA) looks at the cost of a certain list of goods and services needed to maintain a pre-defined minimum standard of living.<sup>10</sup> The exact items vary depending on

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<sup>9</sup>There are several ways to determine the poverty line with no universally accepted definition (Caminada et al. 2012)). In the UK, poverty is generally determined in ‘relative’ terms - where households with the lowest incomes are compared to the rest of the population in a particular year - or ‘absolute’ terms - where income (inflation-adjusted) is compared to a baseline year (typically 2010/11). Any household with an income below 60 percent of the median in that year (or compared to the baseline) is considered to be in poverty (Francis-Devine 2020).

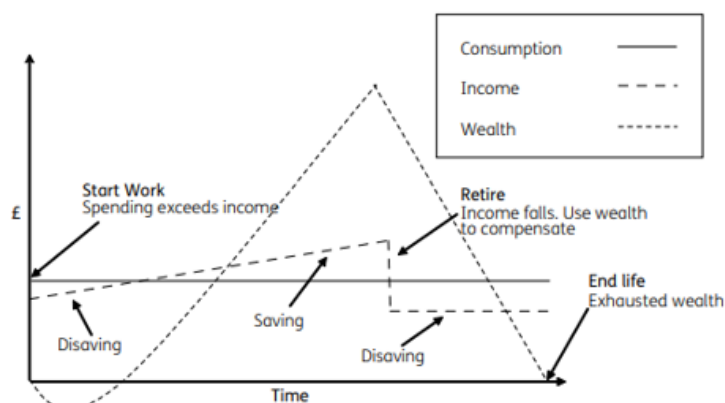
<sup>10</sup>In 2020, this amounted to £206 per week for a single pensioner and £318 for a couple (excluding rent) for those in urban areas outside of London.

the household type (single or dual), geographic location (London or outside of London) and can be manipulated for desired lifestyle ('minimum', 'moderate' or 'comfortable'; see Joseph Rowntree Foundation 2021; Pensions and Lifetime Savings Association 2021). While it provides a stable measure of adequacy for all, specific items included such as mobile phones and holidays have proved controversial and often the cost of housing, dependents or existing debt - all potentially substantial expenses - are excluded (Fearn 2021).

The second approach is the proportional income target (also known as the 'replacement rate'). Used by The Pensions Commission, it defines a proportion by which retirement income should replace income in the period immediately before retirement. The rate does not imply that an individual requires the same income in both time periods as consumption requirements often fall after retirement (Kimhi et al. 2018; Olafsson et al. 2018). Therefore, it is not uncommon to see replacement rates of around 70 percent for those on median incomes (e.g. Haveman et al. 2007; Pensions and Lifetime Savings Association 2016), though estimates vary from as low as 45 percent to as high as 95 percent depending on the underlying assumptions (e.g. Binswanger et al. 2012; OECD 2019a). Arguably, this method more accurately reflects the type of lifestyle an individual will want to live in retirement as it is more individualised, but with this comes an additional complexity for an individual to determine for themselves how much is 'adequate' for them.

Proportional income targets are based on assumptions from the life cycle saving hypothesis (Modigliani et al. 1954), a model commonly used by economists to conceptualise how households *should* plan and save for retirement. The model posits that consumption is predicted to be planned over the lifespan in an effort to generate a standard of living which remains stable year-to-year. Therefore, an individual will save and borrow at different times in their lives so that the discounted marginal utility of their consumption (i.e. the satisfaction derived from spending in one period) is equal across the lifespan. Simply put, if an individual discounts the future at the same rate as interest then the level of consumption expected should be identical from the beginning of adult life to the end of life (see Figure 2.1).

Figure 2.1: The life cycle model of consumption and saving sourced from Hardcastle (2012).



On the basis of the life cycle model, economists and policy makers broadly agree that the conceptual standard for ‘adequate’ retirement saving or preparedness is that which allows a household to maintain their consumption (and consequently standard of living) from pre-retirement into retirement. Therefore, if an individual behaves rationally, they should begin saving when their current savings are deemed inadequate for future needs and their income is above their standard for consumption. However, this is often easier said than done as defining retirement preparedness is often a daunting task involving frequent iterations of forecasting and the need to weigh up current needs, future needs and available resources. There is also often a ‘life style creep’ not accounted for in the model. This is where an individual’s discretionary spending increases (often with salary rises) such that former luxuries are now perceived as necessities. It is therefore not uncommon for such complex decisions around saving to be postponed (Dhar 1997). Moreover, as every household has a different income, expenses and financial priorities it is not realistic for individuals, employers, the government or pension providers to account for these individual differences when determining adequacy. Consequently, a target replacement rate, a shorthand for replacement rate, is often used as a guide based on different income boundaries (for The Pension Commission’s boundaries, see Table 2.1).

Target replacement rates vary based on income with those on lower incomes (e.g. <£12,600) having to achieve a greater replacement income (80%) in order to smooth consumption, but often needing to save less in monetary value to do so due to a greater



Table 2.1: The Pension Commission benchmark proportional targets sourced from the Pensions and Lifetime Savings Association (2016).

Pre-retirement gross earnings (2004)	Pre-retirement gross earnings (2016)	Replacement rate threshold (%)
<£9,500	<£12,600	80%
£9,500 to £17,499	£12,600 to £23,299	70%
£17,500 to £24,999	£23,000 to £33,199	67%
£25,000 to £39,999	£33,200 to £53,199	60%
£40,000 or more	£53,200 or more	50%

proportion being covered by the state pension.<sup>1112</sup> Accordingly, the challenge of maintaining a level of income from work through into retirement is often greatest for the highest paid, with 77% of those in the top quintile expected to miss the target compared to 3% in the bottom income quintile (Pensions Policy Institute 2021).

Disney et al. (2001) used a basic life cycle model of saving to calculate replacement rates and provide a benchmark of savings adequacy. Assuming continuous employment, they suggested that saving 20 percent of earnings throughout ones career would result in an annuity income worth 65 percent of final earnings . Yet, accounting for the addition of a Basic State Pension and the reduction in consumption after retirement the authors suggest 15 percent of one’s salary is a minimum requirement for saving throughout the working life for a replacement rate of between 50 and 60 percent of final earnings before retirement. Similarly, the Independent Review of Retirement Income (Blake 2016) and the Pension Commission (Pensions and Lifetime Savings Association 2016) both conclude that people should save at least 15 percent of their lifetime earnings, with the former stating this is needed merely “to avoid future pensioner poverty”.

Yet despite this, few people save this amount, with many congregating around the default 8 percent mark. Concerningly, the result is that the Pensions and Lifetime Savings Association (2021) estimate that a quarter of people will not meet the JRF minimum income standard with single-people and low-income households at greatest risk.<sup>13</sup> More

<sup>11</sup>The new state pension is a total of £9,339 per year (2021/22) for those with a full contribution record of 35 years.

<sup>12</sup>And because it is a lower monetary amount.

<sup>13</sup>Moreover, if an individual’s income is below the poverty line pre-retirement, even with a 100 percent

optimistically, considering only those who are nearing retirement (over 50 years old), Banks et al. (2005) suggest that more than 88 percent of people may be on track to achieve a 66 percent replacement rate (although these individuals are more likely to have DB provisions than younger generations). Using the Pensions Commission’s target rates, and looking at the broader population, approximately half of working age people can expect to fall short of maintaining a level of retirement income that is personally acceptable (Department of Work and Pensions 2017a; Pensions and Lifetime Savings Association 2020; Pensions and Lifetime Savings Association 2021). The picture is worse for those with only DC savings with an estimated 90 percent at risk of not achieving their replacement rate (Pensions Policy Institute 2021). The government projections suggest that 38 percent of the working-age population are not saving adequately for retirement (Department of Work and Pensions 2017a). Clearly, while estimates vary, there is a consensus that people do not save in reality as the life cycle model predicts in order to smooth consumption, and many are at risk of outcomes below their expectation in retirement (Schooley-Pettis et al. 2013).

Given suboptimal saving is common, it is important to consider whether income is the main driver for this behaviour, as encouraging people to save when they cannot afford to could be detrimental to their overall financial wellbeing (Crawford et al. 2020). However, importantly, despite it being a common-sense argument, such widespread under saving cannot be fully explained through affordability (i.e. people do not increase their retirement saving because they simply cannot afford to contribute more). Smith (2006) found that only half of people who cease contributing to a retirement saving account report financial reasons as the explanation, a finding supported by more recent data in the UK (Crawford et al. 2020). There is also an argument that people cannot afford *not* to save for retirement (Age UK 2019; Francis-Devine 2020) when considering their financial and mental wellbeing over the long term.

Concerns that some people may borrow to save (Andersen 2018; Beshears et al. 2019a; Bourquin et al. 2020b) currently have little evidence; although, evidence is frequently

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replacement rate it will remain below the poverty line post-retirement too.

based in the United States and often difficult to measure due to the disparate ways individuals manage their money.<sup>14</sup> It is unlikely that increasing contributions above what individuals can afford is a risk in the present research. This is partly because most of the studies I present consider hypothetical decisions but also because the interventions are light touch and all require some active decision making (i.e. not using increased saving defaults or automatic escalation).

## 2.4 Explanations for under saving

In the previous section, I described how pension adequacy is determined and the evidence suggesting that a large portion of people are likely to fall short of the definition of adequacy if they do not increase their contributions. With this in mind, there is a strong focus in government as to how individuals could be encouraged to save more for their retirement. The field of behavioural economics seeks to combine the intellectual framework of economics about ‘rational’ financial decision making and utility maximisation with lessons from psychology on behaviour that people do not always behave as suggested by rationality. Consequently, the main insight from behavioural economics is that “human behaviour is guided not by the dictates of rationality embodied in a super-computer that can analyze the costs and benefits of every action” and is instead “led by our very human, sociable, emotional and sometimes fallible brain” (Dolan et al. 2012). Therefore, to develop effective interventions, we must work against the heuristics and biases, that often serve us well in other aspects of our lives, in order to make better long-term saving decisions.

This thesis considers a range of behaviours and influences on behaviour that relate to financial decision making. The majority of the thesis is concerned with retirement saving and the influence of time on decision making (Chapter 4, 5 and 6). Other chapters consider arbitrage gains in retirement saving (Chapter 7), and financial capability in a population of university students (Chapter 8). In this section, I provide an overview of

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<sup>14</sup>Nest Insight are currently examining this in the UK context with researchers from University of Nottingham and Harvard University.

some of the key biases, heuristics and s that affect and explain retirement saving and discuss the literature associated with each: present bias, inaction inertia, arbitrage and financial capability. Each empirical chapter also provides additional information on each of these concepts.

### **2.4.1 A focus on the present**

Time is an important component in many decisions and can have a profound influence on wellbeing across the lifespan. In retirement saving, the intertemporality is prominent when deciding between the short-term gain of spending now and the, potentially larger, long-term gain of saving (and investing) that money. Considering these options, an individual must deliberate the prospects of each option, which may be challenging as they occur at different times where an individual must preempt what they would want now versus in the distant future. For instance, when spending now an individual may be able to afford a better quality of life or more luxuries now, perhaps enabling greater financial freedom in the immediate future and the benefits associated. However, if an individual chooses to save, the benefit of a more comfortable retirement akin to the lifestyle experienced while working might be possible, and the benefits of compound interest, tax relief and matches may also mean the payoff is greater. How an individual perceives and experiences time, and the way decisions across time are framed, can cause them to weight the prospects of the present more heavily than those in the future and therefore understanding this, and developing interventions to correct it may be beneficial.

The observed persistence of low contribution rates may in part be the result of the bias for the present and difficulty exerting self-control over intertemporal decisions (Laibson et al. 1998; O'Donoghue et al. 1999). People are inherently impatient and would often rather experience a reward now and delay the costs to later in such a way that it does not always benefit the self over time. When presented with the option of spending seven hours on an unpleasant activity on April 1 or eight hours on April 15, most people, if asked on February 1, would prefer the former option. However, come April 1, and in the presence of the same choice, far more people would likely put off the work until the

later date (e.g. O'Donoghue et al. 1999). This tendency toward the present results in a stronger weighting towards the more proximal time when considering trade-offs between a present and future reward. Individuals with present bias demonstrate stronger preferences for procrastination and demonstrate greater inertia in, for example, the intertemporal decision to enrol in a pension plan (when retirement saving is a dichotomous variable), resulting in lower projected savings (Eisenhauer et al. 2006; Heutel et al. 2014).

People are not totally unaware of their present bias. Pre-commitment mechanisms have long been discussed in relation to myopic decision making and suggest people are sophisticated enough to know that their future choices may be different to their present ones, at least to some extent. Indeed, one of the earliest papers on discounting by Strotz (1956) notes that decision makers “are often willing to pay a price to pre-commit future actions (and avoid temptation)” (p. 174) suggesting a self-awareness about poor self-control. Despite this, there is no perfect commitment mechanism which precisely constrains behaviours to meet an individual’s optimal needs both now and in the future (Laibson 1997). Pension plans provide a way of ‘locking away’ money for the future through illiquid assets (essentially ‘locking in’ a decision in an earlier time period). Of course, saving in such a way produces a cost in the present as money will not be accessible in the short-term without penalty. However, even illiquid assets are not a sufficient tool for pre-commitment, seen in the low contribution levels. It is apparent to many that individuals underestimate the extent to which their future behaviour will not align to their current preferences. This is such that, in the past, people often did not have the motivation to fill in the paperwork to join their retirement scheme but stated that they would start saving for retirement in the future, assuming – often erroneously - that this willpower will exist at that time. Now with the UK introduction of automatic enrolment, the present bias can lead to a concerning gap between intention and actions for contribution decisions, with even those who state an intention to increase their contributions not doing so (Choi et al. 2002).

In accordance with models of life cycle consumption, present bias, which is dynamically inconsistent (discounting the near future more heavily than the distant future), can lead to

lower savings compared to a rational agent with a consistent discounting factor (Angeletos et al. 2001; Diamond et al. 2003; Laibson 1997). This is because, there is generally a conflict between long- and short-term preferences such that individuals are relatively patient when two alternative rewards are offered in the future but this reverses when choices are closer to the present (Chybalski et al. 2018; Kahneman et al. 1977). For example, Green et al. (1994) found people preferred to receive \$20 now as opposed to \$50 in a month's time with the \$50 option only preferred when there was a delay to both options, for example, \$20 in a year and \$50 in two years. This phenomenon is commonly referred to as hyperbolic discounting (Frederick et al. 2002; Loewenstein et al. 1992; Zauberman et al. 2016) and provides one explanation as to why people prefer the immediate reward of spending over the future reward expected from saving. Choi et al. (2002) report that of those who state an intention to increase their retirement contribution over the next few months (36 percent), only 14 percent actually do. Indeed, interventions such as Save More Tomorrow (SMarT; Thaler et al. 2004) directly target present bias by having individuals commit to saving in the future (initially a minimum of three months and then yearly) rather than now and have demonstrated great success at increasing the adequacy of saving.

If people acted in ways which were entirely self-interested then the subjective value of the future reward would only be partly reduced as a result of the lower expected utility from interest rates and uncertainty (Frederick et al. 2002). However, the magnitude of discounting and the resultant temporal inconsistencies suggest rewards in the present and future are not equally valued; although, the source of this myopic tendency is not well understood. Some describe it as a continuous disparity between rational thought and irrational inclinations, for instance, a discrepancy between the 'planner' who looks to the future and the 'doer' who is selfish (Loewenstein 1996; Thaler et al. 1981). In the case of retirement saving, having a positive outlook of the future has also been found to be positively associated with the level of retirement contributions suggesting affect may too play a role (Hershey et al. 2007). Moreover, beyond resource allocation, delaying rewards also requires the ability to project oneself into the future and imagine receiving

the reward at a different time, and therefore others see it as a result of the inability to imagine the future self accurately.

The multiple-self framework has previously been used to model the gap in short- and long-term preferences caused by intertemporal decisions. While many models exist (Ainslie et al. 1985), they generally posit that multiple versions of the self exist along the lifespan and are characterised by their degree of connectedness to each other and the present self (it can also be retrospective into the past, however for brevity and relation to the present research we only consider future connections). More specifically, this theory captures the notion that the decision maker exists across multiple time points and may change their characteristics and preferences across them providing an explanation for present bias and possibly providing a theoretical basis from which interventions can be developed.

### **Multiple selves theory**

The theory of multiple selves posits that a person consists of many distinct but interconnected entities which differ in connectedness over time (Elster 1987). The connectedness refers to the similarity or stability across these temporal selves such that those with the greatest overlap in characteristics are said to have the greatest connection. Such theories are ubiquitous (although not always well defined theoretically) and are closely related to theories of personal identity over time (Olson 2016; Shoemaker 2008). Over the course of our lifetime many things change; we may experience some shift in values (e.g. Bardi et al. 2009), wealth (e.g. Alessie et al. 1997) or changes to our hobbies or interests. Our bodies will undoubtedly age resulting in a change to both physical (e.g. Hall et al. 2017) and mental abilities (e.g. Craik et al. 2006). Despite this, we are also thought to remain relatively stable across some aspects (e.g. Bleidorn et al. 2018), and often experience only incremental changes, while retaining ownership of past actions and experiences. Therefore, personal identity theories seek to describe how an individual can be qualitatively different and yet quantitatively the same person (Kolak et al. 1991; Olson 2016; Shoemaker 2008). Indeed, theorists have been debating whether we are more similar or different in identity over time since before Plato began discussing the Ship of Theseus thought

experiment on identity.<sup>15</sup>

More recently, philosopher Derek Parfit has been influential in proposing that the connection between the present self and the self of the distant future decreases with increasing temporal distance, leading to the very distant self being so psychologically distant that it is perceived as a stranger (Parfit 1971). Just as it is difficult to know the thoughts, feelings and preferences of a stranger, so too it is difficult to truly understand what our future self would want. Read et al. (1998) asked individuals to decide on a snack a week ahead of time: either a piece of fruit or unhealthy snack. Many people had good intentions with 74 percent choosing the piece of fruit and only 26 percent choosing the chocolate. However, a week later, when the future self became the present self and the same individuals were asked what snack they wanted now, the preferences reversed with 30 percent choosing the piece of fruit and 70 percent choosing the chocolate. Indeed, people frequently make decisions which prioritise the current self over the future self and others due to present bias (e.g. Bartels et al. 2010; Bartels et al. 2011; Burum et al. 2016; Herschfield et al. 2008; Pronin et al. 2008; Pronin et al. 2006) and in retirement saving, this can lead to spending now rather than saving for old age.

Although, it may seem difficult to imagine that we would be so unconnected to our future selves that we would treat them as strangers, there is at least some evidence in support of this notion. When making judgements, evidence suggests the self is often described in terms of the internal state (e.g. motives and feelings) and others are described in terms of their behaviours (Molouki et al. 2015; Pronin 2009). However, there is at least some evidence to suggest that the future self is also described in the style of others, rather than an extension of self. Pronin et al. (2006) asked participants to imagine the self eating a meal at a point in time (the distant past, proximal past, now, the proximal future, or distant future) and found participants were more likely to state they imagined observer-like perspectives, typical of describing others, when imagining the distant past/future and actor-like perspectives when thinking of the proximal past/future (Pronin et al. 2006).

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<sup>15</sup>The Ship of Theseus is the notion that if a ship leaves a port to circle the earth and, during the journey, gradually replaces all of its parts: is it still the same ship when it returns?



Although a small sample ( $n=70$ ), Pronin et al. (2006) demonstrate this tendency to take a third-person perspective when thinking about the future self across a number of different studies. Equally, Pronin et al. (2008) build on this work finding that, across a number of different scenarios, people make decisions for their future selves akin to decisions made for strangers. For instance, undergraduates signed their future selves up to drink a similar amount of a disgusting tasting liquid for science as a stranger and more than their present selves.

Bryan et al. (2012) also found evidence of this blurring between the self and others in a field study where members of a retirement saving scheme were shown messages which either emphasised self-interest or social responsibility (where the future self was overtly framed as an other). Retirement contributions were greater for those who saw the social responsibility messages than the self-interest message but only to the extent they felt close to their future self, with those who felt little connection to their future selves equally unresponsive to both messages. The fact that strangers are treated like we would treat ourselves is not entirely surprising. Even in dictator games where an individual can choose an amount to give to a stranger anonymously (0% to 100% of the amount endowed) around 64 percent of people choose to give to a third-party at least some of the time (Engel 2011), challenging the notion that we are entirely self-interested. However, often people who are disconnected from their future self would rather give their money to others (through charitable donations) than give it to their future self (Bartels et al. 2013).

Giving to the future self is arguably not the same as giving to a stranger. After all, when one gives to the future self there is a shifting of resources such that one expects to see the money again at some point, something not assumed when giving to a stranger. Moreover, in studies where decisions are made about the present, future selves and a stranger, the stranger is often not well identified or described (in terms of their need, similarity, deservingness), suggesting that all ‘others’ are equal, something which is not the case (for example, see Everett et al. 2015 for the effect of in group and out group strangers on decision making). For instance, Burum et al. (2016) found that participants

allocated similar quantities of an unpleasant task to their future self and a stranger when told that their future self was a member of an outgroup although allocations were still lower than when told the stranger was in the ingroup. Indeed, despite the differences between the future self and others and the context, discounting curves of both temporal and social distance are similar (Jones et al. 2006; Jones et al. 2009). Notwithstanding the important distinction between stranger and the future self, Molouki et al. (2020) found that factors such as liking, deservingness, need and similarity affected decisions to allocate money comparably in both interpersonal and intrapersonal giving. This suggests that saving for retirement may not feel unlike giving large amounts of money to a stranger with similar underlying cognitive processes and therefore anything done to increase the connection (and reduce the feeling that the future self is distant, or like a stranger) is likely to be beneficial.

An arguably less provocative and more intuitive way to explain the future self is to consider all future selves on a continuum of the present self (rather than as an ‘other’), with those temporally proximal having a greater similarity than more distant selves. In support of this continuum, those who feel more connected with their future selves have often accumulated more savings (Hershfield et al. 2009), are more patient (Bartels et al. 2010) and procrastinate less (Blouin-Hudon et al. 2015). Consequently, it is perhaps not whether the distinction between the future self is perceived as an other or a version of the self that is important but rather the degree of connectedness which is felt. Research exploring the intrapersonal allocation of resources has, to date, mainly focused on this perception of connectedness, often operationalised as similarity (or continuity), between the current and future self with changes in valuation and attention posited as potential explanations for its influence on reducing myopic decisions.

Increasing the perceived similarity of the future self is thought to mitigate the need gap by increasing the valuation of the future. Doing so makes it easier to understand the needs of the future self when in reference to the present self, for example, strengthening emotional identification with similarity can effect the valuation of long-term benefits and lead to a greater preference for delayed rewards (Bartels et al. 2011; Bartels et al. 2015).

Undoubtedly, most people are aware that their current saving behaviour will impact their future retirement, yet many will still fail to engage in retirement saving because the value of their future wellbeing is less than the sacrifice to the present self is worth (Bartels et al. 2015).

Continuity also allows for the future to be easily imagined and draws attention to the consequence of decisions on the future self (Hershfield 2011). When people are more aware of the implications of their decisions in the present, they can make more informed choices. In one notable study, Bartels et al. (2011) found that increasing an individuals' connection to their future self makes them more patient at waiting for consumption experiences and financial rewards. Importantly, the researchers demonstrated that this relationship between connectedness and patience was distinct from related concepts such as uncertainty, future time perspective, construal level, self-control, emotional affect and free time.

Manipulations to increase the perceived similarity of the present and future selves have shown promise in increasing behaviours which have a long-term benefit, such as saving for retirement (Hershfield 2011). Although, initial research by Frederick et al. (2003), drawing upon the ideas of Parfit (1984), did not find a significant correlation between self-reported connectedness to the future self and responses in a temporal discounting task, connectedness has since been found to correlate with real-world behaviours indicative of a future focus such as academic performance (Adelman et al. 2017), asset accumulation (Hershfield et al. 2009) and environmental behaviours (Lee et al. 2020). More recently, direct manipulations have demonstrated a causal link between reductions in temporal discounting as a result of increases in similarity (Bartels et al. 2010; Bartels et al. 2011; Hershfield et al. 2009) and it is generally considered to have promise when encouraging the delayed reward in intertemporal choices, such as saving behaviours.

### **Episodic future thinking**

Given the multiple selves theory, interventions that strengthen the connection between the present and future self are therefore likely to be beneficial for encouraging individuals

to make more far-sighted decisions. In Chapter 4 and 5 we further add to the literature on episodic future thinking, or the “the capacity to imagine or simulate experiences that might occur in one’s personal future” (Schacter et al. 2017, p. 41), to explore whether generic stimuli can be effective at increasing retirement saving, through an increased connection to the future self. Episodic future thinking is comprised of three components: vividness, (positive) affect, and similarity, each of which are described in this section. Frequently, studies in this area, using the components of episodic future thinking, require a high degree of personalisation which makes it expensive and difficult to scale to the broader population. In this thesis, I draw on episodic future thinking as a mechanism to increase connection, and use non-personalised light-touch interventions to improve saving behaviour, that could be more easily scaled to a larger population.

## **Vividness**

In increasing connectedness between the present and future self, it seems almost implausible that factors such as the vividness of the future self are not also increased and may contribute to the effectiveness of episodic future thinking. The needs of the present self are viscerally evocative, mentally accessible, and relevant to current needs and desires whereas the future is abstract and perceived in an emotionally detached manner (Loewenstein 1996; Metcalfe et al. 1999; O’Brien 2015). Consequently, the attention is with the vivid and more certain needs of the present self. Increasing the perceived similarity of the future self through mental imagery brings that self into focus. Of course, it is not difficult to think vividly about the future, one can imagine the self in retirement with relative ease, but the long-term consequences of decisions made between the present and future are vast and it is impossible to know with any certainty whether that image could be a reality and consequently we tend to imagine it with less contextualisation than possibilities closer in time (Wakslak et al. 2006). As a result, it is all too easy to dismiss the future and focus on the certainty of the present.

Parfit (1984) remarked that “when we imagine pains in the further future, we imagine them less vividly, or believe confusedly that they will somehow be less real, or less painful”

(p.161). The vividness with which the future self can be imagined has been thought to increase the connection between the present and future selves and the construal level, making it easier to integrate the pains and gains of both the present and future into the decision making process (Hershfield et al. 2018; Pronin et al. 2008). Consequently, myopic decisions may result in part because people fail to fully imagine one's internal experience in the future.

Vividness can be generated through two mechanisms: making the future self more visually vivid using technology (e.g. avatars and virtual reality) or making the future self more imaginatively vivid. Both are expected to generate similar outcomes (Hershfield et al. 2018). Bromberg et al. (2015) determined that the vividness with which the future was imagined using autobiographical interviews was negatively correlated with temporal discounting rate in adolescents. The role of vividness in imagining the future self and the part it may have in increasing connectedness and decreasing temporal discounting has received increased interest. Indeed, events which can be recalled more vividly are intuitively thought to occur closer to the present which results in the assertion that they require greater attention and allocation of resources (Gerber et al. 2010; Tversky et al. 1973a). Consequently, if the distant future self is made more vivid it will feel closer in time, resulting in it being more connected to the present self and a greater likelihood of delaying a reward.

Israel et al. (2014) used non-self-relevant ageing primes to increase the vivid perception of the future self, arguably by intensifying the negative emotions which are linked to thinking about the future. They found that individuals who saw images of elderly people suffering from financial issues or in need of assistance discounted the future less than those who saw positive images of vacations. However, when the same images presented in an equivalent text format there was no difference in the discount rate between those who read about the elderly people suffering or the vacation. It has been suggested, that this is due to the images of the elderly suffering being both emotionally and visually more vivid than the texts. While it is possible that the same vividness may be created using self-relevant materials (de Vito et al. 2012; Hershfield et al. 2011; Marques et al. 2018), it

is also seems that vividness alone may be sufficient to alter retirement saving decisions.

Construal level theory is one reason vividness may affect intertemporal decisions through episodic future thinking. The theory suggests that people form mental construals of the future to make predictions and speculate on future outcomes and goals (Trope et al. 2010). The immediate future is construed with cognitive representations which are concrete and vivid with detail whereas those in the distal future are more general, abstract and schematic (Trope et al. 2010). The reference point for thinking about the future is always the present self with the psychological distance from the present moving from lower construal levels (concrete), with a focus on subordinate goals and feasibility, to higher construal levels (abstract) in the distant future, with more superordinate goals and desirability considered (Liberman et al. 2007). Not only does this effect the perceived certainty of the future versus the present, but it also makes comparing across the two time frames - which are construed very differently - feel like comparing two very different outcomes, resulting in a disconnect and suboptimal decision making.

Framing intertemporal decisions such that the future is made more concrete may make the future seem closer, and consequently in more need of attention, leading to greater patience (Lempert et al. 2016). For instance, when using more fine-grained descriptors of time (e.g. days as opposed to months) to describe an event, people predict the event to be sooner and estimated that preparation for the event should occur earlier (Lewis Jr et al. 2015). Similarly, describing a future reward as occurring on a concrete date (e.g. Aug 1) rather than an abstract time interval (e.g. 90 days) results in more patient choices (DeHart et al. 2015; Read et al. 2005). Colby et al. (2013) demonstrated that people are more likely to relinquish small discretionary purchases for larger saving goals if there are smaller sub-goals for saving. For instance, when consumers adopt an abstract (distant) perspective, they become more confident in their ability to save when they make smaller concrete sub-goals. However, when they adopt a more concrete perspective, the same goals increase the perception that the goal is unachievable (Ülkümen et al. 2011). Like many studies of this nature, the ‘future’ was only six months away which is very different to retirement decisions where one may be making decisions 40 years into the future.

Abstract construal levels also often lead to increased consideration of future rewards (Fujita et al. 2010; Fujita et al. 2006). Malkoc et al. 2010 found that when consumer products are described abstractly rather than concretely, people will wait longer to save the delivery fee. In the retirement domain, SMarT (Thaler et al. 2004) has been suggested as a demonstration of the effectiveness of adopting an abstract construal level (Rudzinska-Wojciechowska 2017). In SMarT people are asked to pre-commit to saving more for retirement in the future after they receive pay rises, a strategy which proved very effective (Thaler et al. 2004). Although, the authors do not interpret in terms of construal level theory, Rudzinska-Wojciechowska (2017) suggests that the temporal distance in the decision may have led people to more abstract thinking focusing on the broader benefits of the decision and less about the costs of the decision in the present.

Although, there is support for interventions which increase abstract construals and those which increase concrete construals, this apparent contradiction has been reconciled by the suggestion that neither is more effective but that all choice options must be presented on a similar level of construal, whether that be high or low. It is proposed that this is because intertemporal decisions are usually not comparable as one option is presented at the low level construal and the other at a high level construal, decreasing the connectedness between the two. Kim et al. (2013a) found that with a discounting task where a trip to Paris (the present was a less extravagant trip than waiting for the future) was presented in varying degrees of concreteness people were more likely to delay for the future compared to those who saw abstract information on a trip to Paris (see Study 1a, 1b and 2). They also found that, inducing increases in psychological distance (social distance is used but results are similar to the behavioural consequences of temporal distance, see Pronin et al. 2008; Pronin et al. 2006; Trope et al. 2003; Trope et al. 2010) led to more future orientated decisions. This supports the notion that temporal discounting is a result of construal level differences between the near and far future rather than a preference for either concrete or abstract perceptions and suggests that imagining the future self on the same construal as the present self is likely to be beneficial for reducing discounting, with the scenarios in the present and future being *equally* vivid to imagine.

## Similarity

Arguably, one way to increase both connection to the future self and its vividness is to increase the self-relevance of the future self. Self-relevance refers to anything which triggers the “multidimensional, multifaceted, dynamic structure” (p. 302) in memory which relates to an individual’s own self-concept (Markus et al. 1987). Factors such as goals, self-image, values, motivations and situational determinants can all influence the sense of self. Many studies use a degree of personalisation to increase retirement saving, indeed episodic future thinking, which has been discussed thus far in regards to vividness, is commonly used to increase connection to the future self, and is autobiographical by definition (Bartels et al. 2010; Bartels et al. 2011; Hershfield et al. 2011). Many studies of vividness require participants to think about themselves in the future, yet few account for the increase in self-relevance which is induced as a result of this (Hershfield et al. 2011).

In a seminal study in the field, Hershfield et al. (2011) asked participants to interact with realistic computer-generated avatars of themselves (either age progressed to 70 years old or current aged) in a virtual reality environment. Those who interacted with themselves in the future indicated a greater intention to save for retirement compared to those who interacted with their current aged self. This intervention using vivid versions of the self was explained by an increased connection between the present and future self. However, it should be noted that simply increasing the vividness of ageing or old age (by presenting an elderly stranger), rather than the future self, did not increase retirement saving rates and therefore it is likely that the vividness must be self-relevant in order to be effective. In a more recent study, Sims, Bailenson, and Carstensen (2015) enrolled students with economically diverse backgrounds into a financial education programme where they saw either an avatar of their present self or themselves age progressed. Participants who saw their future selves allocated more hypothetical money to saving than those who saw their current selves. Moreover, of a subset of participants who viewed their avatar several times throughout the course, those who saw their future selves more frequently received higher scores on a test at the end of the programme. Seeing a vivid version of the future self



may therefore increase both the intention to save but also the motivation to learn how to save, regardless of economic background.

Given that self-relevant information is more salient and imagined more vividly (Sui et al. 2015), it is expected that using future self-relevant information to induce vividness is likely more effective than not self-relevant future thinking. Peters et al. (2010) asked participants to complete a temporal discounting task between smaller fixed rewards and larger delayed rewards. In half of the trials participants were cued with personally relevant events which they had generated in a pre-interview which corresponded to each of the delayed amounts of time. The trials were therefore either not self-relevant (€20 now or €35 in 45 days) or self-relevant (e.g. a vacation to Paris). A within-participant design was used to account for considerable individual differences in discounting rate and ability to imagine. Participants were more likely to choose the larger later reward when they were in the personally relevant cue condition than in the standard trials.

Similar results were found by Benoit et al. (2011) where, in the behavioural element of an fMRI study, participants were asked to imagine either themselves spending money at an event (e.g. £35 in 180 days in a pub) or to simply estimate what could be bought with the money at the delayed reward. They were then asked to rate how vividly they could imagine the scenario. The researchers found that people were more likely to choose the delayed option when they imagined spending the money and that they were also more likely to report a greater intensity of vivid imagination. While this suggests that self-relevance decreases myopic decision making, it was also found that the effect was associated with the vividness with which the future is imagined. While vivid imagery can be generated without being self-relevant, it is more challenging to dissociate self-relevance and vividness suggesting that the influence of self-relevance is perhaps moderated by vividness. Conversely, de Vito et al. (2012) also demonstrated that there is a difference between thinking vividly and thinking vividly about the self in the future. They found that participants asked to imagine themselves (self-relevant) experienced a greater sense of pre-experiencing the future than those asked to imagine a familiar other (self-irrelevant). The level of sensorial detail and context clarity, both of which indicate vividness, were

similar for both groups. The authors therefore suggest that it may be the sense of pre-experiencing which is important, a factor which may require vividness but is likely more effective with self-relevant future thought.

## **Affect**

It is often assumed that intense emotion leads to more impulsive decision making, choosing sooner, smaller rewards at the expense of the long-term self because emotion in the present is often felt to be more salient than people believe it will be in the future (Laibson 1997; Loewenstein et al. 2003).<sup>16</sup> In line with this, imagining the future with a greater emotional intensity has been found to moderate a reduction in temporal discounting rate (Benoit et al. 2011). Consequently, if individuals can be made to recognise that the emotions felt in the future will be equal to those felt now, then better financial planning may result (Hershfield et al. 2011).

One influential model of the role of emotion in intertemporal decision making is the two system ‘hot’ and ‘cold’ model (McClure et al. 2004; Metcalfe et al. 1999). According to this model there is competition between a ‘hot’ impulsive, emotional system and a ‘cold’ patient system when making decisions (Laibson 1997; McClure et al. 2004). This model, along with similar models like Kahneman’s (2011) System 1 and System 2 thinking, is influential in psychology but has largely been unsubstantiated in this field, partly due to only few studies on emotion and intertemporal choice, but also because emotion is multidimensional and likely more complex in influencing intertemporal decisions than a two-system framework suggests. For instance, contextual factors can influence the effect of different emotions on long-term decision making. Lempert et al. (2015) used pupil dilation to measure emotional valence during an intertemporal decision-making task. They found intertemporal choices to be influenced by changes in expectations such that when future rewards were stable and immediate rewards variable, people discounted the future less. Emotional arousal (pupil dilation) heightened as the rewards increased in value relative to the expected value too. Of course, pupil dilation is a non-specific measure of

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<sup>16</sup>See also Kahneman (2011) for his model of

arousal and can equally signal novelty or cognitive load (although these were controlled for in this study) (Laeng et al. 2012). The authors suggest that the unchanging rewards become a default and are therefore more salient. Consequently, a bigger emotional response is elicited when a reward is larger than the default expected amount, leading individuals to change their choice away from the default and demonstrating that context is important in determining the emotional response.

Emotional intensity, particularly positivity, has been suggested as an important construct in reducing discounting with more emotionally intense mental imagery resulting in a greater inclination to choose delayed over immediate rewards (Benoit et al. 2011; Israel et al. 2014). In one study, participants were asked to create vivid mental imagery imagining spending a reward after a delayed time in a specific scenario (e.g. the pub) while making their intertemporal decision (Benoit et al. 2011). Those who imagined spending the reward at a future location were more likely to choose the delayed option than those who simply imagined spending the money. However, the effect was found to be moderated by the emotional intensity with which the event was imagined. Indeed, many studies exploring the role of episodic future thinking use, as a default, positive emotional tags (Benoit et al. 2011; Peters et al. 2010). This is in line with the notion that episodic future thinking includes positivity however it is plausible that the effect of increased patience on saving for retirement found in previous research is moderated by positive emotion alone rather than changes in the connection to the future self or construal level.

More recent studies have begun to explore the role of different emotions in episodic future thinking, with largely inconclusive results. Lin et al. (2014) found positive and neutral episodic future thinking resulted in similar decreases in temporal discounting although no comparison to negatively valenced cues was made. They also found the effect to be moderated by working memory capacity, a factor thought to be important in the vividness and concreteness with which a scene is generated, and which is also known to be important in planning when mind wandering (Baird et al. 2011). In a study using more varied emotional cues, Liu et al. (2013) found that positive emotional valence reduced the preference for immediate rewards in an intertemporal decision task using

episodic future thinking. Conversely, negative future thinking increased the preference for immediate rewards whilst there was no effect of neutrally valenced cues. The self-reported vividness of all three types of emotional cues was comparable, controlling for the influence of concreteness with which the cues were imagined, and supports the notion that positivity is an important and independent concept within episodic future thinking. These findings were replicated by Zhang and colleagues using a comparable methodology (Zhang et al. 2018).

Despite this, the conclusion that positivity is important for improving intertemporal decisions is far from unanimous in the literature. Bulley et al. (2019) observed a significant reduction in temporal discounting with both negative and positive cues compared to neutral cues, using a methodology not dissimilar to Zhang et al. (2018) or Liu et al. (2013). Equally, using a within-participants design, Calluso et al. (2019) determined the role of construal level and emotion modulation on temporal discounting. Unlike previous studies, the researchers used a baseline of no emotional cue rather than comparing to a neutrally valenced cue which might influence episodic future thinking, but is often used as a control condition (see Bulley et al. 2019; Liu et al. 2013; Zhang et al. 2018). Calluso et al. (2019) found a reduction in temporal discounting for all three emotions (positive, negative and neutral) compared to baseline of no emotion. A reduction in temporal discounting in all three emotional valences suggests that there is a vividness effect such that all of the emotions make the delayed monetary option more concrete. However, there is also support for the effect of emotional valence as positive cues resulted in the greatest modulation of the effect and significantly more than neutral cues, and the neutral cues resulted in a greater modulation than negative cues. These differences suggest that both changes in concreteness and emotion are important to the effect of episodic future thinking on reducing temporal discounting rates.

The self-relevance of emotional cues has also received increasing attention in the literature. Bulley et al. (2019) and Zhang et al. 2018) both found that participants' self-reported future positive events as more personally relevant than neutral and negative events which may explain the greater modulation for positive cues. Equally, individuals derive pleasure

from sharing information about themselves (Tamir et al. 2012), making generating positive cues for researchers likely a pleasurable experience. In a seminal study, Hershfield et al. 2011 used age progressed avatars of participants or a stranger and then manipulated the emotion of the faces from positive to negative. Participants saw a scale with ‘current income’ at one end and ‘retirement income’ at the other and had to indicate how much they wanted to contribute to their pension now by moving the dial along the scale. As the dial was moved to ‘current income’ the face got sadder and when moved towards the ‘retirement income’ side it became happier. Hershfield found that whilst the emotion had little effect on the amount contributed to retirement, the self-relevance of the face did, with those who saw themselves contributing more to retirement, on average. Whilst this study suggests that self-relevance may be more important to reducing temporal discounting than emotion, it was done using subtle changes in emotion and raises the question as to how the intensity of the emotion effects decision making. Moreover, the stimuli used was personal to the participant making it difficult to apply such a finding to real-world retirement decisions where such personalisation would likely be unfeasible.

### **Interventions in the present research**

Given the impact of emotional affect, vividity, and self-relevance on connectedness between the present and future selves, developing an intervention that utilises these concepts to support people to make better intertemporal decisions for retirement saving may be valuable. To date, much of the literature has utilised stimuli that is difficult to scale because it either requires stimuli to be generated ahead of time or requires technology to vividly represent the future self (which requires an individual to submit images ahead of time or undergo scanning). Therefore, in Chapter 4 and 5 I examine the effect of two different interventions that require no personalisation and could therefore be more easily scaled, if effective.

The first, in Chapter 4, utilises a method developed by Marques et al. (2018) that uses a questionnaire to induce future self-relevance. The study is a conceptual replication of Marques’ and colleagues’ work in a UK (as opposed to Portuguese) context and language.

It focuses mainly on the influence of the degree of self-connection in influencing intertemporal decisions. Not only is replication a useful exercise for determining the reliability of findings, but it also provides a discussion of how context should be considered when applying findings to different populations.

Second, in Chapter 5, I look at multiple aspects of episodic future thinking, developing an intervention that presents vignettes that vary by emotion and self relevance (while minimising the impact of vividness) to see if it could influence retirement saving decisions. Given our attention is drawn to what seems relevant to us and our behaviour is greatly affected by what we pay attention to, it is thought that the self-relevance will be important in encouraging greater saving rates (Kahneman et al. 2006). In addition to self-relevance, this intervention also utilises affect (emotional association), examining how negative, neutral and positive future scenarios impact behaviour relative to a control of no emotion. Given the evidence on affect is somewhat mixed it is unclear what emotion will be most effective.

## **2.4.2 Inaction inertia**

In addition to present bias, in this thesis (Chapter 6) I also explore the influence of inaction inertia on retirement contribution decisions. Inaction inertia refers to the decreased likelihood to act on a subsequent, less attractive opportunity after forgoing an initial attractive opportunity, even when the subsequent opportunity still represents positive value (Tykocinski et al. 1998a). For example, people are less likely, on average, to buy a car when told that the rebate available is \$500 when they previously saw a rebate of \$2,500 (large miss) was available in the previous week, than when they saw it at \$750 (small miss) the previous week (Chen et al. 2021; Tykocinski et al. 1998a).

Inaction inertia is arguably related to status quo bias which refers to the disproportionate propensity to maintain the current state, even when better or more suitable alternatives are available (Knoll 2010). For instance, Van Putten et al. (2013) draws parallels between the two phenomena, noting that “once someone commits to an action, they are more likely

to stick with it” – the status quo – “the same is true about inactions” causing inaction inertia. Status quo bias predicts that individuals will stick to the current baseline (or status quo) as it becomes the reference point, with any change from it representing a possible loss (Thaler et al. 1997). Indeed, when inaction is the baseline, the default contribution status quo provides a strong inclination to remain there.

In the UK, the introduction of automatic enrolment in 2012 means that people no longer have to actively think about joining a retirement account. The principle of inertia which formerly stopped people joining is the same mechanism which stops people leaving their retirement account now (Cribb et al. 2019; Madrian et al. 2001)). However, despite high levels of membership (Cribb et al. 2019), engagement is low with many people remaining at the default contribution levels and investment strategies regardless of their needs (Mitchell et al. 2004). In Sweden, where a mandatory pension scheme was introduced in 1999, 73 percent of employees who invested in the default strategy had not made a single change to their portfolio in the following 16 years (Cronqvist et al. 2018). The UK is also following a similar trend, with Nest reporting that 98 percent of members remain in the default investment strategy (Nest Insight, 2019). Yet, people who engage with retirement planning by gathering information, adjusting their saving strategy and estimating their needs in retirement are more likely to save an adequate amount for retirement than those who do not actively plan, and therefore overcoming inertia is vital to ensuring more people save sufficiently for retirement (Ameriks et al. 2003; Lusardi et al. 2007a).

The tendency to remain at the default is arguably due to increasing contributions being felt as a perceived loss due to a cut in take-home pay. This is despite the forgone incremental gain in future income. In line with loss aversion, the cost of reduced income ‘looms larger’ than the potential gain in future income. An orientation towards the present and the desire to maximise utility locally, for the present self, rather than for overall welfare across the lifespan compounds this. This occurs in spite of the fact that retirement saving accounts represent an attractive way of saving for life after work (Office for National Statistics 2019c). Matched contributions and tax benefits<sup>17</sup> as well as the

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<sup>17</sup>In the UK, contributions are matched by employers at a minimum of 3 percent for a 5 percent con-

influence of compound interest mean that starting to save early is beneficial. This is such that, keeping all else constant, saving decisions for retirement represent a series of constantly worsening opportunities over time. Put another way, if you start to save at 25 you will have to contribute more than if you started at 24, in order to achieve the same retirement wealth. Therefore, saving for retirement is cheapest in absolute terms when started young (Munnell et al. 2011), a rhetoric which is frequently adopted by the media, governments, and pension providers alike to encourage greater long-term saving (Brotman 2019; Lunn 2018; National Employment Savings Trust 2019; Richmond 2019), but is often underestimated by the general public (Eisenstein et al. 2007; McKenzie et al. 2011a; Stango et al. 2009). Highlighting the benefit of early saving is thought to encourage higher rates of saving earlier in one's career (by drawing attention to the benefits of compound interest); however, many people are no longer in the 'early stages' of their career and therefore such messages may backfire, serving instead as a reminder of the missed opportunities to save for a lesser cost. Consequently, in emphasising the missed opportunities inaction inertia may result in people actually saving less (Tykocinski et al. 1995).

Despite this, and in accordance with a rational perspective of decision making, highlighting missed opportunities should not affect people's evaluations of present opportunities because only future costs and benefits matter to the decision (that is, individuals should rationally only consider the cost of starting today and the cost of starting at a point in the future, with starting today almost always being the cheapest of these options). Of course, this is not the case with the influence of prior actions on decision making well known. For example, people are more likely to invest in a course of action which is failing having previously invested in the same action (sunk cost effect; Arkes et al. 1985).<sup>18</sup> Equally, people are more likely to agree to a large request having previously agreed to a modest request (foot-in-the-door technique; Freedman et al. 1966).<sup>19</sup> Indeed, given the

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tribution from employees, although companies can offer more generous matches. There is also a tax benefit, with tax relief at the highest marginal income tax rate, which means that people could pay as little as 60p for every £1 they contribute (GOV.UK n.d.).

<sup>18</sup>For example, finishing a boring film because you already paid for the cinema ticket.

<sup>19</sup>For example, make a donation to a charity when called having earlier signed a petition for the same



influence of previous actions on decisions, it is not difficult to see how previous inactions could too influence the decision an individual makes.

In addition to normative accounts of decision-making being undermined by evidence suggesting past inaction and action affect behaviour, so too are motivational accounts. It may be expected that emphasising a missed opportunity would motivate people to take action. After all, the issue is more pressing to them having previously missed a good opportunity, and, in the case of retirement saving, the missed opportunity is getting exponentially larger for each month that contributions are not increased. The majority of evidence suggests that often regret does not lead to motivation, with people failing to take up subsequent opportunities in domains such as retail (Tsiros et al. 2010), betting (Tykocinski et al. 1995) and investing (Tykocinski et al. 2004). Indeed, when the outcome is goal relevant people are less effected by inaction inertia; business students who missed a career fair and were looking for a job (high goal relevance) were less likely to exhibit inaction inertia than those who missed the fair but had a job (low goal relevance) (Van Putten et al. 2013).

In retirement saving, inaction inertia can be generated in a number of ways. First, delaying an increase in retirement contributions, even if only for a month or two (perhaps due to present bias), represents a missed opportunity as the amount needed to save to maintain the same retirement goal increases month-on-month. The majority of inaction inertia literature examines abrupt changes in the attractiveness of the opportunity (e.g. betting odds change, discounts end) rather than a more gradual series of ever-present missed opportunities that retirement saving presents. Indeed, time has previously been found to weaken inaction inertia; for example, Tykocinski et al. 2001 presented participants with the option to buy a fictional trip to Tuscany where, by failing to act quickly enough, they had missed out on either a large bonus or a small bonus. Participants who were told the offer was a ‘near-miss’ (i.e. it ended yesterday) displayed greater inaction inertia (were less likely to buy the trip) than those who were told it was a ‘far-miss’ (i.e. it ended 5 days previously). Often the discount is somewhat irrelevant with the ability

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cause.

to decouple the missed and current opportunity (e.g. by the passing of time) being more important than the attractiveness of the missed opportunity itself (Van Putten et al. 2007). However, investing - and therefore retirement saving - is unique whereby the passing of time actually makes the relative magnitude of the ‘loss’ in value greater and may therefore induce greater inaction inertia. This is a unique circumstance to retirement which may result in a decreased likelihood to save and a need to investigate the unique influence of inaction inertia on retirement saving behaviour (Krijnen et al. 2020).

The second way, inaction inertia can affect the likelihood to change retirement contributions is due to the return on investments fluctuating such that enrolling in an earlier time period may have resulted in a greater return through compounded investment and interest returns. Given that many people do not change their investments (Nest Insight, 2019), it may be suggested that fluctuations in returns are of little concern to most members in the real world when deciding whether to increase retirement contributions. However, it may still provide a partial explanation as to why they do not change their investment strategy. Krijnen et al. (2020) found that in a controlled environment, people reminded of a missed opportunity in terms of greater financial returns in a previous time period were less likely to join a fictional retirement scheme offered in the present where the financial returns were lower. This suggests that, when brought to peoples’ attention, information on the performance of their retirement savings may influence their decision to enrol in a pension, and by extension may possibly be useful in increasing contributions too.

A third explanation for inaction inertia in retirement saving may be perceptual distortions of compound interest. Compound interest affects returns and is important in retirement saving as it is one of the main reasons that starting to save early is effective. Krijnen et al. (2020) suggests that people are often poor at estimating exponential growth leading to an underestimation of the true cost of delaying retirement saving, and therefore an under appreciation of the fact that the current opportunity to save more is beneficial compared to delaying further. When asked to estimate growth in the last 10 years, participants underestimate the contributions needed to achieve the same financial wealth as if starting

to save now. The degree to which people underestimated mediated inaction inertia as the missed opportunity is greater than they expected. Conversely, when estimating the growth in the past year people overestimate the contributions needed to save the same amount if beginning now. Consequently, when looking into the distant past, providing information on exponential growth is likely to increase inaction inertia as it may emphasise that the missed opportunity was greater than the individual originally expected.

Despite this, people are often less aware of, or underestimate, the benefits of saving early (Krijnen et al. 2020). This uncertainty may actually reduce inaction inertia. Van Putten et al. (2007) find that when the attractiveness of the missed opportunity is ambiguous or uncertain people are less likely to exhibit inaction inertia for the subsequent opportunity. For instance, people are less likely to buy a television when they missed the opportunity to purchase it at €100 rather than €165. However, when told the missed discount was *either* €100 or €165 (that is, ambiguous) inaction inertia was absent. It is not unreasonable to think that in retirement saving, people are less aware of, or underestimate, the disadvantages of delaying saving and therefore, this uncertainty may result in lower levels of inaction inertia unless the missed opportunity is made more salient either through communications from pension providers and the media or in studies in the laboratory.

In the following sections, I describe two of the possible interventions for inaction inertia that are tested in this thesis (Chapter 6).

## **Future orientation**

The relative attractiveness of increasing retirement contributions early in ones career may increase inaction inertia for those who did not take advantage of the opportunity and who therefore experience the exponential worsening of opportunities. However, simple interventions have been suggested to overcome this. For instance, explaining the exponential worsening of opportunities to employees may be expected to increase financial literacy and savings behaviour. Interventions which have used financial education in an attempt to counter exponential growth bias have been extensively reported (e.g. Atkinson et al. 2015; Goda et al. 2012). Although, there have been some successes, many studies

demonstrate no effect or it is minimal relative to the cost. Levy et al. (2016) showed participants in the treated condition a graphical illustration of the growth of \$100 at 6.0 percent interest; the graph was dynamic so that they could observe the change from 1 time period up to 40 time periods. They found that the provision of information on exponential growth bias did not affect scores on a financial literacy questionnaire more than the control (Levy et al. 2016). Indeed, when framed retrospectively, teaching individuals about exponential growth may increase the awareness of the missed opportunity and consequently the inaction inertia.

Instead, Krijnen et al. (2020) suggest that inaction inertia may be attenuated with a focus on the future rather than the past, as education about exponential discounting often focuses on the past loss. This is because the future highlights the potential growth of savings (rather than the loss when framed in the past), which may increase the motivation to save (McKenzie et al. 2011a). Tykocinski et al. (1995) found that opportunities framed as gains rather than a loss resulted in an absence of inaction inertia. Furthermore, when thinking about the multiple opportunities still available to an individual, inaction inertia is attenuated (Van Putten et al. 2009).

Krijnen et al. (2020) studied the influence of orientating exponential growth towards the future, rather than the past to make people more aware of the rapid deterioration of future opportunities as a result, without increasing inaction inertia. Indeed, it was effective at making people more likely to raise their contributions in the present as they seem more attractive than in the future (Krijnen et al. 2020; McKenzie et al. 2011a). Equally, evidence suggests that framing the benefit of the future outweighs any negative effect caused by people applying the information retrospectively to the missed opportunity (Krijnen et al. 2020). Together this suggests that a focus on the future gains rather than the past losses appears to be associated with reduced inaction inertia.

### **State-action orientation and regulatory mode individual differences**

In addition to the framing of the message as prospective, it has also been found that some people are more likely to pay attention to past missed opportunities than others

and therefore experience greater inaction inertia (Van Putten et al. 2013; van Putten et al. 2009). People who tend to ruminate about the past and have a more difficult time letting go of missed opportunities are said to be state-orientated. It is characterised by the preservation of cognition about a particular state (e.g. present, past or future) or no state (e.g. absentmindedness). On the other hand, those who easily get over past events and have developed intentional action plans are said to be action-orientated (Kuhl 1981; van Putten et al. 2009). They have a relational ‘map’ between their present and desired future states and have different action alternatives that have the potential to move them towards their desired end-state.

As may be expected, the latter action-orientated individuals exhibit less inaction inertia than state-orientated individuals both for characteristic and mind-set induced action- and state-orientation (Van Putten et al. 2009). This is because they are quicker to overcome the negative emotional outcomes and have a focus on moving from the present state to a desired future state. As a result, it may be expected that asking members of retirement saving plans to think about actions they *could* take to improve their situation (action-oriented) would be more effective at reducing inaction inertia than thinking about how they currently feel about the situation (state-orientated). Indeed, in the case of booking a holiday, van Putten et al. (2009) found that people who are told to use an action-orientated mindset to cope with a missed opportunity, exhibit less inaction inertia than those told to use a state-orientated mindset, but only when the difference in attractiveness between current and missed opportunity is large. While this has been examined in relation to inaction inertia, it has not yet been explored with retirement saving decisions specifically, where the action plan needed could span multiple decades and may be harder to formulate.

In addition to state-action orientation, regulatory mode is also explored in the present research for the first time in relation to inaction inertia. In regulatory mode theory, there are two orientations: the aspect of locomotion refers to ‘doing’ and assessment refers to ‘thinking’ (Kruglanski et al. 2013; Kruglanski et al. 2000). At first glance, it seems like the concepts of locomotion and assessment are similar to action and state orientation

respectively; however, while there are similarities in their theoretical conceptualisation they are not the same (Kruglanski et al. 2018). First, assessment orientation is about making a considered and deliberate approach to taking action with a focus on selecting the ‘right’ option. While, behaviourally this may be similar to a state orientation, the latter is a tendency to preserve a state (or focus on no state as in the case of absent-mindedness), not moving forward because of a passivity or desire to preserve the current state rather than a deep consideration of whether the decision is right. Second, a locomotion orientation focuses on movement, change and progress although the direction is not overly emphasised. While this may result in similar behaviour to an action orientation the mechanism is different with the latter focused on cognitive representations of action and what is needed to move from the present to a desired state (rather than simply just moving). In the case of retirement saving, it may be expected that those with a mindset-induced locomotion mindset would be less impacted by inaction inertia, as they seek to move forward rather than deeply deliberating over the decision.

### **Intervention in the present research**

Using these principles to reduce inaction inertia, in Chapter 6 I examine whether inaction inertia exists in the UK pensions context where the introduction of automatic enrolment means that the miss is a partial rather than complete loss. This makes the context quite different to other research and raises the question as to whether this reduces or removes the possibility of inaction inertia as they still receive *something*. I also determine how this varies when framed retrospectively or prospectively and the influence of action-state orientation and regulatory modes on the likelihood to take up the subsequent opportunities. This is explained in more detail in Chapter 6.

### **2.4.3 Arbitrage gains**

The Freedom and Choice (F&C) legislation was introduced in April 2015 to provide greater flexibility for people to access their pension in different ways. It allowed those aged over 55 years old who chose to access their retirement savings to continue making tax-

efficient contributions and receive employer contributions while accessing their pension pot as cash - effectively making their retirement savings liquid. This obviously provides a way for those close to retirement who have accessed their savings to re-build them up to ensure that when they leave the workforce they have a sufficient income. Consequently, people should opt out at lower rates. Therefore, in Chapter 7 I explore whether this intervention does indeed have this effect and decreases opt out in this age group. While it is less ‘light-touch’ than the other interventions in this thesis due to the underlying change in economic incentive, it is light touch in its implementation in that it is already woven into the pension infrastructure and therefore requires no further effort to offer. I examine whether its presence is a valuable addition in terms of reducing opt-out behaviour.

Yet, despite the potential gain of thousands of pounds, research on other similar arbitrage gains suggest people often do not maximise these decisions. Choi et al. (2011) studied employer matches in seven companies in the US where employees aged 59  $\frac{1}{2}$  could have their contribution matched up to a threshold whilst maintaining relatively unconstrained access to their retirement savings and continuing employment. Yet, they find that between 20 and 60 percent of older employees (depending on the company) did not contribute up to the match threshold, effectively leaving “\$100 bills on the sidewalk” (Choi et al. 2011, p. 748). For some this was not a small miss but as much as \$7,596 (or 6 percent of salary) in one year. If the same is true of the F&C then this intervention is likely not a valuable strategy to improve saving balances in the run up to retirement (although possibly costs the government a lot to offer).

### **Intervention in the present research**

Given that there is a potential for individuals to boost their retirement saving after they access their pension without reducing the liquidity of the money, in Chapter 7 I explore whether the introduction of this F&C policy does indeed result in lower levels of opt out among those eligible.

Although a less ‘light-touch’ intervention than those previously mentioned in this thesis due to its substantial cost and legislative implications, the F&C is already in place and

therefore is light-touch in that no additional amends would need to be made if it is effective.

#### **2.4.4 Financial capability**

In Chapter 8, I move away from retirement saving specifically to consider the broad set of skills that are often thought to be necessary for financial decision making. It is often assumed that if you want people to make better financial decisions you should improve their financial literacy (e.g. Allgood et al. 2016; Atkinson et al. 2012; Mountain et al. 2021; Potrich et al. 2018), after all people cannot make good decisions if they don't know what the options are or understand why. Improving financial knowledge is also thought to improve financial wellbeing as well as behaviour (e.g. Potrich et al. 2016). Given this, it is perhaps unsurprising that one of the main strategies used by the government,<sup>20</sup> employers and providers to improve saving rates, including for retirement, is to educate people.

Financial illiteracy is concerning due to its frequent association with poorer financial decision-making and outcomes like low or negative personal saving and investments, or running out of money (Lusardi et al. 2011; Mandell et al. 2009), all of which can lead to considerable ramifications and sometimes irreversible mistakes (Gathergood et al. 2017; Lusardi et al. 2015). Evidence suggests financial knowledge can account for around 30 to 40 percent of wealth inequality due to returns people obtain through subsequent saving and investments (Hastings et al. 2013; Lusardi et al. 2017). Specifically among university students, Peng et al. (2007) found that higher investment knowledge and higher saving rates were associated (although there was no relationship between taking a personal finance course and investment knowledge). Similarly, in a recent meta-analysis, Kaiser et al. (2020) included 76 randomised controlled experiments (160,000 individuals) and found effects of financial education on knowledge yield an average positive effect size similar to those in other education domains such as maths and reading. Given the association between financial knowledge and behaviour it is perhaps unsurprising that

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<sup>20</sup>See Chapter 1



financial education programmes have become ubiquitous for the promotion of financial inclusion and stability in some of the world's largest economies (OECD 2015).

Due to the relationship between financial literacy and more optimal management of money, traditional behaviour-change interventions have often relied on information and education to improve financial knowledge. Through this it is hoped that reflective mental processing impacts the beliefs and attitudes an individual has around finances which in turn change behaviour. Education as an intervention to change behaviour is therefore consistent with the standard economic model that views the individual as a rational agent. Where an individual makes an economically suboptimal decision it is reasoned that this is because they do not have the information necessary to accurately calculate the payoffs of a decision, or are unable to apply it effectively (Garcia 2013). Therefore, it is thought that informed consumers make better financial decisions because they have a greater understanding of concepts, allowing for explicit appraisals of the cost and benefits of different behaviours. Indeed, several psychological models of behaviour change recognise the importance of attitudinal or belief change in order to drive intentions to change behaviour (e.g. Theory of Planned Behaviour or Social Cognitive Theory; Ajzen 1991; Bandura 1989). Such education interventions have become prominent in the policy maker's toolkit (in the UK and around the world) with numerous national education-based interventions developed in the UK to help improve financial capability, aimed primarily at reducing behaviours of public policy concerns like the regular use of expensive credit or under saving for retirement.

Nonetheless, purely knowledge-based interventions may not be as 'straight forward' and 'common sense' as some intuitively believe. Indeed, many interventions measure financial knowledge as an outcome, rather than the influence it has on real-world financial behaviours, limiting its value. Where financial behaviour is measured, impact is often limited; Mandell et al. (2009) evaluated a personal financial management course and found that those who took it did not exhibit more favourable financial behaviour than those that did not take it, in the subsequent years.

The type of education matters, and recently, Mountain et al. (2021) longitudinally (over the course of 5 years) examined the impact of different financial learning activities on emerging adults' financial knowledge and behaviours. They found that the impact of the knowledge on financial behaviour varied substantially depending on the activity an individual experienced. Activities like meeting with a financial advisor, reading books, magazines and websites on personal finances, parental role models and gaining objective financial knowledge (experience) were associated with building positive financial behaviours. In contrast, activities like seminars and workshops were negatively associated with financial wellbeing and classroom learning at university had no effect. Not only does the type of education matter but a number of demographic, psychological and cognitive factors have been suggested as reasons why financial literacy does not always translate into positive financial behaviours (e.g. Shim et al. 2009; Taft et al. 2013).

A greater understanding of how to improve financial knowledge and more rigorous empirical methods in recent years (see Kaiser et al. 2020) has resulted in researchers moving away from pure financial knowledge and towards financial capability as a mechanism to improve financial behaviour through information. Financial capability is “the ability to manage money well – both day-to-day and through significant life events” (Money and Pensions Service 2019) and is a key driver for financial decision making (Van Rooij et al. 2011) and wellbeing (Sohn et al. 2012). It typically encompasses factors like financial knowledge, inclusion, attitudes, values and beliefs, social norms contextual cues, self-control, planning and accessibility to suitable financial products.

Taking a broader view of financial capability acknowledges the fact that there is undoubtedly more to improving peoples' financial wellbeing than simply providing them with financial knowledge (McCormick 2009). The subjective experience of the world as well as interactions and knowledge that are gained are likely to be of greater importance in shaping self-beliefs about financial management than pure knowledge alone. This is perhaps because the financial world is complex with rapid changes in the financial marketplace, unstandardised products, and biases in financial decision making which can render financial education of little value, particularly in the long term (Willis 2008). Indeed,

some models of improved financial capability now seek to go beyond knowledge to take into account other factors that may be important in developing and sustaining financial capability and using it to affect behaviour and wellbeing.

Serido et al. (2013) proposed a developmental model of financial capability to account for how young adults in particular use financial knowledge to inform their self-beliefs and as a result change their behaviour and financial wellbeing through financial capability. The model is developed from the principles of Cognitive Development Theory (Piaget 1972) and Social Cognitive Theory (Bandura 1989) and proposes that financial topics must first be internalised before being expressed as behaviour and influencing wellbeing. In a sample of 18 to 23 year olds (second wave taken when they were 21 to 26 years old), Serido et al. (2013) found that changes in self-beliefs about finances (including attitude, personal control and confidence) led to changes in behaviour in accordance with these beliefs and ultimately the action on those behaviours affected wellbeing.

In accordance with Social Cognitive Theory, self-beliefs applied to the financial context are defined as “any internal working model that arises from one’s cognitive understanding of how financial concepts relate to an individual’s ability to cope with the financial demands of day-to-day life” (Serido et al. 2013, p. 3) and essentially relate to self-perceived financial management skills such as the attitude to finances, perceived personal control over ones financial situation and self-efficacy in regard to managing money. They provide a self-regulating mechanism for how external information is interpreted and experienced to inform internal working models of the self. As such, knowledge influences behaviour but equally, the outcome of behaviour may influence knowledge (e.g. going into ones overdraft may provide a lesson for an individual which they assimilate into their knowledge). Having already briefly discussed financial knowledge, below I outline the extant literature on the other elements of the developmental model of financial capability: financial attitudes, confidence and self-efficacy and their effect on financial behaviour and wellbeing.

## Financial attitudes

There is some evidence that knowledge may contribute to financial behaviours through a more positive attitude towards financial activities (e.g. Jorgensen et al. 2010; Shim et al. 2010). Financial attitudes define the personal inclination an individual has towards financial matters (Rai et al. 2019). Some suggest that development of favourable attitudes is crucial for financial literacy to affect behaviour (Bhushan et al. 2014) but also that education can improve financial attitudes and reduce the dependence on credit cards (Ibrahim et al. 2013). Jorgensen et al. (2010) examined factors thought to be important for financial behaviours in university students and found that there was indeed a significant association between financial knowledge and financial attitudes and that financial attitudes mediated the relationship between financial knowledge and financial behaviour. In another study, Shim et al. (2010) found that, in a population of young adults, financial knowledge was a significant predictor of financial attitudes which in turn was important for financial behaviours. Interestingly, the global Covid pandemic appears to have resulted in a shift in attitudes amongst students towards personal finance as they become increasingly anxious about their financial future. This seems to have manifested in a renewed interest in personal finances and an appetite for education (although not always from the right sources).<sup>21</sup>

In a study of accounting students, who were assumed to have good financial knowledge, internalisation of knowledge into attitudinal change was found to be important for driving behavioural change (Radianto et al. 2021). That is, knowledge had little impact on behaviour unless it was internalised into positive financial attitudes. The researchers also found that financial self-efficacy and perceived financial control were critical for individuals to manage debt well. This suggests broader self-beliefs may be important for money management behaviours.

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<sup>21</sup>See <https://www.bbva.com/en/finfluencers-financial-education-and-regulator-surveillance/>

## **Perceived financial control**

Perceived behavioural control is closely related to locus of control and the “causal beliefs about action-outcome contingencies” (Bandura 1977). Individuals who perceive that they have control (internal locus of control) tends to have more confidence in their ability to manage money than those who do not perceive they have control (external locus of control) and believe that luck, destiny and external actors have more power over outcomes (Rotter 1966). The magnitude of willingness to save and control spending, along with other financial behaviours, is, at least in part, driven by an individuals own perception of control (Pinjisakikool 2017). Moreover, levels of distress and strain related to finances is lower in individuals who report a strong sense of personal control (Creed and Bartrum, 2008). This suggests that, perhaps independent of financial situation, perceived control and the belief that one can overcome external events may benefit an individual’s financial wellbeing. Indeed, the link between growing income (which may be assumed to allow an individual more financial freedom) is often not as linearly correlated with financial wellbeing as would be expected if objective resources were the only factor in improving financial wellbeing.

People with high perceived control more frequently have plans in place to manage their money and are therefore better able to manage unexpected financial events that arise (Pinger et al. 2018; Radianto et al. 2021). In line with this, those with low internal focus have been found to be more likely to face financial issues (Mien et al. 2015). Perry et al. (2005) found that when people believe that outcomes are the result of chance or powerful others, they are less likely to manage their finances well. Similarly, those who have low perceptions of control are less likely to look into behaviours like information seeking about a purchase (Hoffman et al. 2003). Croy et al. (2010) examined the intention to save for retirement of employed Australian adults through the lens of the theory of planned behaviour: the effect of attitudes, subjective norms and perceived behavioural control on intentions to change behaviour and actual behavioural change. They found that domain knowledge influenced the intention to save through an individuals perceived behavioural control.

## **Financial self-efficacy**

The final self-belief which is thought to impact financial behaviour in the developmental model of financial capability is self-efficacy. This refers to “one’s belief in his or her ability to achieve financial goals” (Forbes et al. 2010) and is closely related to financial confidence (Palameta et al. 2016). It is thought that financial confidence provides the self-assurance necessary for an individual to implement the financial knowledge they acquire in their decisions, and therefore aids in financial decision making (Atlas et al, 2019; Hilgert et al, 2003; O. Stolper, 2018). Financial confidence in young adults is also associated with the likelihood of consulting professional information sources (e.g. banks) for guidance rather than informal support from family and friends that less financially confident individuals tend to rely on.

Knowledge plays an important role in financial self-efficacy with a degree of understanding needed in order to effectively engage with many sources of guidance (Money and Pensions Service 2021) Yet, for young adults who often have low financial confidence but greater over-indebtedness, seeking out debt advice is less common than other age groups and therefore providing opportunities for education and improving confidence in a way that does not lead to choice anxiety has been proposed as being beneficial (Money and Pensions Service 2021). Oftentimes, the approach improving financial confidence is to provide education and this is flawed by erroneous assumptions that knowledge acquisition alone is sufficient to affect confidence and result in a fundamental shift in consumer behaviour (Gross 2005; McCormick 2009). Instead, in addition to cognitive elements, other intrapersonal factors (e.g. perceived control and attitudes) and interactional elements (e.g. relationship to the environment) are also likely influential and therefore it is likely that Serido et al. (2013) factors must all work collectively to change behaviour.

## **Financial wellbeing**

Having established that financial attitudes, perceived control and self-efficacy all impact financial behaviour, there is also evidence that the financial behaviour which results affects wellbeing outcomes. Poor financial wellbeing is the “the extent to which individuals

perceive that their financial demands exceed their ability to meet those demands” (Serido et al. 2014a, p, 339).<sup>22</sup>, and while factors such as household income, cost of living and number of dependents can all influence financial wellbeing, they are largely out of control of the individual, leaving financial capability through self-beliefs and the consequent behaviour as one of the most widely applicable ways to increase it.

There are many studies which demonstrate a link between financial capability and wellbeing. A study using British Household Panel Survey data found that financial capability had significant and substantial effects on psychological wellbeing<sup>23</sup> over and above those of both income and material wellbeing more broadly (Taylor et al. 2011). Using debt as the stressor, Xiao et al. (2022) posit that financial capability moderates the association between debt delinquency and financial wellbeing. The same is also true where an individual have low financial resources . This is because it contributes to financial satisfaction (Xiao et al. 2014b; Xiao et al. 2017) and can lead to desirable financial behaviour (Henager et al. 2016) which can improve aspects of wellbeing like financial and life satisfaction (Xiao et al. 2009). On a Dutch sample, de Bruijn et al. (2020) showed that making ends meet financially was an indicator of desirable financial behaviour likely to reduce financial worries. Therefore, any intervention which encourages consumers to engage in and apply financial knowledge is likely to result in more beneficial financial behaviours that translates into a feeling that their financial situation is under control (Xiao et al. 2022), this may also improve feelings of overall wellbeing. Focusing on improving financial capability may therefore be more beneficial to individuals than improving their income (although this is not to say that the latter would not also be beneficial, see evidence on bursaries).

### **Intervention in the present research**

The availability of good quality financial information is frequently not an issue with information often available to help students in particular build good financial behaviours

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<sup>22</sup>Financial anxiety (Archuleta et al. 2013), stress, strain (Serido et al. 2014b), uncertainty (Romo 2014) and worry are all terms often used interchangeably to indicate financial wellbeing.

<sup>23</sup>Using the General Health Questionnaire (Goldberg 1988).

(e.g. budgeting and saving). However, they are often overwhelmed by the quantity of information and their engagement with such materials is often related to their financial confidence (Harrison et al. 2016; Money and Pensions Service 2021). This is similar to the earlier findings of the Organisation for Economic Cooperation and Development (Atkinson et al. 2016; OECD 2005) who in surveys across 30 countries found that “consumers do not actively seek out financial information. The information they do receive is acquired by luck or chance or hazard” (OECD 2005, p.44). This age group is also less aware of their need for help and therefore may leave it longer before looking for information or seeking help (Harrison et al. 2016; National Advice Trust 2016). The OECD (2019b) have integrated this information seeking ability into the PISA (Program for International Student Assessment) Financial Literacy Framework as a key component of the financial literacy process.

In Chapter 8, a text message intervention to improve widening participation students’<sup>24</sup> financial capability and wellbeing is explored.

## 2.5 Summary

In this chapter, I have described four factors that are thought to contribute to low saving levels to different extents: present bias, inaction inertia, not utilising arbitrage gains and financial capability. It demonstrates that there are a number of behavioural biases and knowledge gaps in place that mean an individual often remains at the default rather than increasing their contributions, and provides the theoretical basis for the rest of this thesis. It also highlights the gap in our understanding of how light-touch interventions can be used in the UK retirement saving context where the policy and economic landscapes create a particular context. This thesis aims to address these gaps in testing a number of interventions that may be effective at improving saving.

The foundation presented in this chapter is expanded upon in Chapter 4 and 5 in regards

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<sup>24</sup>Widening participation is a government policy in higher education that attempts to increase the numbers of students from under-represented backgrounds in higher education.



to present bias; in Chapter 6 for how prospective thinking, action-state orientation and regulatory mode could be used to reduce the impact of inaction inertia on decision making; in Chapter 7 for how the F&C may affect opt out in the over 55s; and in Chapter 8 for how financial capability may be strengthened using a text message intervention. More information on the relevant literature is provided in each of these respective chapters.

In the next chapter, I will begin setting out how I propose to address the issue of under saving and the methodologies required in order to do so. This will provide an overview of the approach taken to answering the research question with methodological details specific to each study presented in the respective chapter.

# Chapter 3

## Methodology

### 3.1 Introduction

In earlier chapters I set out the need to encourage people to save more for retirement and the value of light-touch nudge interventions in achieving this goal (Chapter 1). I have also identified and reviewed the literature relevant to each intervention tested in this thesis (although further information is provided in the respective chapters) and believe that there remains value in testing simple, non-personalised interventions that are easy to scale (Chapter 2). As a result of this, my primary research question is: ‘Can light-touch interventions be used to help increase retirement saving contributions in the UK?’ (for Chapters 4 to 6). This becomes a broader question of: ‘Can a light-touch intervention be used to increase the financial capability?’ specifically for the population of widening participation students in English higher education institutions in the final empirical chapter (Chapter 8), under the common suggestion that interventions that improve financial capability have the potential to effect financial decision making.

Each empirical chapter explores a different light-touch intervention and the specific research design and methodology for each is explained in the respective chapters (Chapter 4 to 8). Therefore, the purpose of this chapter is to set out the broad approach to research and provide some information on research factors that impact multiple chapters of this

thesis.

## **3.2 Methodological framework**

The methodological framework of research refers to the “plans and the procedures for research that span the steps from broad assumptions to detailed methods of data collection, analysis, and interpretation” (Creswell 2014, p. 3). In this section, I start with the broadest set of philosophical beliefs that underpin the research (Section 3.2.1). This is followed by the more specific research designs used in the studies (Section 3.2.2). Typically, that would also be followed by the even more specific research methods used in the research however that is covered in each empirical chapter due to the varied nature. Instead, in the final section (Section 3.2.3), I cover some of the broad principles of sample and recruitment that are relevant to the empirical chapters.

### **3.2.1 Research paradigm**

The research paradigm refers to the “essential collection of beliefs shared by scientists, a set of agreements about how problems are to be understood, how we view the world and thus go about conducting research” (Rahi 2017, p. 1). Although it has been suggested that “it is important that we do not overemphasize the significance of epistemological distinction” (Henwood et al. 1993, p. 99), providing a philosophical basis of research provides an important means for understanding the implications for the choice of research methods and the interpretations of research findings. Often the research paradigm employed by the researcher must be deciphered by the reader; however, to avoid this, I set out the reason why the positivist approach is used in the present research. For brevity, I do not describe the alternative ‘worldviews’ for conducting research, however details of these can be found in Table 3.2.1.

The positivist approach is born out of empiricism, the epistemological argument that ‘fact’ is based on sense-experiences, a posits that ‘truth’ is derived from logical and scientific

Table 3.1: The four research ‘worldviews’ as set out by Creswell (2014).

<b>Positivism</b>	<b>Constructivism</b>
Determination Reductionism Empirical observation and measurement Theory verification	Understanding Multiple participant meaning Social and historical construction Theory generation
<b>Transformative</b>	<b>Pragmatism</b>
Political Power and justice orientated Collaborative Change-orientated	Consequence of actions Problem-centered Pluralistic Real-world practice orientated

treatment based in sensory experience (including measurement).<sup>1</sup> It aims to identify objective, universal and quantifiable differences which explain behaviour, viewing reality as a shared experience which exists independently of humans. The approach is commonly adopted in economics and psychology and can, and has, made valuable contributions to understanding retirement behaviour.

Positivists believe laws can be identified which govern our social behaviour and that, in applying experimental scientific methods which seek to identify cause and effect, these laws can be formulated, tested and presented in factual statements. Consequently, positivist approaches use hypotheses and deductions to (attempt to) look at data objectively. It therefore requires quantitative methods, used in order to generalise insights such that the findings do not apply to just one individual (or small group) but rather a wider population. It also posits that knowledge is conjectural in that absolute truth is never found (probabilities result in the failure to reject a hypothesis but it is always fallible) but instead a claim is refined or abandoned through empirical research to determine its strength (Phillips et al. 2000).

Much of the research on financial decision making in the context of automatic enrolment combines economic theory and psychological experiments in a positivist approach. The aim is to identify the systematic constraints that explain why individuals consistently do not act like ‘rational agents’ when making decisions. Such constraints include heuristics

<sup>1</sup>Both posit that knowledge stems from human experience.

(mental short cuts) and biases (Benartzi et al. 2007; Thaler et al. 2004; Tversky et al. 1974; Weyman et al. 2016), both of which are observable and quantifiable can be explored when measured in this approach. It is this search for quantifiable observations without the influence of the researcher’s thoughts and experiences that makes this approach suitable for the present thesis. With this approach in mind, the studies presented in this thesis are consequently quantitative in their design, a topic I cover in the next section.

### **3.2.2 Research design**

Having decided on a positivist approach, the research will be quantitative, however, within this one must decide on a research design to provide a structure for the analysis and interpretation of the research. Two broad possibilities are available: experimental and non-experimental (e.g. attitudinal surveys). In this thesis, as the purpose is to identify causal relationships I focus on experimental methods, and predominantly use the randomised controlled trial as the research design (see Chapter 4, 5, 6, and 8). However, the use of quasi-experimental methods (that use non-random assignment) are also used where experimental research is not possible (see Chapter 7). In this section, I explain the rationale for the use of these designs.

#### **Randomised controlled trials**

Now often considered the ‘gold standard’ in experimental research (Cartwright 2007),<sup>2</sup> the randomised controlled trial (RCT) has seen somewhat of a resurgence in UK policy development with organisations such as the Behavioural Insights Team, the National Endowment for Science, Technology and the Arts (NESTA) and the What Works Network all utilising this method to gain insight into areas of public interest. It is attractive primarily due to the greater confidence it can provide when determining causal inference and therefore allows for more confidence when applying the findings of research to real-

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<sup>2</sup>Even the RCT is not perfect and some commentators have raised concerns that in suggesting it is the ‘gold standard’ for research they underplay the important limitations it can have (Krauss 2018).

world situations.<sup>3</sup>

When assessing the impact of a policy intervention it is desirable to compare the outcome of an individual who receives the intervention to the outcome of that same individual should they have not received the intervention. It is however impossible to be both ‘treated’ (and receive the intervention) and ‘untreated’ (and not receive the intervention) simultaneously, creating a fundamental problem for causal inference (the potential outcomes framework;<sup>4</sup> Rubin 2005). To overcome this, RCTs are often used to determine if an intervention is effective at achieving a specific goal or outcome because the method involves randomly assigning individuals to either the treatment or the control groups such that any systematic differences between individuals (e.g. in terms of demographic characteristics or intrinsic factors) are not correlated with the treatment. For example, it is possible that members of pension schemes are systematically different from those that do not participate, either in terms of observed demographic factors (e.g. eligibility for automatic enrolment) or unobserved factors such as motivation. Naive comparison of groups (i.e. assuming homogeneity in composition) introduces selection bias and the chance that confounding prognostic factors are influencing outcomes rather than the intervention. Therefore, randomisation ensures that any systematic correlation between the treatment and participant characteristics is removed as well as removing the correlation between the group assignment and the outcome (in the absence of any intervention) and therefore any difference in outcomes ex-post can be used as empirical evidence for causal treatment efficacy.

While their value is well justified, there are a number of issues which should be considered when applying and interpreting RCTs. First, perhaps the most profound issue with RCTs is that of external validity, with many studies conducted on samples which are not representative of the population of interest or which are conducted in specific contexts which limit their wider application. No matter how robust the study, if its only tested

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<sup>3</sup>Although, conclusions are based on probabilities and not certainties. Environmental differences (e.g. in context, history, and population) can have a big impact on findings in different situations and should be considered when applying findings.

<sup>4</sup>The potential outcomes framework is both used to illustrate the problem and to demonstrate how it can be solved empirically.

on one employer it will only ever generalise to that same one location. In the case of the present research, many of the studies are conducted online or in niche contexts with a particular sample of individuals (e.g. young adults) all of which limit the generalisability of the research beyond this. It is not an issue unique to the present research, with the majority of studies conducted in specific contexts or with specific groups. The value of an intervention is established not only in terms of ‘what works or does not work?’ but also ‘for whom does it work (and to what extent)?’, ‘under what circumstances does it work?’ and ‘how and why does it work?’ (Pawson et al. 1997). The focus is therefore beyond simple cause and effect but towards determining the boundaries in which an intervention works and can be generalised. Of course, even with such an approach it is often not possible to examine all possible contexts and therefore it is important when describing results and conclusions to ensure that they are not over-stated or over-generalised. In each of the method sections for the empirical chapters, I provide an outline of the sample and context in which the data were collected (e.g. online, through universities). This allows the reader to judge for themselves the external validity of the findings. Equally, in Chapter 4 I run a replication of a previous RCT that was conducted in Potrugal, in the UK context. This study demonstrates some of these challenges around external validity that cannot be overcome in the selection of RCTs as the research design.

A second potential issue with RCTs, which is often evaluated on a case-by-case basis, is internal validity: the extent to which the study measures what it sets out to measure (i.e. that the studies findings are due to the factors you manipulated and not other variables) and therefore affects whether the cause and effect interpretation is valid. In one example, it is often implicit in RCTs that you meet the *all-preconditions-are-fully-met* assumption. This is the notion that an intervention can only be effective if influencing factors (beyond the treatment) are simultaneously present with the treatment (and are consistent over the time of the study). For instance, in the case of retirement saving, you may develop an intervention which is effective at increasing saving but only when people can afford to save more, therefore you do not measure the impact of the intervention but rather the affordability thereof. Often this factor is not measured in research because it is complex

to determine and, in other instances, preconditions may be unknown or unobservable. Randomisation can reduce its impact (by providing an equal chance for someone of a given income to be in the treatment and control), however if you erroneously measure a factor your conclusions will always be inaccurate (this is particularly relevant when measuring internal psychological concepts). Additionally, in laboratory studies, the potential negative effect of factors like affordability (which could affect the internal validity of results) is minimised further by the use of hypothetical situations (i.e. affordability does not matter in a hypothetical decision-making task) increasing the chances that the causal impact is actually true in the context of the trial. However, this of course concurrently reduces the external validity and therefore there is a clear balance to be struck.

Chapters 4, 5, 5b, 6 and 8 use an RCT design with the randomisation occurring at the individual level. In Chapter 7, randomisation is not possible due to the retrospective nature of the research, therefore a quasi-experimental design is used and it is this design that I consider next.

### **Quasi-experimental designs**

Whilst RCTs are often considered to have a methodological advantage over other designs, they are not always the appropriate research tool for all research questions. In Chapter 7 of this thesis, I instead use a quasi-experimental research design in order to examine the effect of a policy which was introduced in the UK several years ago to increase retirement saving. Quasi-experimental designs refer to those “in which units are not randomly assigned to conditions” (Shadish et al. 2002, p. 511) but where causal impacts can be determined through statistical means. Such designs are commonly used in order to better understand the behaviour of a specific group of individuals in response to a retrospective policy change where randomisation to a group is not possible.

Similar to RCTs, quasi-experimental studies seek to demonstrate causality between an intervention and outcome and are valuable where there is a smaller available sample, it would be unethical to randomise participants to a group, or where it is difficult, expensive or not possible to randomise (e.g. because the intervention occurred in the past). They



also often have the advantage of being more pragmatic and therefore having greater ecological validity than their RCT counterpart due to the fact that inclusion and exclusion criteria are often less stringent.

Although they can be beneficial, many of the benefits come at the cost of internal validity. Schweizer et al. (2016) identify nine threats to the internal validity of quasi-experiments (although many apply to RCTs too).<sup>5</sup> These include: selection bias, maturation bias, Hawthorne effect, historical bias, regression to the mean, instrumentation bias, ascertainment bias, reporting bias, and complex designs. However, arguably the main disadvantage is the inability to randomise groups which means that the groups may vary in systematic ways which may not always be obvious to the researcher (introducing selection bias). The inclusion of a control group in quasi-experimental research increases the internal validity, accounting for issues such as historical bias, and reducing factors like selection bias. However, the control group is a non-equivalent comparison so while it strengthens the causal inference it does not account for all possible threats to internal validity.

In an attempt to draw a causal conclusion about the influence of the Freedom and Choice (F&C) legislation on opt-out behaviour, I turn to the quasi-experimental method of difference in differences (DiD) in Chapter 7. In this study, I focus on a change in legislation (the F&C) which affected the ability for some, but not all occupational Defined Contribution (DC) pension members to simultaneously access and contribute to their pension and therefore receive the associated advantages of the employer match and tax incentives without restricting liquidity. The retrospective nature of the research and the fact that it would not be feasible to randomise some people to receive the legislative change and not others due to the policy being based on age, means that DiD provides a useful tool to compare the differences in outcomes as a result of the legislation. In the DiD design, this is done by comparing the difference in opt-out rates before and after the intervention's introduction on April 6 2015 for those 55 years old and older, and affected by the legislation, to those under 55 years old and unaffected by the legislation. This sequential difference over the two time periods and between the estimated effect of being treated

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<sup>5</sup>They are identified in a healthcare context but most arguably apply here.

and the assumed counterfactual of no treatment result in the DiD estimate. The appeal of DiD lies in its simplicity and potential to evade many of the endogeneity issues which can arise when comparing heterogeneous groups (Meyer 1995).

Arguably, the most important consideration when utilising a DiD design is that the identification of the treatment condition is assumed to be “as good as” random (as true randomisation is not possible). This is necessary because the statistical properties of random assignment are key for establishing estimates which have causal impact (Glymour et al. 2016). As previously mentioned, the ‘treatment’ group in this case are eligible to take advantage of the F&C legislation and are therefore aged 55 years or over. Of course, the assignment to treatment conditions is not, in reality, as good as random as over 55s may be systematically different to under 55s in a number of ways, both observable and unobservable. Therefore, it is possible that the groups are not statistically independent of any measured (or unmeasured) factor which may also influence the outcome. For instance, in the present case it is not unreasonable to think that the over 55s may have saved more for retirement meaning that additional savings are not needed and opt out is more likely. In order to account for this, DiD imposes a number of assumptions which restrict the influence of possible confounds by assuming that variables which vary across groups (e.g. income) are time invariant and that time-varying confounders (e.g. concurrent policy changes) are group invariant. These twin claims are referred to as the common (or parallel) trend assumption which, in this case, rests on the expectation that there are parallel trends in opt-out rates between the treatment and control in the months prior to the policy introduction. Using this assumption, it is thus possible to circumvent the problem that one cannot control for the influence of unmeasured observable and unobservable characteristics. In Chapter 7, the treatment group is narrowed to 55 year olds only and the control group is 54 year olds only, this further reduces the likely differences between the treatment and control conditions.

Given the validity of DiD, and the debate around its value, revolve around this parallel trends assumption and the possible endogeneity of the intervention itself, I test this assumption in the data by modelling the level of opt outs in the treatment and control

6 months prior to the legislative change on 6 April 2015. I will also do the same for the 6 months prior to an arbitrary point of time, 6 July 2016, in order to act as a placebo control (as no significant changes in pension policy occurred at this time). Examining the trends pre-reform is highly desirable and often recommended as “best practice” in DiD studies, particularly where the final analysis will be presented as before and after only (Fredriksson et al. 2019). More information on this, the policy, and the analysis is provided in Chapter 7.

## Determining statistical significance

In both the RCT and quasi-experimental designs I use statistical power to comment on the “probability that the test will yield a statistically significant result when the research hypothesis, in reality, is true” (Norton et al. 2001, p. 308). In analysing our results there is always the possibility that we mistakenly detect a significant difference between groups when no such difference exists. This is also known as a ‘type one error’ or ‘false positive’ and is represented as  $\alpha$ ; it is commonly set by convention at .05 in psychological research. Equally, we may find no difference between groups when a difference does exist; this is also known as a ‘type two error’ or ‘false negative’ and is represented as  $\beta$ .

As noted in the definition, statistical power is the probability of *not* making a type two error and has important implications when considering the confidence one has in the conclusions of research. As there are only two outcomes from a research study: the groups are different (hypothesis)<sup>6</sup> or they are not different (null hypothesis), the overall probability is one and so accordingly statistical power is calculated as one minus the probability of making a type two error. Typically power is set at .80 or greater meaning that there is a 20 percent probability of making a type two error, but the higher the statistical power, the smaller the risk of type two error.

There are four primary factors which influence the power of statistical tests: the sample size, the variability among subjects (as greater variability increases  $\beta$ ), the expected difference in outcome between group means (i.e. larger expected differences should be

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<sup>6</sup>This includes being different in one or two directions.

easier to detect) and the  $\alpha$  level (Norton et al. 2001). In line with convention, I specify an  $\alpha$  of .05 (5 percent) meaning that if the mean outcome of the treatment group and control group are genuinely different and I ran the exact same study repeatedly, I would still expect to find a statistically insignificant result 5 percent of the time (1 in 20 studies). Therefore, in every trial there is a possibility for the reverse conclusion to the one I find to be the true outcome, and this is often stated as a primary reason for replication research given very rarely do we actually re-run studies (see chapter 4).

When large, sample sizes decrease the variability of the sample means meaning that we are able to detect a smaller difference between groups. The difference between group means and the variability of subjects can be combined into one figure called an effect size. This moves the discussion of the results beyond does the intervention work or not according to an arbitrary cut off (statistical significance) towards a more sophisticated interpretation of the results (how well does it work in a specific context?). There are a number of definitions of effect size with most aiming to standardise the magnitude of an effect to allow comparison across studies. I use a number of different effect sizes in the present research with, for example, partial eta square ( $\eta_p^2$ ), and Pearson's r used. In the case of partial eta squared,  $\eta$  (eta), the association between the independent variable (x) and the dependent variable (y) is measured. This is squared,  $\eta^2$ , to produce the differentiation ratio and measures the proportion of variation in y which is associated with the membership of groups defined in x, much like  $r^2$ . Partial eta squared,  $\eta_p^2$ , partials out the effect of any other independent variables and interactions. On the other hand, Pearson's r is a correlation coefficient between -1 (perfect negative correlation) and +1 (perfect positive correlation), providing an indication of the strength of the relationship.

### 3.2.3 Research methods

In the previous sections, I described the research paradigm adopted in this thesis and the two types of experimental method used in the empirical chapters. At this point it would be customary to describe specific details of the research methods; however, given Chapters 4 to 8 are very different, these details can be found in the method section of

each respective chapter. Instead, here I provide some over arching details and background information about the population used and their recruitment.

## **Target population**

Each data chapter includes details on the specific sample recruited and, where collected, presents information on the educational attainment, pension membership and gender. The characteristic of primary interest in this research context is arguably age. All of the research focuses on a population aged between 18 and 65 years. Where the research focuses specifically on retirement (all studies except Chapter 8) the participants included in the research are in the ‘working age’ age group and as such has a greater likelihood of either having a workplace pension, or be aware of workplace pensions. This is important given a lot of psychological research focuses on students who are less likely to be working or have a workplace pension (Office for National Statistics 2020).

The impact of age on pension enrolment (and consequently saving) is substantial and therefore should be considered carefully in this research context. The average age of enrolment has been reduced with the introduction of automatic enrolment. In 2012, 21 percent of 22 to 29 year olds had a pension, increasing to 80 percent in 2019 and bringing it in line with other age groups (Office for National Statistics 2020). Individuals younger than 22 have not been directly impacted by pension reforms and have the lowest membership rates with around 22 percent of those employed, enrolled in 2019 (Office for National Statistics 2020).<sup>7</sup>

While membership may be similar across the age spans, saving rates and balances across the age span are very different. Those aged over 40 are most likely to be prepared for retirement as they have had longer to save, however if they have insufficient saving they also have less time to make up the shortfall and therefore may be considered more vulnerable. Alternatively, young people may derive the greatest benefit from increasing their savings now (because it may cost less over the lifespan), but may not see the benefit

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<sup>7</sup>This is however an increase from 7 percent in 2012 suggesting some spill-over effects from the automatic enrolment legislation.

or have the motivation to increase saving when it is so far in the future. Given this, it is perhaps important to target interventions at different age groups.

In Chapter 4, 5 and 5b, the focus is on a younger population, defined as being between 18 and the end of ‘youth’ at 35 years old in accordance with the European Social Survey (Abrams et al. 2011). In Chapter 6, the age group are slightly older given the necessity that they be able to remember 10 years into the past and future while still imagining the working self (i.e. aged between 35 and 55 so can reflect on being 25 and project being 65 years old). In Chapter 7, the focus is on a change in policy occurring at age 55 and so the analysis focuses on a comparison of 54 year olds to 55 year olds. Finally, in Chapter 8, the focus is on widening participation groups in higher education and therefore the sample is expected to cluster around the 18 to 21 age group (although not exclusively as there may be mature students). In all studies, a description of the age demographics of the sample is provided, and where necessary a justification for using a certain population beyond what is presented here is given.

## **Recruitment**

The recruitment of the target population is described in each chapter. Chapter 4, 5, 5b and 6 are all similar in that the primary recruitment tool for research is through online participant panels: Prolific and Amazon Mechanical Turk (MTurk). Prolific is a dedicated online platform for experiments developed with support from the Oxford University Incubator with over 70,000 participants internationally (mostly in the UK). It is considered a robust platform for research which generates high-quality data (Palan et al. 2018; Peer et al. 2017). MTurk, arguably the better known of the two platforms, is similar and has been demonstrated to be a reliable source of data for behavioural studies (e.g. Buhrmester et al. (2016); Crump et al. (2013); Paolacci et al. (2014)). It is the larger of the two platforms with an estimated 100,000 active members mostly based in the US (Difallah et al. 2018).

Using such a recruitment method has implications for the types of participants recruited which in turn may have implications for the research interpretation and conclusions. For

example, to participate you must own a computer or mobile device, be aware that such a website exists and have the motivation to sign up and access it all of which may affect who signs up. Participants will also have likely participated in a considerable amount of research (although this is better regulated on Prolific) which may lead to research fatigue.

Overall, the samples I use are unlikely to be representative of the population at large in the age group of interest. Despite this, it is arguably a better sample in the present research than a student sample which is commonly used, and heavily debated, in psychological and behavioural research (e.g. Hanel et al. 2016; Peterson 2001). This is because students are less likely to be employed and while they can opt in to a pension they are not automatically enrolled under the current regulations and may have less experience of the need to save. With an adult sample arguably needed, Prolific and MTurk provide an efficient way to recruit them. In order to limit the disadvantages of external validity and aid interpretation of the results, as well as avoiding any conclusions being overstated, I provide information on the demographics and context of each sample in the relevant chapters which use online recruitment for the pool of applicants. The purpose of this is to provide transparency of the samples so that the interpretation of the research is clear.

In Chapter 8, the recruitment is of university students from widening participation backgrounds at English institutions. The study is based in the field and so recruitment through online platforms was not an option. Instead, Transforming Access (TASO) and Student Outcomes, the independent hub for research into access to higher education, used their newsletter, website and social media channels to recruit interested universities who I then contacted. In total, 15 universities participated in the research by sending an email to the students they identify as meeting widening participation criteria in their institution. More information on these students is provided in Chapter 8.

### **3.3 Ethical considerations**

There are several ethical questions to reflect on when considering the present research. Many relate specifically to how the research is conducted and ensure adherence with psy-

chological principles for ethical research. That includes things like ensuring participants provide informed consent, are able to withdraw and are not deceived or subjected to harm. The ethics committees at Kings College London reviewed each study, as necessary, to provide ethical approval for the research included in this thesis in these regards. However, here I consider two of the most pertinent ethical questions that over-arch the entire thesis and its theme (rather than specifically how it is run): do people want to save more for retirement? and do they want to be ‘nudged’ to do so?

### **3.3.1 Do people want to save more for retirement?**

In Chapter 2 I provided a case that people need to save more if they are to have an ‘adequate’ income in retirement. However, we should also consider whether people *want* to save more for retirement. In an increasingly complex financial world, there are many decisions to be made as to what to save for. Encouraging people to save for retirement is only one of a number of financial goals and necessities an individual may be planning for. In itself this is arguably not an ethical consideration given the interventions proposed do not mandate higher saving; however, it is an important question to consider when deciding when, and if, the state should intervene to encourage greater saving.<sup>8</sup>

Research frequently notes that individuals make decisions that “requires the least current effort...often...the ‘path of least resistance’” (Choi et al. 2002). Therefore, people stay at a default not because they want to but because they simply fail to act and so stick with the status quo. So while the possibility exists that, in doing nothing, an individual is choosing the best option for them, this is frequently contradicted by the available evidence (e.g. Choi et al. 2002). People often report a strong intention to save early for retirement but fail to make the long-term saving decisions which facilitate this intention (Knoll 2010; Lynch Jr et al. 2006; MacLeod et al. 2012; Madrian et al. 2001; Rogers et al. 2008; Zaumberman et al. 2011). It is frequently self-reported in surveys that people indicate a desire to save more but are hindered by uncertainty, inertia or other biases. Given that

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<sup>8</sup>This is particularly true given the discussion on compulsory saving has been raised again in light for potential decreases in enrolment participation due to the 2022 cost of living crisis.



there seems to be a desire to save more optimally, the question becomes whether people want to be nudged to do so.

### 3.3.2 Do people want to be nudged?

It is commonly accepted in behavioural science that there is a distinction between two types of cognitive processes in the human mind. The first is system one which is a fast and automatic way to process and the second is system two: a slower and more deliberative approach (Kahneman 2011; Kahneman et al. 2011). Behavioural biases typically affect system one which raises an ethical consideration when devising interventions to address biases given that system one is typically thought to be subconscious and system two conscious. For instance, the downplaying of the future in favour of the present is a system one bias (Gigerenzer et al. 1999; Kelman 2011). Attempting to nudge behaviour of a subconscious process is arguably objectionable to some and may be viewed as an exploitation or the manipulation of behaviour to achieve a goal. Moreover, even though the choice architecture in ‘nudges’ is based on a ‘best’ decision determined on the basis of presumed pretesting and objective measures, it still may disregard other, unknowable factors which make the nudged decision incongruent with an individuals value system or beliefs (Felsen et al. 2013).<sup>9</sup>

On the other hand, improving the deliberative capacities of an individual by targeting system two appear less controversial as individuals can reflect on the decision and the impact of the intervention. Indeed, Felsen et al. (2013) demonstrate that people typically prefer system two nudges. However, despite this, the differences between reactions is modest and it is not to say that those approving of system two systematically disapprove of system one nudges. Interestingly, when individuals *wanted* help exercising self-control they are more receptive to both conscious and subconscious nudging viewing them as equally favourable. Therefore, in the case of retirement saving, where there is frequently a gap between intentions and actions, individuals are perhaps likely to welcome, or at

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<sup>9</sup>The opposite of a nudge is a ‘sludge’ where small interventions are used to make a process more burdensome or add unnecessary friction to processes (e.g. requiring students to complete complex or elaborate forms to receive financial aid; Sunstein 2020).

least not object to, being subconsciously nudged towards better financial decisions.<sup>10</sup>

Reflecting on automatic enrolment - a powerful use of a nudge - people generally reported its introduction as being positive despite the ‘loss’ to take-home pay that they experienced as a result (Croy et al. 2012; Department for Work and Pensions 2020a). In a study of the acceptability of nudges, including automatic enrolment, Sunstein (2016) asked participants whether they approved or disapproved of five well-known nudges and found that 77 percent of people approved of automatic enrolment. Together, it may be suggested that encouraging greater retirement saving is viewed as desirable by the majority of those saving for retirement.<sup>11</sup> Consequently, when it is utilised to move behaviour in a direction that is, on average, considered desirable (for other examples see, Mullins et al. 1996; Sunstein 2019), it provides support for the notion that they would be welcomed. Therefore, arguably we should encourage greater retirement saving in order to help people overcome their biases and achieve their long-term financial goals.

### 3.4 Conclusion

In this chapter I provide a methodological base for subsequent chapters and consider the broad research paradigm and the designs used. Further details of the specific methods of each empirical chapter can be found within each respective chapter and in Table 3.2 I provide a summary of the chapters, the research question they address and the primary topic covered.

In the next six chapters, I present the empirical research conducted for this thesis. This begins in the next chapter (Chapter 4), with a replication study of a study by Marques et al. (2018).

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<sup>10</sup>Any change in contribution rate also requires an active decision.

<sup>11</sup>There is an assumption here that not only do individuals want to save but they also want to save *enough*.

Table 3.2: Summary of the research questions, topics and design used in each chapter of this thesis.

<b>Chapter</b>	<b>Research question</b>	<b>Primary topic</b>	<b>Research design</b>
4	Primary	Replication of future self-relevance intervention	RCT
5	Primary	Emotional valance and future self-relevance in a vignette-based intervention	RCT
6	Primary	Inaction inertia for retirement saving and prospective thinking, action orientation and regulatory mode as an intervention	RCT
7	Primary	The influence of the introduction of the money purchase annual allowance on saving behaviour	DiD
8	Secondary	Text message intervention to improve financial capability	RCT

Note: Primary - Can light-touch interventions be used to help increase retirement saving contributions in the UK?

Secondary - Can a light-touch intervention be used to increase the financial capability of widening participation students in English higher education institutions?

# Chapter 4

## Is future self-relevance necessary to increase saving for retirement?

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### 4.1 Introduction

In the previous chapters, I provided an introduction to the literature pertinent to this thesis (Chapter 2) as well as an overview of the research approach (Chapter 3). This included discussing the influence of present bias on financial decision making and the role episodic future thinking has in decreasing the psychological space between our present self (who is making the decision) and the future self (who will experience the consequences of the decision).

In this chapter, one aspect of episodic future thinking, future self-relevance, is utilised in an intervention aimed at increasing retirement saving. The trial explores whether those

high in such self-relevance are more affected by primes of future ageing and therefore contribute more to retirement compared to those primed with the general future or a neutral cue. Crucially, given the primary research question, the intervention to improve future self-relevance is not personalised and is quick to administer (10 short questions) and therefore is a light-touch intervention that could improve retirement saving. The trial is a replication of a study conducted by Marques et al. in (2018) and therefore also contributes to the literature on replication too, the value thereof and the importance of considering contextual and population differences when applying research to public policy.

In the following sections I extend on the literature presented in Chapter 2 that is relevant to this specific study. I also provide a rationale for the research and present the hypotheses specific to the chapter (Section 4.2). Following this, a description of the methods, including how the research differs from the original study is presented (Section 4.3) followed by the results (Section 4.4). Finally, a discussion of the results in light of the original study is presented along with a consideration of how the research may be of value to policy makers (Section 4.5).

## **4.2 Literature review**

Like many industrialised countries, the UK is experiencing an ageing population (OECD 2020). Consequently there are more older adults in retirement receiving the state pension which is supported by a shrinking population of working age adults (OECD 2017a). The result is that the current model for supporting old age through the state pension is becoming increasingly untenable (FT Adviser 2018). The responsibility for ensuring an adequate retirement income is therefore more firmly with the individual than it has been for several decades, and there is a growing interest in how to encourage young adults to prepare financially for their lives after work. Research has begun to explore several different psychological determinants which may encourage individuals to invest more in their long-term financial wellbeing by saving for retirement and in this chapter we focus

on future self-relevance.

Retirement saving is an intertemporal decision between spending money now and investing it for the future. People are even willing to forgo some future, greater income in exchange for current income (Green et al. 1994). The implication of such behaviour for retirement saving is that people would rather spend now than invest for the future. As a result, retirement pot sizes often fall below the level which will provide an adequate income in life after work (Pensions and Lifetime Savings Association 2016). This tendency to take the smaller, more proximal reward over a future greater reward is referred to as temporal discounting and has been frequently used to explain why people often fail to save early for retirement.<sup>1</sup>

One way to reduce temporal discounting is to strengthen one’s sense of continuity (closely related to psychological connectedness)<sup>2</sup> with their future self. People feel more connected to the proximal future (e.g., in 1 years time) than distant future self (e.g., in 25 years) (Bartels et al. 2010) and treat the near self more favourably. In this instance, if connectedness is low, it may be rational to care less about the outcomes for the future self “when the grounds for caring will hold to a lesser degree” (Parfit 1984, p. 313).

As a result, increasing the connection between the present and future self by imagining the future self has been posited as one way to reduce irrational temporal discounting (Benoit et al. 2011; Daniel et al. 2013b; Lin et al. 2014; Peters et al. 2010). There are substantial individual differences in temporal discounting (D’Argembeau et al. 2010; Peters et al. 2010), and it is plausible that this in part results from difficulties in, and propensity to engage with, episodic future thinking. Episodic future thinking refers to the ability to project the self into a future time to pre-experience a situation or event (Atance et al. 2001; Schacter et al. 2007).<sup>3</sup> When individuals imagine future events connected to

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<sup>1</sup>Some degree of temporal discounting is rational given the uncertainty, nominal interest rate, and the declining marginal utility of money. The temporal discounting I refer to here is beyond that which would be considered rational (Ahmed 2020).

<sup>2</sup>Continuity does not come in degrees whereas connectedness does, and therefore there is an assumption that there is some way to count the number of connections with ‘very many’ connections between the present and a future self resulting in *strong connectedness* (Parfit 1984).

<sup>3</sup>Episodic future thinking is sometimes called mental time travel or prospective thinking.

their personal goals or values, the sensation of pre-experiencing that situation is often stronger and felt to be closer in time. Similarly, when an imagined scenario is personally relevant, individuals are more likely to believe the imagined event will happen or reward will materialise (D’Argembeau et al. 2012). Episodic future thinking may then improve the subjective valuation of the delayed reward and the consideration thereof. In turn this may attenuate temporal discounting (Boyer 2008; Kurth-Nelson et al. 2012).

Peters et al. (2010) found that episodic future thinking induced by cuing participants with real personally relevant future scenarios (e.g. vacations, weddings courses etc.) resulted in a greater propensity to choose the delayed over the immediate reward than when cued with a standard (non-personally relevant) delay discounting task. This modulation was the direct result of thinking about the episodic future with those who could imagine the future with greater vividness discounting on average 16 percent less than those who were not able to imagine the future vividly. It is thought that this ability to vividly imagine the future is what improves the connection between the present and future selves. This raises the question as to whether the effect is the result of an increase in vividness of the future, or whether it matters that it is the *self* that is vividly imagined in the future.

The personal relevance of the vividly imagined event is an important component for increasing this connection. Personal relevance refers to anything which triggers the “multidimensional, multifaceted, dynamic structure” (p. 302) in memory which relates to an individual’s own self-concept (Markus et al. 1987). Factors such as goals, self-image, values, motivations and situational determinants can all influence the sense of self. Indeed, evidence suggests that future self relevance is distinguishable from the relevance of the future more broadly (i.e. not simply a vividness effect). Hershfield et al. (2012) found participants asked to write about how they would remain similar over 10 years felt greater similarity to their future selves than those asked to write about what the world would be like in 10 years time. As such, simply thinking about the future does not seem to increase the connection felt to the future self, without it including some personal relevance. Similarly, those imagining the self spending money, as opposed to just imagining what the money could buy, show a greater tendency to choose the distant over the

immediate reward (Benoit et al. 2011). In an attempt to distinguish between vividness and self relevance, Hershfield et al. (2011) asked participants to interact with realistic computer-generated avatars of themselves, either age progressed to 70 years old or the participant's current age, in a virtual reality environment. Those who interacted with themselves in the future indicated a greater intention to save for retirement compared to those who interacted with their current aged self. Yet, this was not simply a vividness effect as presenting an elderly stranger to the future self condition did not increase retirement saving rates. Hence, it is likely that the vivid imagery must be self-relevant in order to be effective.

Kurth-Nelson et al. (2012) explain this effect by suggesting that episodically-cued outcomes are easier to find in our memory (this is also supported by the fact that improving cognitive resources like working memory reduces discounting). Easy to imagine events are also often discounted less than difficult to imagine ones and often imagining the self is easier than imagining scenarios without the self. It is not simply an increase in the vividness of the imagined future that results in the decrease in discounting, but instead the relevance of the event to the present self. de Vito et al. (2012) also demonstrated that there is a difference between thinking vividly and thinking vividly about the self in the future. They found that participants asked to imagine themselves (self-relevant) experienced a greater sense of pre-experiencing the future than those asked to imagine a familiar other (self-irrelevant). The level of sensorial detail and context clarity, both of which indicate vividness, were similar for both conditions. The authors therefore suggest that it may be the sense of pre-experiencing which is important, a factor which may require vividness, but is more effective with self-relevant future thought. When events are not personally relevant they are often more challenging to imagine, resulting in greater temporal discounting (Daniel et al. 2013a; Daniel et al. 2013b). Together, this suggests that improving future self-relevance may be a powerful tool in attenuating temporal discounting.



### 4.2.1 Rationale for the present research

To date, in the study of future self-relevance on retirement savings, many studies have used pre-interviews to generate vivid and personally relevant future scenarios, or used technology to create age-progressed avatars (static or dynamically presented). However, this is unfeasible for the 110 million people currently enrolled in pension schemes in the Europe (Pensions Europe 2017) as it would be prohibitively costly and time intensive. An alternative way to increase personal relevance is therefore needed. A recent study by Marques et al. (2018) found that when future self-relevance was strengthened through a short questionnaire (Lang et al. 2002), text which increased the salience of future ageing prompted participants to allocate more money to retirement than those who did not complete the questionnaire. Given that much of the information on retirement is in text format, this finding suggests a simple solution to encouraging people to boost their retirement savings.

Marques et al. (2018) showed participants a webpage advertising a financial product for retirement where the product described is either future ageing (retirement account titled ‘Future Ageing’), the future in general (retirement account labelled ‘Future’) or the present (debit card account titled ‘Debit Card’). Participants in the high future self-relevance group provided their level of agreement to future self-relevant statements while those in the low future self-relevance group saw nothing. It was found that those in the high self-relevance group contributed more to a hypothetical retirement account than those in the low self-relevance group when they saw the future ageing webpage. Participants in the low self-relevance group contributed less to retirement regardless of which financial product they had seen. This suggests that self-relevance is essential for ageing primes to be effective at increasing retirement savings. This is perhaps because, activating personally relevant future thoughts about an individual’s own ageing may enable participants to think more vividly about the future and therefore consider with greater accuracy the potential implications of their saving decision on their older self.

Given that the study presents a cost-effective way to increase retirement saving through

self-relevance, the present study aimed to explore whether the findings replicate in the UK context. Portugal's pension system, which provides the context for the Marques et al. (2018) study, is different from that of the UK in that there is a mandatory state pension scheme with smaller occupational schemes to supplement this (McInnes 2019). In the UK, the opposite is true, with occupational schemes expected to make up a significant proportion of retirement income (McInnes 2019). Given the familiarity and reliance on individual saving, it may be expected that a UK sample will contribute more to retirement in the present study.

Conversely, differing perceptions of ageing may result in the opposite effect. For instance, in the UK only 43 percent of British people perceive ageing to be an issue compared to 52 percent in Spain<sup>4</sup> (Kochhar et al. 2014) which may decrease the motivation to save. These pension system differences and the potential variation in the perception of ageing between the countries may result in differences in the allocation of money to retirement and sensitivity to ageing primes. However, whilst levels of retirement saving may differ due to context, a difference between future self-relevant and not future self-relevant presentations should remain similar between the studies given this is arguably less likely to be affected by cultural differences.

In the present study, in line with the findings of Marques et al. (2018), it is hypothesised that:

H1: When future self relevance is increased before seeing the priming task, participants who see the ageing future prime condition will choose to save more for retirement than participants in the future and neutral prime conditions.

H2: When future self-relevance is low (i.e. not increased) before seeing the priming task, participants who see the future ageing, future and neutral prime will save similar amounts of money for retirement.

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<sup>4</sup>Spain provides a good comparison with Portugal due to similar or more extreme trends in ageing; for example old-age dependencies (number of individuals over 65 years old per 100 people) and current pension expenditure (as a percentage of GDP) between the two countries are similar (OECD 2019a).

## 4.2.2 Value of replication studies

The primary reason for, and value of, replication research is that the findings of the lone study or researcher (or research team) may not always be reliable - after all significance testing is based on probabilities - and replication provides an opportunity to verify them and add credibility to findings (Park 2004). Errors in equipment or measures, possible human error (e.g. computation, observation and reporting) or ‘fluke’ results may go unidentified in unreplicated research (Rosenthal 1990), different contexts can also have a substantial impact. Therefore, in order to avoid “one-shot studies of phenomenon whose veracity is unquestioned” (Easley et al. 2000, p. 83) replication is necessary, and increasingly called for.

Typically, we explicitly tolerate a 5 percent false discovery rate that allows us to measure the weight of evidence from replications against a hypothetical explanation that an effect is mere chance (Fisher 1971). This means that “no isolated experiment, however significant by itself, can suffice for the experimental demonstration of any natural phenomenon” (Fisher 1971, p.14). However, when two independent studies are combined the likelihood of false discovery becomes 5 percent of 5 percent (0.25 percent) and therefore we can have greater certainty that any effect truly exists.

Attempts to systematically replicate psychological research indicate a surprisingly low concurrence in findings. The Psychological Reproducibility Project took the primary finding from 100 papers in three leading journals and found that only 34 percent resulted in a second statistically significant result (Open Science Collaboration 2015). Similarly, Camerer et al. (2018) sought to replicate twenty-one experimental studies in the social sciences originally conducted between 2010 and 2015 (and published in *Nature* and *Science*). The sample sizes used in the replications were, on average, five times larger than the original studies. Sixty two percent ( $n = 13$ ) of the studies replicated with a significant effect in the same direction as the original study; however, the effect sizes of the replications were approximately 50 percent of that of the original studies. There is a difficulty replicating social science research which has lead to an appeal for greater trans-

parency and rigor with calls to provide pre-registration and, where possible, open source access to data, materials and code (Munafò et al. 2017; Nosek et al. 2015; Nosek et al. 2018). This allows for greater confidence on the reproduceability of findings (i.e. that the authors conclusions can be drawn by another researcher using the original data) and an increased confidence in the findings. However, the discussion on the credibility of research has also lead to a greater value put on replication studies.

In their 2020 paper, Nosek and Errington refute the common understanding of replication as a “repeating of a study’s procedure and observing whether the prior finding recurs” (Nosek et al. 2020, p. 2) as often a faithful replication is not possible. Indeed, under a strict definition it is arguable that no study can be an exact replication, if only because time moves on and with it small changes in society, and the context of the research (LeBel et al. 2018). In the present study many of the original materials were originally used in Portuguese. A direct replication could not be conducted on an English speaking sample (with the expectation of meaningful results) without at least some minimal changes to the materials. So, while not identical, it is arguably a replication as the study provides insight into the limitations of future self-relevance (Park 2004) from which developments and improvements to its application can be made. Indeed, the approach that a replication “is a study for which any outcome would be considered diagnostic evidence about a claim from prior research” (Nosek et al. 2020, p. 2) is more accurate for most replications and is the spirit under which the present study was conducted. This reduces the need for the research to adhere to all operational characteristics and instead focus the emphasis on the interpretation of the outcome. Arguably, a study that is so ephemeral that it cannot tolerate even small changes in the design is not hugely valuable. Understanding how a replication is similar to and differs from the original study is useful for researchers, policy makers and pension providers to consider when implementing the findings of financial behavioural science.

Ultimately, the purpose of replication is to increase understanding of a phenomenon, and can be particularly useful when the concepts underpinning an observation are not well understood. In conducting the present research in a different context and with different

choices for monetary decisions recorded using a different medium (online) we gain a greater insight into the influence, boundaries and limitations of future self-relevance and its generalisability to different context, allowing for greater understanding of the domain.

## 4.3 Method

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### 4.3.1 Participants

Simonsohn (2015) argues that a sample size of about two and a half times the original size is needed for a replication of a laboratory study. This is so that the study is designed to have 80 percent power to detect an effect that the original study had 33 percent power to detect. Therefore two-hundred and twenty participants were recruited for the present study, all recruited from Prolific and compensated for their time.<sup>6</sup>

All participants were aged between 18 and 35 in accordance with ‘young age’ indicated using data from the European Social Survey (Abrams et al. 2011). The age limit of 35 years old indicated by this survey as being the end of ‘youth’ was similar for both Portugal (where the original study was conducted) and the UK (where the replication study was conducted). One participant was excluded from the analysis as they were more than 35 years old. The final sample consisted of two-hundred and nineteen participants.

There were a number of similarities between the sample in the present study and that of the original study. First, the gender of participants was similar across the studies with the original and current study having 54% and 58% female participants respectively. Second, in the original study, 60% of participants already had pension provision in some form compared to 57% in the present study. However, in the original study the majority of these were set up by relatives (57%) compared to employers (81%) in the present study. This difference is arguably the result of automatic enrolment legislation in the UK

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<sup>5</sup>(Stockdale et al. 2020)

<sup>6</sup>This method is taken from Stockdale et al. (2020).

requiring employers enrol all eligible employees in a pension scheme.

Arguably, the main difference in samples is in the age and occupation of participants. In the Marques et al. (2018) study, all participants were students, with 97% of them aged between 18 and 24 years old. In contrast, the present study had a population consisting of only 15% students with the majority of participants being in full-time work (59%) and only 29% aged between 18 and 24 years old.<sup>7</sup>

### **4.3.2 Materials and procedure**

The study was conducted online at the convenience of the participant through the platform Prolific (compared to in pen and paper in a university classroom in the original study). Each participant was directed to a survey which automatically and randomly allocated them to one of six groups: self-relevance (high versus low) x prime (future ageing versus future versus neutral). The manipulation of the moderator variable (future self-relevance) was introduced first for those in the high future self-relevance group (those in the low self-relevance group saw nothing. This was done before seeing the primes to ensure that they did not have an unintended effect on the moderator. Next, all participants saw a prime (webpage) and completed the money allocation task before answering some demographic questions. All materials were provided by Marques et al. (2018) and were amended, where necessary, to an English translation.

#### **Future self-relevance task**

Participants in the high future self-relevant group were asked to think about their own future by showing their agreement to a range of statements about the future on a 7-point Likert scale from ‘very much’ to ‘not at all’. Statements were from a version of Lang et al.’s (2002) Future Time Perspective Scale adapted by Marques et al. (2018). Items included: ‘most of my life is still ahead of me’, ‘I have the sense that time is running out’ and ‘my future seems infinite to me’.

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<sup>7</sup>Due to experimenter error, participants were not asked to provide their actual age in the present study, only age band.

## **Priming task**

Participants were presented on the screen with a webpage advertising a financial product. Whilst modelled closely on real bank and insurance websites, the website was fictional. In the ageing prime condition, the webpage was titled ‘Future Ageing’ and included information on a retirement savings plan (Appendix A.1). In the future condition, the webpage was identical to the ageing condition with the exception that it was titled ‘Future’ with no reference to ageing (Appendix A.2). In the control condition (henceforth called ‘Neutral’), participants saw information about a debit card (Appendix A.3). All three webpages contained text information of similar lengths and format and, apart from the intervention-relevant text, were otherwise similar in appearance. After viewing the financial product, participants rated their interest in it, their likelihood to choose it themselves and their likelihood to recommend it on 7-point Likert scales from (1) ‘not at all’ to (7) ‘always’.

## **Money allocation task**

After seeing the website, participants were told that they had just received £1,000 (previously Euros) to distribute between five options. The options available were: ‘buy something nice for someone special’, ‘invest in a retirement account’, ‘spend it on a trip away or a fun day out’, ‘put it into a current account’ and ‘save for a house’. The wording of some options was changed from that of the original (see Table 4.1), with the most substantial change being the ‘save for a house’ option which was originally ‘invest in a health plan’. The change was made due to the fact that private health plans are not commonly utilised in the UK and, if used, are often employer funded (The King’s Fund 2014). While other options were considered, saving for a house was selected as an alternative due to the long-term nature of saving.

The primary interest of the study was in the money allocated to the retirement account with the current account providing the main comparison due to its focus on immediate or short-term spending. Providing other money allocation options allows for a greater understanding of the pattern of spending in terms of it being directed towards the present

Table 4.1: Changes to the money allocation options between the original (Marques et al. 2018) and the present study

Original study	Present study
Buy something nice for someone special	Buy something nice for someone special
Invest in a retirement savings fund	Invest in a retirement account
Plan a fun and extravagant occasion	Spend it on a trip away or a fun day out
Put into a checking account	Put it into a current account
Invest in a health plan	Save for a house

or the future.

## 4.4 Results

The results<sup>8</sup> are divided into three sections. First, the balance checks for demographics are presented which examine the spread of individual differences across the treatment groups. Second, differences in interest in the financial product, likelihood to recommend it and likelihood to choose it are described. Finally, the results of the primary analysis are presented using a statistical approach analogous to that of Marques et al. (2018).

### 4.4.1 Demographic balance

First, participants who indicated that their highest level of education was a PhD ( $n = 2$ ) were combined with those who indicated their highest level of education was a masters to create a group of individuals with postgraduate level education ( $n = 31$ ). This was done due to the small sample of individuals in the PhD group. Similarly, those who were separated and divorced ( $n = 3$ ) were combined with those who were single to create a broader ‘single’ group ( $n = 100$ ) for the same reason.

Using all 219 observations in the data, a test of balance of the demographic variables

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<sup>8</sup>(Stockdale et al. 2020)



(age, gender, education, marital status, employment and already having a retirement account) across the treatment groups was conducted.<sup>9</sup> These variables were individually regressed on the treatment assignment using a simple linear regression (Table 4.2) with all treatment assignments compared to the not self-relevant neutral treatment group. No significant differences between the groups were found on any of the variables and this was confirmed with an additional chi-square test suggesting that the participants randomly allocated to each group did not significantly differ by gender ( $\chi^2(5), N = 219) = 2.42$ ,  $p = 0.789$ ), already having a retirement account ( $\chi^2(5), N = 219) = 3.95$ ,  $p = 0.556$ ), employment status ( $\chi^2(20), N = 219) = 27.26$ ,  $p = 0.128$ ), education ( $\chi^2(15), N = 219) = 14.90$ ,  $p = 0.459$ ), marital status ( $\chi^2(10), N = 219) = 9.177$ ,  $p = 0.515$ ) or age ( $\chi^2(5), N = 219) = 5.61$ ,  $p = 0.346$ ). Consequently, the results suggest that all of the demographic characteristics were sufficiently balanced across the six groups.

#### 4.4.2 Interest in financial product

The level of interest in the financial product was examined to check for balance across the three website primes. This is to reduce the risk that behaviour may differ between groups due to varying levels of interest in the product. A 3 (website primes: future, future ageing, neutral) x 2 (future self-relevance: high, low) ANOVA was conducted and revealed that there was a significant difference in the level of interest between the three website primes,  $F(2, 213) = 4.80$ ,  $p = .009$ ,  $\eta_p^2 = .043$ . This was such that those in the neutral website group ( $M = 3.40$ ,  $SD = 1.67$ ) self-reported lower levels of interest than the future ageing ( $M = 4.15$ ,  $SD = 1.66$ ) and future ( $M = 4.16$ ,  $SD = 1.76$ ) groups. There was no significant main effect of future self-relevance,  $F(1, 213) = 0.05$ ,  $p = .830$ ,  $\eta_p^2 = .0002$  suggesting it did not affect level of interest, nor was there an interaction effect

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<sup>9</sup>The predictors were coded such that:

Gender: 1 = Male, 2 = Female, 3 = Prefer not to say

Age: 2 = 18 to 24, 3 = 25 to 35

Saving already for retirement: 1 = Yes, 2 = No

Employment: 1 = Full-time, 2 = Part-time, 3 = Unemployed, 4 = Student/in training, 5 = Retired, 6 = Other

Marital status: 1 = Married / civil partnership, 2 = Living with partner (unmarried), 3 = Single

Education: 1 = GCSEs, 2 = A-Levels, 3 = Undergraduate 4 = Masters and above

Table 4.2: Regression and Chi square balance checks for multiple demographic variables on condition.

	Gender	Employment	Education	Marital	Saving	Age
Not SR and future ageing	0.126 (0.119)	-0.533 (0.317)	0.187 (0.239)	-0.216 (0.569)	0.0999 (0.118)	0.169 (0.113)
SR and future ageing	-0.0414 (0.111)	-0.154 (0.331)	-0.0956 (0.215)	-0.474 (0.493)	-0.0897 (0.111)	0.0921 (0.107)
Not SR and future	0.0311 (0.111)	-0.368 (0.312)	-0.0696 (0.205)	-0.546 (0.515)	-0.0421 (0.112)	0.196 (0.102)
SR and future	-0.0157 (0.121)	0.136 (0.413)	-0.286 (0.219)	-0.555 (0.542)	-0.106 (0.121)	0.120 (0.115)
SR and neutral	0.0535 (0.117)	-0.0950 (0.371)	-0.288 (0.225)	-0.739 (0.526)	0.0279 (0.116)	0.204 (0.106)
Constant	1.564*** (0.0805)	2.154*** (0.251)	2.641*** (0.166)	3.974*** (0.359)	0.590*** (0.0799)	2.590*** (0.0799)
$\chi^2$	2.47	27.26	14.90	9.18	3.95	5.61
$N$	219	219	219	219	219	219

Note: Huber-White standard errors in parentheses

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

between website and future self-relevance,  $F(2, 213) = 0.09$ ,  $p = .910$ ,  $\eta_p^2 = .0009$ . The original study reports no differences in level of interest across the groups.

While only interest is reported in the original study, we also repeated the ANOVA with the likelihood of choosing and recommending the financial product as the dependent variables. There were no significant differences in likelihood to choose or recommend the financial product between the different website primes or future self-relevance conditions ( $ps > .05$ ). Overall, likelihood to choose ( $M = 3.66$ ,  $SD = 1.52$ ) and likelihood to recommend ( $M = 3.58$ ,  $SD = 1.59$ ) were moderate across the groups.

#### 4.4.3 Primary analysis: Money allocation task

Using a 3 (website primes) x 2 (future self-relevance) between-participants x 5 (money allocation option) within-participants analysis of variance design, and following the approach taken by the original paper, we found a significant main effect of money allocation option,  $F(4, 852) = 44.23$ ,  $p < .001$ ,  $\eta_p^2 = .172$  (see Appendix A.4). Pairwise compar-

isons revealed the money allocation to the current account was significantly higher than all other alternatives ( $ps < .001$ ) with the exception of saving for a house where there was no significant difference between the two options ( $p = .762$ ). Saving for a house had the second largest amount of money allocated, significantly more than spending on a trip or fun day out or buying something nice for someone special ( $ps < .001$ ). Spending money on a trip or fun day out was third, with significantly more money allocated to it than retirement ( $p = .001$ ) or buying something nice for someone special ( $p < .001$ ). Finally, retirement and buying something nice for someone special did not significantly differ in the money allocated to them ( $p = .363$ ). There was no three-way interaction between the variables,  $F(8, 852) = .46$ ,  $p = .885$ ,  $\eta_p^2 = .004$ , suggesting that money allocation did not vary between the options depending on which website prime participants had seen nor whether they were in the high or low future self-relevance condition. For the mean money allocation to each option, see Table 4.3.

Table 4.3: Means and standard deviations for the money allocated (£) to each money allocation option in each of the future self-relevance and priming conditions.

	Low future self-relevance						High future self-relevance					
	Future ageing		Future		Neutral		Future ageing		Future		Neutral	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Special	49.0	61.5	86.0	110.8	49.2	67.4	56.4	58.8	59.7	63.8	90.3	94.7
Retire	86.2	156.9	86.4	107.5	112.8	212.0	128.4	209.5	103.2	202.5	111.8	188.3
Trip	148.6	168.0	179.5	185.5	239.0	273.8	169.8	217.9	166.5	168.8	258.8	238.5
Current	421.4	341.8	307.9	286.9	266.9	293.5	359.1	269.4	355.2	301.7	292.1	221.6
House	294.8	341.0	340.2	304.0	332.1	356.2	286.4	302.6	315.5	324.4	247.1	286.6

## 4.5 Discussion

The aim of this study was to replicate the research by Marques et al. (2018) which found that being exposed to ageing primes was insufficient to increase retirement account savings, and instead future self-relevance was a necessary condition for the effectiveness of future ageing primes. My findings depart from theirs substantially, finding instead that contributions to retirement accounts are no greater when participants see the future ageing prime compared to the future and neutral primes, regardless of whether participants were high in future self-relevance. This draws further attention to the complex mechanism which likely underpins the effectiveness of future self-relevant information and changing retirement saving behaviour. I now consider possible explanations for this divergence in findings.

Whilst the findings support previous research which suggests that textual ageing primes are ineffective at increasing retirement saving (e.g. Israel et al. 2014), there are also several differences between the original study and replication which may provide a possible explanation for the contrast in findings. First, in my study the money allocation options were changed such that ‘invest in a health plan’ became ‘save for a house’. These saving options are not comparable, as housing expenditure is arguably a crucial factor in saving for retirement in a way that health plans are not (at least in the UK where healthcare is free at the point of access). Individuals who own a home are likely to have lower living costs in retirement than those renting or paying a mortgage and therefore the amount of retirement savings needed is arguably lower. It may be suggested that saving for a house is beneficial for retirement saving if the mortgage is paid off prior to retirement.<sup>10</sup> Therefore, individuals may have chosen to allocate more to this option in our present study as a consequence, splitting their ‘retirement contributions’ between saving for a house and a retirement account and essentially meeting an age appropriate milestone (house purchase) without completely ignoring the needs of their future self.

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<sup>10</sup>Indeed, it is often assumed that you will own your house in retirement and as such it is often not included in household retirement income estimates (e.g., Pensions and Lifetime Savings Association 2021)

The discussion on how to encourage people to save for retirement has increasingly turned to the question of people using housing wealth in order to fund their life after work. In this model, an individual would buy a large property during their working life, and pay off the mortgage. Then, come retirement, they would downsize releasing the equity and producing a pot of savings to drawdown on. The National Institute for Economic and Social Research (NIESR) suggest that people with a mortgage are paying less into their retirement pots than renters (resulting in a pot that's 15% lower come retirement), perhaps suggesting that at least some people are using this strategy. While, historically this may have been a sound investment, there are at least three concerns with this approach that individuals and policy makers should consider. First, diversification is usually the key to responsible investments and therefore to put all (or nearly all) of your retirement wealth into a single asset class is likely to be risky (particularly if a market crash coincides with retirement). Second, there is an emotionality attached to a home that does not exist with a saving pot, meaning that individuals may not 'cash in' the asset come retirement as expected. If you have raised your family in a house, spend 20 or 30 years building memories, a life and a community you probably like the house a lot. Leaving it, and possibly the area and social networks in which you live, is likely to be undesirable for many. Of course, equity release is a possibility through lifetime mortgages or home reversion plans (there may be substantial interest to pay), although it would allow you to remain in your home. Third, as an individual you also miss out on the tax relief from the government, matching incentives from your employer, lower volatility (from investment in a broader asset classes) and a greater flexibility come retirement, all of which may make retirement saving more attractive.<sup>11</sup> As a result of these factors, policy makers are unlikely to suggest that housing wealth be used as the primary mechanism of saving; however, it is useful to consider that, at the individual level this may be a consideration and such wealth may form part of their plan. Therefore, to look purely at retirement saving wealth purely through the lens of retirement accounts may be naive and short sighted of researchers and policymakers. Since the decline of DB pensions (which have

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<sup>11</sup>Although there is capital gains tax relief on first homes.

previously been a main source of pension provision), people may simply choosing to invest their money for retirement more widely (e.g. in ISAs, other investment accounts, property) rather than using traditional pension saving vehicles, making it more challenging to estimate the sufficiency of savings.

Another explanation for the present study are differences in the presentation of the website primes. In the present research, these were presented online without supervision rather than using pen and paper in the laboratory. Consequently, it cannot be ruled out that participants may have allocated less attention to the task or been more distracted in the present study. Alternatively, it may be argued that the present study has greater external validity because the prime webpages were presented in congruence with the medium for which they were intended (i.e. computer screens) and in a familiar environment (Reips 2000). There may also be less social desirability associated with the online format due to greater anonymity (Joinson 1999). In any case, research utilising primes that alter behaviour by influencing subconscious processing are somewhat controversial regardless of their presentation method. There is concern over possible nefarious (perceived or otherwise) user (e.g. advertising or the government covertly manipulating behaviour) or that many simply don't stand up to replication. Priming is also a complex phenomena because we experience thousands of primes each day and therefore the influence on behaviour can be complex (for example, what we find in the laboratory with one prime may be very different to the field where people are subject to many primes). The priming literature also generally does poorly in replication studies (e.g. Harris et al. 2013; Molden 2014; Pashler et al. 2012). Consequently, their ineffectiveness in the present study may be less to do with the presentation method and more to do with their use full stop.

Finally, cultural differences between the sample in Portugal and the UK may provide an explanation for the differences in results. The effect of both ageing primes and future self-relevance on saving for retirement is likely influenced by the perception of one's own ageing. In a report by the PEW Research Centre (Kochhar et al. 2014), ageing was described as a 'major problem' by 52 percent of people in Spain<sup>12</sup> compared to 43 percent

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<sup>12</sup>Spain provides a good comparison with Portugal due to similar or more extreme trends in ageing; for

in the UK. Additionally, 55 percent of British people reported being very or somewhat confident in their ability to fund an ‘adequate’ standard of living in retirement compared to 41 percent of the Spanish. Regardless of whether this is reflective of actual adequacy of savings, this may mean that British people perceive less of a need to make additional contributions to their retirement account when they receive a windfall. In the future, research examining how the perceived threat of ageing influences future self-relevance may be useful to better understand the influence of these cultural differences.

Another cultural difference between the studies is that the majority of people in the present sample who reported having a retirement account said it was set up by their employer (81%) as opposed to family in the original study (57%). This is an important distinction between the UK and Portugal as in the UK occupational pensions are widespread. They are set up by employers, automatically joined and do not require the employee to make any active saving decisions if they do not want to. Unless you are self employed or wish to set up a pension independent of your workplace, it is rare you would need to choose a pension scheme. Employees in the UK would therefore rarely see information on retirement from banks (as it was presented in this study) and may equate it with an unnecessary decision or, at worst, a pension scam. A study looking more specifically at increasing contributions or making one-off additional voluntary contributions to retirement may have been more appropriate in the UK context. Given this, it is perhaps unsurprising that retirement information in this format is ineffective as a prime for UK participants. Due to this method of saving, and the ubiquitous nature of workplace pension schemes, people would be unlikely to save a windfall in this way.

Ultimately, the divergence in findings suggests that there is perhaps a more complex mechanism that underpins the effectiveness of future self-relevant information and changing retirement saving behaviour. It is plausible that the mechanism is highly specific and that a greater consideration of the perception of ageing and the cultural and social aspects of deciding how much to contribute to retirement are critical. There are also several

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example old-age dependencies (number of individuals over 65 years old per 100 people) and current pension expenditure (as a percentage of GDP) between the two countries are similar (OECD 2019a).

other aspects of the mechanism which, although present in both the present and original study, may, when considered with the above differences, explain the present findings. For instance, the website primes used were neutral in their emotional valence (or at least not intentionally positive or negative). Neutrally valenced stimuli are often reported to be less effective at reducing discounting than positive (Liu et al. 2013; Zhang et al. 2018) and even negative stimuli (Bulley et al. 2019), and therefore the present finding may have been found due to the neutrality of the emotional valence. Similarly, the future self-relevance questionnaire used focused on future time perspective with no ‘pre-experiencing’ or autobiographical thought required by the participant. These factors are thought to increase the connectedness felt between the present and the future self and are thought to be independent of future time perspective (Bartels et al. 2011). A stronger induction of episodic future thinking may therefore be needed.

Moving forward, future research collectively examining such factors as emotion and pre-experiencing, using stimuli which is both generic enough to be widely produced but self-relevant enough to generate an increase in connectedness between the present and future self, would be valuable. Addressing this will allow for a greater understanding of the influence of self-relevant future thinking on temporal discounting, and allow it to be more feasibly applied in the field to increase retirement saving.

## 4.6 Conclusion

This chapter details whether the introduction of a light-touch intervention in the form of a questionnaire to increase future self-relevance could increase the impact of future ageing primes on retirement saving. Contrary to the original study I replicated, I found that the intervention did not impact retirement saving, with no evidence that future self [U+2010]relevance moderates the effect of future ageing primes. Instead, I find that ageing primes are ineffective at increasing retirement saving regardless of whether individuals are high or low in future self [U+2010]relevance.

When considering the impact of these findings on decision-making processes and policy



making, it is clear that this is not an intervention that is likely to be successful in the UK with young people.<sup>13</sup> This is a conclusion that can only be made because the apparent contextually-sensitive findings do not replicate in the UK, such that the findings are different to when the study was conducted in Portugal. Without this replication it is possible that the blind application of this intervention would lead to wasted public money in a misguided effort to improve retirement saving. This emphasises the importance of testing interventions in different contexts (real-world where possible) as this helps policy makers to better understand the complex interaction of behaviour and the system in which people operate and identify where different interventions, or more than one intervention, may be needed. This is fundamental from a resource perspective where channeling public finances at interventions which are most likely to work is both preferable and needed. With this in mind, in the next chapter (Chapter 5), I explore whether the addition of emotional valence to the future self-relevance is sufficient to result in a change in retirement saving contributions.

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<sup>13</sup>Although, we should be mindful that the study was conducted in the laboratory, not the real world.

# Chapter 5

## Emotion, future self-relevance and retirement saving decisions

### 5.1 Introduction

In the previous chapter, I found that an intervention which used a questionnaire to increase future self-relevance had no impact on hypothetical retirement saving. Therefore, in this chapter, I explore the influence of a different light-touch intervention that explores the impact of future self-relevance, *and* emotional valance (positive, negative and neutral) on retirement contribution decisions.

As in Chapter 4, much of the relevant literature, including that on present bias and the impact of future self-relevance and emotional valence, is included in Chapter 2. In this chapter, I include an overview of the literature (Section 5.2) before presenting the methods (Section 5.3), results (Section 5.4) and a discussion thereof (Section 5.5).

### 5.2 Literature review

Many decisions, including retirement saving, require a trade-off between short-term gains and long-term consequences. In this regard, our current and future selves rarely see

eye-to-eye with the needs, wants and desires of the present self often winning out, even if it is not in our best interest when looking at life in its totality. Yet, being able to optimise the right focus at the right time can ensure we do not forgo our health, life goals and multi-step accomplishments in favour of today's slice of cake, television marathon or spending splurge.

These intertemporal decisions are typically examined in fabricated experiments by having individuals choose between (often hypothetical) smaller, sooner rewards (e.g. £5, now) versus larger but delayed rewards (£10, in a month's time). All else equal, a diverse body of literature has robustly documented that people are more likely to choose a proximal reward at a lesser value as the delay increases for the distal reward; although, there are considerable individual differences (for examples, see Amasino et al. 2019; Lempert et al. 2012; Liu et al. 2016). In retirement saving, this translates as many individuals choosing to spend their money now rather than save some of it for the future, even if employer matching, tax incentives and investment returns mean it could be worth more in retirement.

Few decisions have a delay in delivery as long as retirement saving, and therefore this is arguably one of the most challenging intertemporal scenarios to overcome, but one which has substantial ramifications for the wellbeing of individuals. A wealth of research explores the ways in which individuals can be encouraged to make more far sighted decisions (Rösch et al. 2021; Rung et al. 2018); including, mindfulness and acceptance-based training (Morrison et al. 2014; Scholten et al. 2019), contextual changes (Ashe et al. 2020; Dai et al. 2013; Dshemuchadse et al. 2013; Radu et al. 2011), and pharmacological interventions (de Wit et al. 2002; Shiels et al. 2009). In this chapter, I focus on the impact of episodic future thinking (EFT), or the ability to imagine prospective events pertinent to one's own personal future (Schacter et al. 2017), as a possible way to increase retirement saving through an strengthened connection with the future self (Thorstad et al. 2018).

In one of the first studies looking at the impact of connectedness, Bartels and Urminsky

(2011) systematically manipulated the degree of connectedness between present and future selves by asking participants to read (and then summarise) how they would be the same or different in a years' time, before completion of a temporal discounting task. They found that inducing the belief that their identity would change following graduation resulted in greater discounting compared to those who were told their identity would remain stable. Indeed, individuals who self-report their present self as being highly connected to their future self have accumulated, on average, greater levels of savings (Hershfield et al. 2009), have higher levels of patience (Bartels et al. 2010), and procrastinate less (Blouin-Hudon et al. 2015) than those with lower connections.

The psychological disconnect between the present and very distant self has been thought to be so marked that the future self can be considered as a different individual to the present self (Hershfield 2011; Parfit 1971). Pronin et al. (2008) found that participants signed their future self *and* strangers up to similar amounts of undesirable activities (e.g. drinking a horrible tasting liquid, tutoring hours) and significantly more than they assigned to themselves in the present. This suggests that the future self is seen as being more akin to an other than a version of the self who, at some point will feel the ramifications of such decisions. In the domain of retirement saving, if an individual judges their current self to be only weakly connected to their future self, this in turn should result in them assigning less weight to one's future financial wellbeing and accordingly the wellbeing of others should take on relatively greater weight in the individual's retirement saving decision making process. To test this, Bryan et al. (2012) conducted a field study where members of a pension scheme were shown either a rational message emphasising the self-interest of saving, or a social responsibility message which overtly framed the future self as if they were another person. Retirement contributions were greater for those who saw the social responsibility 'other' framed message than those that saw the self-interest message. However, this was only to the extent they felt socially close to their future self, with those who felt little connection to their future selves equally unresponsive to both messages.<sup>1</sup> Therefore, any intervention which improves the extent

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<sup>1</sup>This is similar to the charitable giving literature in that messages framed towards helping another

to which a distant future version of the self is made to feel like a closer version of the self through episodic future thinking, is likely to be beneficial at improving the intertemporal decisions the present self makes on their behalf.

In generating mental representations (or episodic future thoughts) to increase the connectedness between the present and future self, it seems almost implausible that factors such as vividness do not play an important role. Events which can be recalled more vividly are intuitively thought to occur closer to the present which leads to the feeling that they require greater attention and allocation of resources as a result (Gerber et al. 2010; Tversky et al. 1973a). This is because, the needs of the present self are viscerally evocative, mentally accessible, and relevant to current needs and desires, whereas the future is abstract and perceived in an emotionally detached manner (Metcalf et al. 1999).<sup>2</sup> Indeed, correlational evidence from Bromberg et al. (2015) posits that the vividness of future thoughts is negatively correlated with temporal discounting rate, suggesting that those who can more vividly imagine the future are less biased by the present.

In the behavioural task of an fMRI trial, Peters et al. (2010) gave participants a series of intertemporal choices between a fixed smaller monetary amount and a larger delayed reward at different time intervals. In half of the trials, prior to decision making, participants saw self-relevant events timed concurrently with the delayed option. The events were derived from pre-interviews and were therefore realistic possible scenarios for the near future.<sup>3</sup> In the other half of trials participants saw nothing before indicating their decision. The results suggested that participants were more likely to choose the delayed option when they saw the episodic cue than when they saw no cue, shifting their gratification towards longer term outcomes. There were considerable individual differences in the effect, with those reporting more frequently and vividly imaging the future in day-to-day life, more inclined to delay the reward in the task.<sup>4</sup>

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person who feels close to the ‘giver’ are more effective than those not close (Bartels et al. 2013).

<sup>2</sup>We tend to imagine the future with less contextualisation than possibilities closer in time Wakslak et al. (2006).

<sup>3</sup>Tags were matched in their valence, arousal and personal relevance

<sup>4</sup>People more likely to engage in task-unrelated mind wandering – which is known to frequently include thinking about the personal future – have lower levels of discounting than those who do not frequently engage in mind wandering (Smallwood et al. 2013).

Parfit (1984) remarked that “when we imagine pains in the further future, we imagine them less vividly, or believe confusedly that they will somehow be less real, or less painful” (p.161). This is in part because imagining the near future self (e.g. in 10 years’ time) is easier than imagining a distant future self (e.g. in 40 years’ time), because the overlap with the present self, and its emotions, are arguably greater (Löckenhoff et al. 2017). Moreover, closer events are more ‘available’ in memory and so feel more probable to occur (Szpunar et al. 2013; Tversky et al. 1973b). The greater the vividness of the future self, the easier it is to integrate the pains and gains of both the present and future into the decision making process (Hershfield et al. 2018; Pronin et al. 2008). Consequently, myopic decisions may result in part because people fail to fully imagine one’s internal experience in the future, and episodic future thinking bridges this empathy gap with vivid imagery, making the consequences of decisions more clear (Hershfield et al. 2018; Kurth-Nelson et al. 2012).

It has been theorised that vividly imagining the future self, and specifically, the *ideal* future self can facilitate the self-regulatory impact of episodic future thinking (Markus et al. 1986). This is because such self-referential processing plays a role in goal pursuit with increased motivation and effort to attain the imagined future scenario (Bartels et al. 2010; D’Argembeau et al. 2010; Freitas et al. 2002) and motivates the steps needed to achieve it (Taylor et al. 1998). It also primes a future-orientated mindset that stimulates an individual to consider the future consequences of their decision and reduces myopic decision making (Chen et al. 2011; Cheng et al. 2012). Through self-relevant thinking, a greater value is also attributed to such scene creation because of its association with personal goals and values (D’Argembeau et al. 2011) making it easier to encode and recall in memory (Bø et al. 2022).

In addition, personally relevant information is more salient and imagined more vividly than non-personally relevant mental simulations (Sui et al. 2015) which may be why it is important for moderating episodic future thinking (it may simply help in the process of making vivid imagery vivid). In a seminal study in the field, Hershfield et al. (2011) asked participants to interact with realistic computer-generated avatars of themselves

either age progressed to 70 years old or current aged in a virtual reality environment. Those who interacted with themselves in the future indicated a greater intention to save for retirement compared to those who interacted with their current aged self. Nonetheless, simply increasing the vividness of old age by presenting an elderly stranger, rather than the future self, did not increase retirement saving rates.<sup>5</sup> Similarly, de Vito et al. (2012) demonstrated that there is a difference between thinking vividly and thinking vividly about the self in the future. They found that participants asked to imagine themselves (self-relevant) experienced a greater sense of pre-experiencing the future than those asked to imagine a familiar other (self-irrelevant). The level of sensorial detail and context clarity, both of which indicate vividness, were similar for both groups. The authors therefore suggest that it may be the sense of pre-experiencing which is important, a factor which may require vividness but is likely strengthened with self-relevant future thought.

When we consider the ideal self that we imagine in many episodic future thinking paradigms, the default is almost always positive – we are richer, have better health behaviours and are happier. Many adults<sup>6</sup> share this tendency to process information in a way that communicates a positive view of the self (Taylor et al. 1988). It is also quicker, and requires less effortful thought to generate positive future scenarios than negative ones (D’Argembeau et al. 2004; Newby-Clark et al. 2003). With this in mind, it is thought that if the future looks affectively dismal then prioritising what is immediately available is likely to be beneficial. Correspondingly, a future that looks positive may motivate an individual to delay rewards to obtain those more pleasing outcomes (Bø et al. 2022). Accordingly, episodic future thoughts that are positive are associated with more vivid pre-experiencing and greater clarity of temporal considerations than negative events (D’Argembeau et al. 2004).

This tendency towards the positive means that early research on episodic future thinking typically employed the use of positive emotional tags in the generation of future relevant

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<sup>5</sup>Interaction with a virtual self has been found to decrease discounting in a number of domains (Chiou et al. 2017; Kuo et al. 2016).

<sup>6</sup>Who are not part of a clinical population.

stimuli (e.g. Benoit et al. 2011; Peters et al. 2010) making it difficult to disentangle the specific effects of emotional valence on the efficacy of episodic future thinking. Yet, when imagining the future, an anticipatory emotional effect is produced in the present; for example, thinking about an exam in the future may elicit anxiety in the present, essentially allowing an individual to pre-experience the emotional consequences of an event – both good *and* bad (Benoit et al. 2011; Israel et al. 2014). In a meta-analysis looking at the effect of emotion on episodic future thinking (along with self-imagination and future worry induction), Schubert et al. (2020) found that simulations of the personal future increase both positive and negative affect in the present, and that such representations are more evocative than remembering the personal past. Therefore, these emotional responses can then be used to determine the emotional consequences of an event and the decision to pursue or avoid future outcomes (Bulley et al. 2016).

More recently, in recognition that other affective valances may influence intertemporal decisions, the comparison of neutral<sup>7</sup> and negative valances have been introduced to examine which is most effective when using episodic future thinking to encourage greater uptake of distal rewards. Liu et al. (2013) found that positively valanced future thoughts reduced the preference for immediate rewards in an intertemporal decision task. Conversely, negative future thinking increased the preference for immediate rewards whilst there was no effect of neutrally valanced cues. The self-reported vividness of all three types of emotional cues was comparable, and in controlling for the influence of concreteness with which the cues were imagined, this study suggests that the positivity is of greater importance than the vividness when using episodic future thinking to change behaviour. These findings were replicated by Zhang and colleagues using a comparable methodology (Zhang et al. 2018). Similarly, Lin et al. (2014) found positive and neutral episodic future thinking resulted in similar decreases in temporal discounting (although no comparison to negatively valanced cues was made). The authors suggested that the effect was moderated by working memory capacity, an ability which is crucial in increasing the vividness and concreteness of imagined scene creation (and planning when mind

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<sup>7</sup>Note that Peters et al. (2010) did include neutral tags but combined with positive tags.



wandering, see Baird et al. 2012 or for an alternative view see McVay et al. 2013). It may be that positive emotion therefore increases the vividness with which the future is imagined, resulting in a greater propensity to delay rewards in intertemporal decision-making tasks.

Despite this, the conclusion is far from unanimous in the literature when negatively valenced simulations are included. Bulley et al. (2019) observed a significant reduction in temporal discounting with both negative and positive cues compared to neutral cues, using a methodology comparable to Zhang et al. (2018) or Liu et al. (2013). Israel et al. (2014) used non-self-relevant ageing primes to increase the vivid perception of the future self (arguably by intensifying the negative emotions which are linked to thinking about the future). They found that individuals who saw images of elderly people suffering from financial issues, or in need of assistance, discounted the future less than those who saw positive images of vacations. However, when the same images were presented in an equivalent text format there was no difference in the discount rate between those who read about the elderly people suffering or the vacation pictures. It has been suggested, that this is due to the images of the elderly suffering being both emotionally and visually more vivid than the texts.

Equally, using a within-participants design, Calluso et al. (2019) determined the role of construal level and emotion modulation on temporal discounting. Unlike previous studies, the researchers used a baseline of no emotional cue rather than comparing to a neutrally valenced cue which might influence episodic future thinking, but is often used as a control condition (see Bulley et al. 2019; Liu et al. 2013; Zhang et al. 2018). Calluso et al. (2019) found a reduction in temporal discounting for all three emotions (positive, negative and neutral) compared to baseline of no emotion. A reduction in temporal discounting in all three emotional valences suggests that there is a vividness effect such that all of the emotions make the delayed monetary option more concrete. However, there is also support for the effect of emotional valence as positive cues resulted in the greatest modulation of the effect and significantly more than neutral cues, and the neutral cues resulted in a greater modulation than negative cues. These differences suggest that

both changes in concreteness and emotion are important to the effect of episodic future thinking.

The self-relevance of emotional cues has also received increasing attention in the literature. Bulley et al. (2019) and Zhang et al. (2018)) both found that participants self-reported future positive events as more personally relevant than neutral and negative events, which may explain the greater modulation for positive cues. Equally, individuals derive pleasure from sharing information about themselves (Tamir and Mitchell, 2012), making generating positive cues for researchers likely a pleasurable experience.

In retirement saving, Hershfield et al. (2011) used age progressed avatars of participants or a stranger and manipulated the emotion of the faces on a scale from positive to negative. Participants saw a scale with ‘current income’ at one end and ‘retirement income’ at the other, and had to indicate how much they wanted to contribute to their pension now by moving the dial along the scale. As the dial was moved to ‘current income’ the face got sadder and when moved towards the ‘retirement income’ side it became happier. Hershfield and colleagues found that whilst the emotion had little effect on the amount contributed to retirement, the self-relevance of the face did, with those who saw themselves likely to contribute more to retirement. Whilst this study suggests that self-relevance may be more important to reducing temporal discounting than emotion, it was done using subtle changes in emotion and raises the question as to how the intensity of the emotion effects decision making. Moreover, the stimuli used was personal to the participant making it difficult to apply such a finding to real-world retirement decisions where such personalisation would likely be unfeasible.

Indeed, in psychological research examining the influence of episodic future thinking on retirement saving in the laboratory typically involves one of two processes. First, studies employ some form of age-progressed avatar of the self to create a vivid depiction of the future self (e.g. Hershfield et al. 2011). Or, more commonly, researchers give participants standardised instructions to engage in episodic future thinking (e.g. future event related to spending £35 in a pub in 180 days; Benoit et al. 2011; Cole et al. 2013; D’Argembeau

et al. 2004). Asking the 22.6 million workplace pension members in the UK (Office for National Statistics 2022a) to submit pictures for this purpose or generate cues is, in most cases, unscalable due to cost and practicalities. In the latter case, it also relies on active interrogation of one's own autobiographical memory, within a set of 'rules',<sup>8</sup> in order to generate a specific response to a cue, set in the future (Crovitz et al. 1974). Such a deliberative process of thought construction is effortful (Conway et al. 2019) and therefore getting people to engage in such thoughts of their own volition is likely to be difficult.

Instead, priming the environment to encourage individuals to think about the future without creating an environment that is completely personalised may be an effective alternative to inducing future thoughts and increasing the propensity to make decisions in favour of the distal self. Episodic future thinking is often engaged in through mind wandering or spontaneous cognition (Warden et al. 2019) and these frequently result from environmental triggers (Plimpton et al. 2015). Cues which are positive are more likely to trigger thoughts about the future than present or past and negative cues are more likely to trigger past memories (Kvavilashvili et al. 2011; Plimpton et al. 2015; Schlagman et al. 2008). Similarly, disinterested individuals tend to focus on prospective thinking when they are less experienced with the topic and those who are experienced engage in more retrospective mental simulations. This has led to some support for the "intriguing possibility that autobiographical associations with the current task environment have a potential to cue the disinterested mind" (Smallwood et al. 2009, p. 118). This opens up the possibility that textual primes could encourage an individual to consider the future self more and consequently make more future orientated decisions.

In the present study I sought to investigate the role of emotional valence, self-relevance and connectedness on contributions to a retirement account. I use third person generic vignettes in order to manipulate future self-relevance. This was done to avoid the need for pre-interviews or use of specialist equipment or software (i.e. to 'age' participants) which

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<sup>8</sup>i.e. that it must be "plausible, given the participant's plans, and novel, that is, not previously experienced by the participant" (Addis et al. 2008, p. 35).

many previous studies use but is arguably not a solution which could be used in the field due to cost and time implications. This has the benefit of being more widely scalable if found to be effective than personalised stimuli where a greater degree of engagement is needed (i.e. to generate stimuli or upload pictures). It is hypothesised that:

H1: Vignettes which are future self-relevant will be more effective at increasing hypothetical retirement contribution rate than vignettes which are not future self-relevant or seeing no vignette at all.

H2: The emotional valence (positive, negative, neutral) of the vignette will affect contribution rates compared to when there is no vignette present. We expect the positive valence to result in higher contributions compared to the control. We also suggest that negative valence may also increase retirement allocation compared to no emotion although to a lesser extent than the positive emotional valence.

H3: Connection to the future self (future self-continuity) will mediate the effect between the vignette seen and retirement contributions.

## **5.3 Methods**

### **5.3.1 Pre-test**

A pre-test was conducted in order to ensure that the vignettes used in the main study were distinct emotionally (i.e. positive versus negative) and that the intensity of each of the four vignettes ultimately used for each emotion varied in intensity. A total of twenty-four vignettes were written for the present study: eight for each emotion (positive, negative and neutral) and, within this, two for each of the four levels of intensity within this (positive and negative only, neutral did not vary in intensity but the same number were created).

Participants saw the vignettes for only one emotion and either self-relevant (using the pronoun 'I') or not self-relevant (using the pronoun 'he'/'she' or a name). The positive

vignettes focused on the positive aspects of retirement saving such as traveling, being financially stable, doing activities with friends and family. Conversely, the negative vignettes focused on the struggles of retirement including debt, cutting back, and bridging retirement with employment. Finally, whereas the positive and negative vignettes had time markers to indicate retirement, the neutral vignettes focused on activities not explicitly timed in retirement nor an emotion, for example, going to the shops or eating dinner. All vignettes were of a similar length and were presented in a random order with black text on a white background. To see examples of the vignettes used see Appendix B.

Following each vignette, participants rated the vividness with which they could imagine each scenario on a 7-point Likert scale from ‘not at all vivid picture’ (1) to ‘very vivid picture’ (7), the feeling of experiencing the scenario from ‘not at all’ (1) to ‘completely’ (7), and the emotional valence of the vignette on a 9-point Likert scale from ‘extremely positive’ (1) to ‘extremely negative’ (9). In order to ensure sufficient attention was given to the vignettes, one third of the time participants were randomised to see a true or false question about the vignette they had just read (e.g. ‘True or false, in the scenario you just read, you attend more tennis classes now you have retired?’). This then repeated until they had read all 8 vignettes.

A total of 56 participants were recruited from Amazon Mechanical Turk (M-Turk) to participate in the pre-test (no demographic details were collected). Four participants were removed for answering two of the true or false attention questions incorrectly.

There was little difference between the ratings for the self-relevant and not self-relevant vignettes in terms of emotional valence (Appendix B.1) and therefore I combined these groups together for each emotion. The emotional valence and intensity of the vignettes varied mostly as expected with the negative vignettes falling at the top end of the scale ( $M = 5.72$ ,  $SD = 2.72$ ) (Appendix B.2) and the positive vignettes at the bottom ( $M = 3.19$ ,  $SD = 1.70$ ) (Appendix B.3). The neutral vignettes veered towards positive ( $M = 3.35$ ,  $SD = 1.70$ ) (Appendix B.4). Neutral affect is generally considered to be a

feeling of indifference. It can, in theory, co-occur with a feeling of positive or negative affect: “Neutral affect is [thus] defined as the presence of neutral affect rather than the absence of, or low levels of, positive and negative affect” (Gasper et al. 2019, p. 2476). It is therefore not totally surprising that people rated these vignettes as slightly positive. When choosing the final vignettes an effort was made to pick the the vignettes with the least extreme positive or negative scores.

Based on the mean scores, four vignettes were selected for the final study from each emotion. This was such that for the positive and negative conditions there was a vignette which could be interpreted as ‘extremely’, ‘very’, ‘moderately’ and ‘slightly’ positive or negative respectively. For neutral, all were supposed to be similar in valence and as close to emotionally neutral as possible (i.e. not very negative or very positive) and so vignettes were chosen that best fitted this description. As desired, the reported vividness ( $M = 4.67$ ,  $SD = 1.76$ ) (Appendix B.5) and level of feeling of pre-experiencing ( $M = 4.42$ ,  $SD = 1.75$ ) (Appendix B.6) of the vignettes were comparable across all vignettes regardless of their emotional valence or self-relevance. This means that any change found in the main study are more likely to be due to emotion and self-relevance rather than the vividness with which an individual imagines the scenario.

### 5.3.2 Participants

Data were collected using a combination of Amazon Mechanical Turk (M-Turk)<sup>9</sup> and Prolific<sup>10</sup> in three waves<sup>11</sup> with participants all based in the UK. Whilst not a perfect method of participant recruitment (for a review see Chandler et al. 2016), Amazon M-Turk and Prolific have been found to be reliable and valid methods of data collection frequently utilised in psychology and behavioural economic research (Buhrmester et al. 2016; Paolacci et al. 2010).

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<sup>9</sup>Wave 1 and 2.

<sup>10</sup>Wave 3.

<sup>11</sup>Wave 1 was collected in September 2019. Wave 2 was collected in November 2019 in order to explore the validity of the future self-continuity measures given the results of Wave 1 (see Chapter 5b) and Wave 3 was collected in October 2020 in order to increase the sample size of both Wave 1 and Wave 2.

For the purpose of this study, only data from Wave 1 and Wave 3 were used in the analysis and consequently there is no discussion of Wave 2 here (see Chapter 5b for the study utilising this data). In the initial data collection round, referred to as Wave 1, a total of 209 participants were recruited with 31 people being removed from the analysis as they did not complete the survey and one additional person removed for being under 18. In total, 177 participants were used in the present analyses and ranged in age from 18 to 65 ( $M = 33.44$ ,  $SD = 10.06$ ). The majority were male (67%) and in full-time work (62%) and had an undergraduate degree or above education (74%). Many were also currently contributing to a pension scheme (69%).

In Wave 3, the sample consisted of 315 people and were recruited from Prolific. A total of 15 people were removed for incorrectly answering at least one of the two attention questions or for failing to complete the survey. The sample ranged in age from 18 to 65 ( $M = 35.85$ ,  $SD = 11.93$ ) with a majority being female (75%), in full-time work (50%) and had a minimum of an undergraduate degree (61%).

### 5.3.3 Procedure and materials

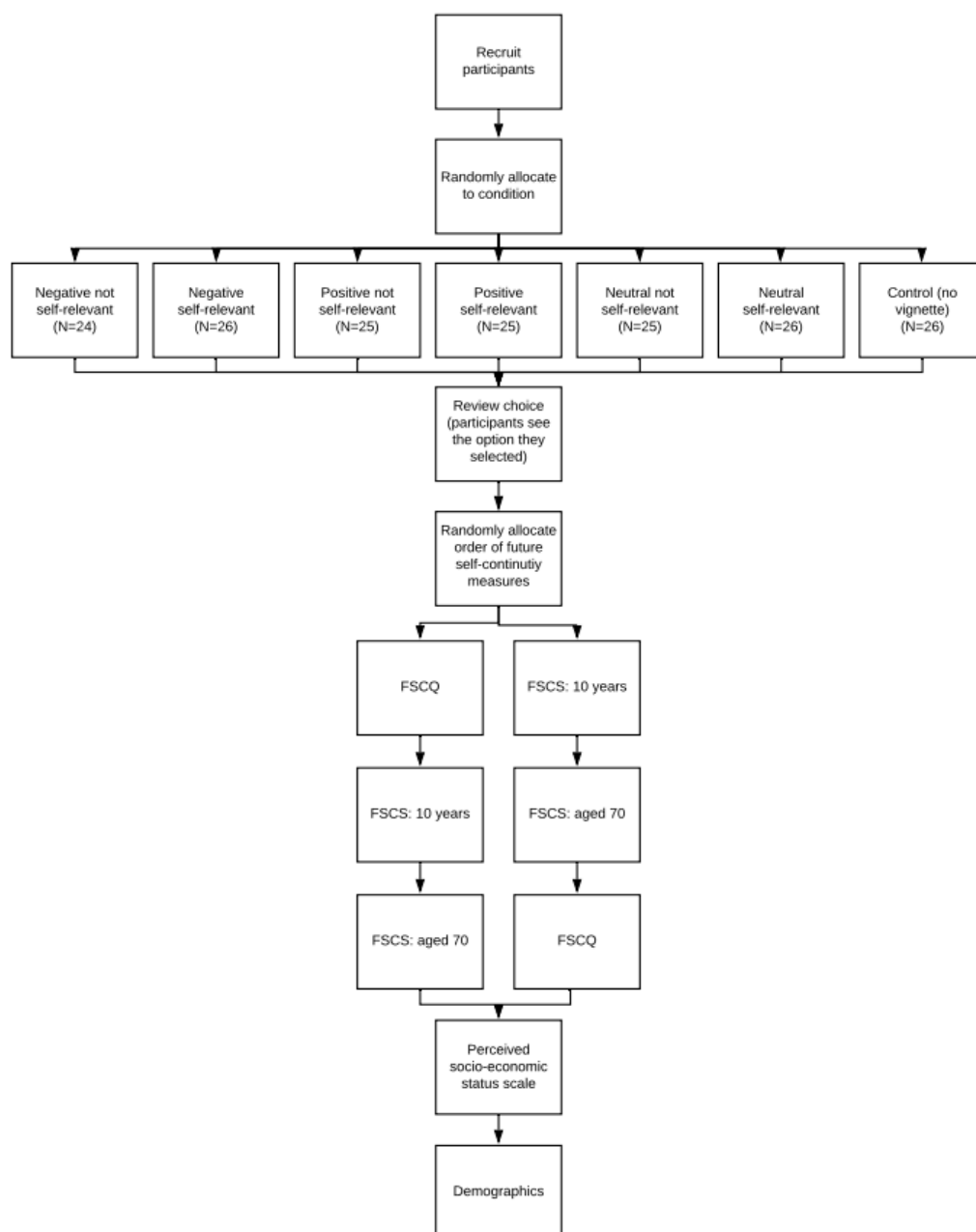
The data collection procedure was slightly different for both Wave 1 and Wave 3. The procedures are outlined in Figure 5.1 and Figure 5.2 for Wave 1 and 3 respectively with the materials used outlined below.

#### Slider scale task

Participants were asked to imagine that they had earned an annual income of £35,423 (the average UK salary for full-time employees; ONS, 2018) and had to decide how much to contribute to retirement. They were also told that their employer would match 100 per cent of contributions up to 3 per cent of their qualifying earnings and that they would receive tax relief such that for every £1 they put in it would only cost them 80p.

Beneath this description, a slider with four intervals was presented. The first was 0 per cent contribution from employees and employers, the second was a 5 percent employee

Figure 5.1: A flow diagram of the experimental design of Chapter 5 and 5b, Wave 1 (n is from final sample)

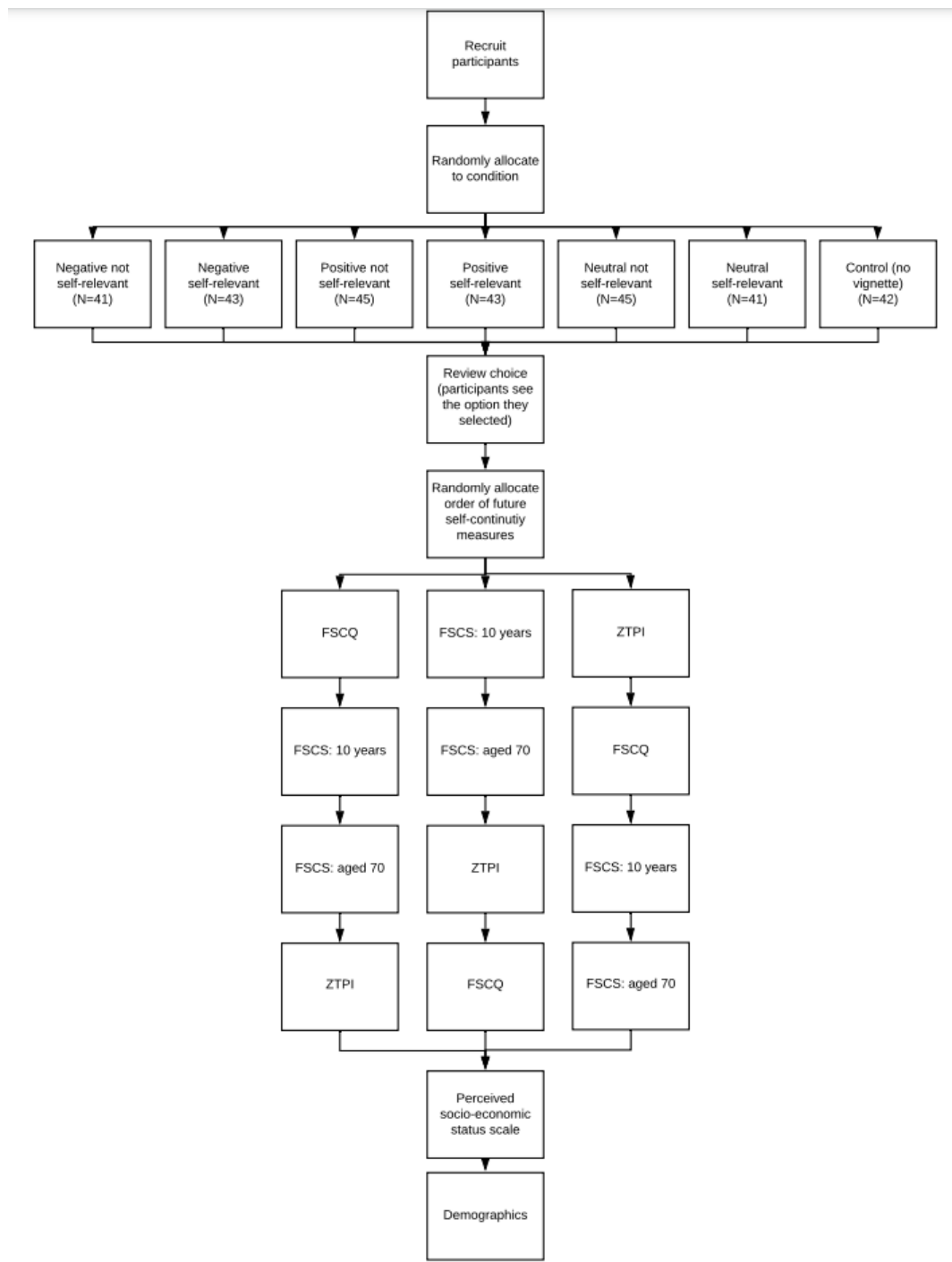


contribution and 3 percent employer contributions (akin to auto-enrolment), the third was 8 percent employee contribution and 3 percent employer contribution and the final interval was 10 percent employee contribution and 3 percent employer contribution. Participants never saw the percentage parameters and instead saw the monetary value (all contributions were calculated based on qualifying earnings)<sup>12</sup> As participants moved the

<sup>12</sup> £6,240 and £50,000 a year (2020/21).



Figure 5.2: A flow diagram of the experimental design of Chapter 5 and 5b, Wave 3 (n is from final sample)



slider along the bar to different contribution levels, the vignette (selected in the pre-test) beneath changed (see Appendix B.7).

The vignette which appeared varied depending on what condition participants were in: positive, negative or neutral vignettes and self-relevant or not self-relevant framing. There

was also a control group who saw no vignettes. In the positive and negative conditions, the emotional intensity of the vignette changed as individuals moved the slider such that when contributions were highest participants in the positive condition saw the most positive vignette (or in the negative condition, the least negative). However, if they moved the slider to the opposite end where contributions were lowest, the vignette was the least positive (or in the negative condition, the most negative). The emotional valance remained consistent in the neutral condition. Once participants had selected their contribution rate, they saw the vignette which corresponded with their selection repeated on the following page and were asked to confirm their choice (or go back and change it) before moving to the next section of the study. The amount of money they chose to contribute was the dependent variable.

### **The MacArthur Scale of Subjective Social Status**

In order to obtain a measure of participants' socioeconomic status - which may affect the response to the slider task - the MacArthur Scale of Subjective Social Status was used (Adler et al. 2000). This scale is a ladder with 10 rungs which represents the social hierarchy. Participants indicate where they feel they belong on the ladder in relation other individuals in the UK. The scale has been found to be a good indicator of education, individual and household income, perceived financial security, and employment, all of which may affect the way an individual allocates money.

### **The Future Self-Continuity Scale**

Ersner-Hershfield's and colleagues' Euler circles Future Self-Continuity Scale (FSCS) (Hershfield et al. 2009) is often used to measure future self-continuity in recent retirement studies (e.g. Hershfield et al. 2011). Using this measure, participants select a two-circle diagram which best describes how similar they feel that their present self and future self are. There are seven diagrams to choose from where the degree of overlap between the circles varies such that a greater overlap indicates a greater feeling of similarity between the present and the future self (and a greater score between 1 and 7). This measure is

currently one of the only validated methods of measuring future self-continuity and has adequate test-retest reliability and predictive validity (Hershfield et al. 2009; Hershfield et al. 2011).

In the present study, participants were asked to complete two FSCs, one imagining how similar their present self and self in 10 years' time would be, and a second on how similar their present self and their self at 70 years old would be.

### **The Future Self-Continuity Questionnaire**

The recently developed Future Self-Continuity Questionnaire (FSCQ; Hershfield 2011; Sokol et al. 2019a) is also used in the present study in order to compare it to the existing measure of future self-continuity. This measure includes 10 questions including 'do you like what your personality will be like 10 years from now?' and 'how vividly can you imagine what your family relationships will be like 10 years from now?'. All questions were answered on a 6-point Likert scale from 'not at all' (1) to 'perfectly' (6) and were reverse coded where appropriate.

### **Zimbardo's Time Perspective Inventory (ZTPI) (Wave 3 only)**

Only the future and past negative subscales of Zimbardo's Time Perspective Inventory (ZTPI) were used, comprising of a total of 23 questions. The negative past subscale was included to provide divergent validity as it should not be correlated with future self-continuity as it measures the past rather than future (Sokol et al. 2019a). It includes items such as 'even when I am enjoying the present, I am drawn back to comparisons with similar past experiences'.

The future subscale should provide convergent validity as it has been found to correlate with measures of future self-continuity (Sokol et al. 2019a). It includes items such as 'I keep working at difficult, uninteresting tasks then they will help me get ahead'. Items on both subscales were rated in terms of how characteristic an individual felt them to be of themselves on a 5-point Likert scale from 'very uncharacteristic' (1) to 'very characteristic' (5).

## 5.4 Results

Data from Wave 1 and 3 were used to examine the effect of the vignette (emotion and self-relevance) on the amount of money an individual is likely to say they will contribute to retirement. First I provide an analysis of the level of demographic balance across the groups before presenting the main analysis.

### 5.4.1 Demographic balance

A comparison of demographic characteristics across the treatment groups was conducted in order to determine whether the random allocation of participants resulted in balanced groups (Table 5.1).<sup>13</sup> Chi square analysis and a regression comparing the treatment groups to the base group of the control (seeing no vignette) suggest that all demographic variables were balanced across the treatment groups.

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<sup>13</sup>The predictors were coded such that:

Gender: 1 = Male, 2 = Female, 3 = Prefer not to say

Employment: 1 = Full-time, 2 = Part-time, 3 = Unemployed, 4 = Student/in training, 5 = Retired, 6 = Other

Marital status: 1 = Married / civil partnership, 2 = Living with partner (unmarried), 3 = Single

Education: 1 = GCSEs, 2 = A-Levels, 3 = Undergraduate 4 = Masters and above

Table 5.1: OLS regressions and Chi Square for balance checks for multiple demographic variables of the conditions in Wave 1 and 3 combined.

	Age	Gender	Employment	Education	Marital	Income stability	Socioeconomic status
Negative and not SR	0.338 (1.941)	-0.0771 (0.0845)	0.122 (0.245)	-0.173 (0.158)	-0.451 (0.384)	-0.0986 (0.178)	-0.493 (0.340)
Negative and SR	1.947 (1.908)	-0.111 (0.0835)	0.000426 (0.255)	-0.0277 (0.182)	-0.105 (0.394)	0.0648 (0.175)	-0.314 (0.296)
Positive and not SR	-1.762 (1.879)	-0.0761 (0.0828)	0.0151 (0.247)	-0.0832 (0.181)	0.393 (0.393)	0.0134 (0.176)	-0.319 (0.289)
Positive and SR	-0.324 (1.851)	-0.0588 (0.0883)	-0.0147 (0.238)	-0.206 (0.171)	-0.0147 (0.385)	-0.118 (0.175)	-0.324 (0.323)
Neutral and not SR	0.624 (1.980)	-0.0903 (0.0830)	0.000840 (0.237)	0.00252 (0.166)	0.136 (0.388)	0.0849 (0.172)	-0.376 (0.316)
Neutral and SR	1.293 (1.816)	0.00988 (0.0817)	-0.165 (0.219)	0.0435 (0.166)	-0.340 (0.383)	-0.186 (0.185)	-0.453 (0.313)
Constant	34.66*** (1.297)	1.662*** (0.0578)	1.971*** (0.179)	2.912*** (0.125)	3.235*** (0.277)	3.529*** (0.119)	5.662*** (0.220)
$\chi^2$	257.18	16.07	27.47	31.62	29.92	29.53	52.84
$N$	477	477	477	477	477	477	477

Note: Huber-White standard errors in parentheses

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

### 5.4.2 Main analysis

The regression analysis examines the impact of the different treatments on the contribution rate to a retirement account compared to the control of seeing no vignette (Table 5.2). The table reports the model for participants' contribution rate where 0 referred to no contributions, 1 for minimum automatic enrolment contributions, 5 percent for the employee, 2 for 8 percent employee contributions and finally 3 for 10 percent employee contributions (no covariates were added to the model).

Table 5.2: OLS regression of retirement contributions on self-relevance and emotional valance for Wave 1 and 3 combined

	Saving
Negative and not SR	0.226 (0.137)
Negative and SR	0.494*** (0.125)
Positive and not SR	0.00294 (0.119)
Positive and SR	-0.0735 (0.142)
Neutral and not SR	-0.0256 (0.126)
Neutral and SR	0.0880 (0.133)
Constant	1.897*** (0.0892)
<i>N</i>	477

Note: Huber-White standard errors in parentheses

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

The results suggest that seeing negative, positive and neutral vignettes framed in a none future self-relevant way made little difference to the contribution rate opted for compared to seeing no vignette at all. The same was also found for those who saw the positive and neutral future self-relevant vignettes. However, those who saw the negative and future self-relevant vignette were significantly more likely to contribute higher amounts to the hypothetical retirement plan than participants who did not see any vignette ( $p < .001$ ).

In order to determine the individual influence of future self-relevance and emotion on the contribution rate chosen, I ran the same regression again collapsing the groups across either future self-relevance (Table 5.3, Column 2) or emotion (Table 5.3, Column 2) separately. Table 5.3 (Column 1) which examines at the effect of future self-relevance, controlling for emotion, suggests that there is no significant difference between seeing a vignette which is either self-relevant or not self-relevant and seeing no vignette at all. The coefficients are however opposite in direction with the not self-relevant group contributing less than the control and the self-relevant group contributing more, albeit non-significantly.

In Table 5.3 Column 2, where the effect of emotion is examined, controlling for the influence of future self-relevance, all coefficients were positive representing an increase in saving compared to the control group of no vignette. However, only the negative condition was significantly different such that those who saw the negative vignettes contributed more to retirement than the control group ( $p < .001$ ). This also suggests that the significant effect of self-relevant negative vignettes found in Table 5.2 is largely driven by the emotional valence of the stimuli rather than its self-relevance. Moreover, when collectively interpreting the columns in Table 5.3, it may be suggested that given the variation in coefficients, the effect of emotion on contribution rates are mostly countered by the information being presented in a not self-relevant way.

### **5.4.3 Additional analysis: The role of mediators and moderators**

As was done in Hershfield et al. (2011), the mediating role of perceived income stability, socioeconomic status and future self-continuity were also explored. I first centred income stability, socioeconomic status and the three measures of future self-continuity (FSCQ and FSCS for 10 years and aged 70) and created interaction terms for each with treatment group. In line with Hershfield et al. (2011) the results suggest that neither socioeconomic status, income stability moderate, nor future self-continuity mediate the

Table 5.3: OLS regressions of retirement contributions on self-relevance (column 1) and emotion (column 2) for Wave 1 and 3 combined

	(1) Saving	(2) Saving
Not SR	-0.0190 (0.116)	
SR	0.0811 (0.119)	
Negative		0.413*** (0.117)
Positive		0.0160 (0.123)
Neutral		0.0811 (0.119)
Control	Yes	Yes
Constant	1.897*** (0.0890)	1.897*** (0.0890)
<i>N</i>	477	477

Note: Huber-White standard errors in parentheses.

Emotion was controlled for in Column 1 and self-relevance was controlled for in Column 2.

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

effect of treatment group on contribution rate ( $p < .05$ ).

## 5.5 Discussion

The aim of the present study was to explore the effect of emotional valence and future self-relevance on hypothetical contributions to retirement (when controlling for vividness of the stimuli). The findings suggest that, in general, vignettes with an emotion (positive, negative or neutral) and future self-relevance or not are no more effective at increasing retirement contribution rates than seeing no vignette at all. The exception to this was the negative future self-relevant vignette which resulted in increased contributions to the retirement pot compared to no vignette. We find no evidence that the effect is mediated by future self-continuity.

The greater efficacy of negative self-relevant vignettes than their positive equivalents runs



counter to the majority of findings that suggest positive stimuli is more effective (Liu et al. 2013; Zhang et al. 2018). However, it should be considered that, until recently, most studies used positive emotional tags as a default and negative stimuli has only started to be explored, with mixed results (Bulley et al. 2019; Calluso et al. 2019). Many of these studies look at temporal discounting rates as opposed to specific intertemporal decisions, such as retirement saving, where the delay can be considerably longer. This may therefore explain the present findings as perhaps drawing attention to the negative aspects of retirement saving, years in advance of the consequences and when an individual still has the power to change their outcome, is an effective way to encourage saving. For instance, terror management theory posits that people are threatened by negative depictions of the distant future as it is a reminder of their own mortality, the fallibility of the body and the notion that self-esteem is transitory (Martens et al. 2005). Therefore, reading the negative self-relevant vignettes may have increased the thoughts of illness and death, increasing the incentive to save with the aim of mitigating some of the anxiety about the future in a way that the negative not self-relevant and other emotional vignettes did not.

The general finding that textual primes are ineffective relative to no vignettes may also be due to the textual primes not being concrete or vivid enough. Israel et al. (2014) found that textual primes of the elderly were ineffective at influencing time preference around retirement saving. Instead, they found that images of old people, emphasising the negative consequences of ageing, were more effective. This may be because it increases the perceived importance of long-term saving through a more emotive depiction of the consequences and therefore reduces discounting by making information about ageing more salient or available to the participant (e.g. Kliger et al. 2010) in a way that the textual primes do not. It may also be that the images increase the vividness with which the future could be brought to mind making them more effective than the textual primes which rely more heavily on an individual's own ability to mentally create scenarios. In the present study, the vividness of all the vignettes was controlled for in the pre-trial step, as was the sense of pre-experiencing, meaning that the difference in findings between the different

emotions cannot necessarily be explained by a difference in the vividness of the image.<sup>14</sup>

The present study has a number of limitations which should be acknowledged when interpreting the results. First, the design of the study requires multiple levels of perspective taking which may be complex for individuals: one must imagine receiving a specific salary, in a fictional pension system (albeit one that closely resembles automatic enrolment into workplace pensions) and then, in some conditions, imagine their future self during retirement. This double layer of perspective taking may require participants to be more engaged in the task and committed to visualising in order to put themselves into this new identity and scenarios, something which is questionable when using an online platform such as Amazon M-Turk. Of course, all conditions with the exception of the control faced the same challenge and therefore it is perhaps better in this study to compare to the neutral group rather than the no vignette condition (where only one level of perspective taking is needed). Alternatively, an intervention using an individual's own financial situation (e.g. income) may make for greater ecological validity as an individual is closer to the experience of living on their income and could therefore perhaps suggest a saving rate closer to what they would choose in reality.

Second, the present study also uses hypothetical monetary decisions. While this has been found to be reflective of decisions made in real life (Dixon et al. 2013; Madden et al. 2003; Xu et al. 2018) the present study allowed participants to choose from 4 options rather than the minimum of 100 choices (1% to 100%) an individual has in the real world. Indeed, contribution rates in the present study were not congruent with known actual saving rates. In the present study, the likelihood to choose the minimum rate is greater than in the real world (Office for National Statistics 2019c). Moreover, only 9 per cent of workplace pension members contribute more than 7 per cent of their earnings to retirement (Office for National Statistics 2019b) compared to 80 per cent in the control condition of the present study. This is perhaps due to the paradox of choice and bounded rationality where having fewer options to choose from aids individuals in making better financial decisions in the present study. Indeed, people are known to use anchors as cues

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<sup>14</sup>Although the vividness task and main task had different samples.

of how much to save into their pension, perhaps because the options are overwhelming. This reduction of choice in the present study may mean that in the present study people did not necessarily read the vignettes but rather based their decision solely off the monetary value presented or chose the middle option. Efforts were made to reduce this by asking participants to confirm their choice on a second screen where the value and the vignette appeared again. Although, participants may not have read all of the vignettes, it may be argued that this is more realistic of actual retirement decisions where individuals would not necessarily read all the information prior to making a decision. However, this also means participants may not have been exposed to all emotional intensities leading them to be most affected by whichever vignette they saw first. In future studies, a continuous scale based on people's actual earnings may be more valuable in order to better understand the wide range of contribution rates individuals could opt for in the real world. It too would be beneficial to present the vignettes of varying emotional intensity on a single page, allowing a greater comparison of the costs or benefits of a certain decision.

How thinking about the future affects long-term decision making is complicated, and emotion and self-relevance may play a role in some circumstances. The present results support the notion that the mechanism is likely complex and suggests that negative self-relevant vignettes may be effective at increasing retirement saving but that emotion and self-relevance may also interact. Further research is needed to explore the mechanism by which non-personalised episodic future thinking influences real-world financial decision making in order to better understand how people can be encouraged to save more for retirement.

## 5.6 Conclusion

The study in this chapter demonstrates that there is perhaps potential in a light-touch intervention that utilises negative emotional valance and future self-relevance, if developed well. The study provides some evidence of the attenuating effect of episodic future

thinking on myopic temporal discounting (Rösch et al. 2021) and suggests that it can be done without the personalisation of stimuli. The effect is very small and therefore policy makers may want to develop this, testing if other types of negative future self-relevant stimuli can elicit a stronger response. This is also important given it is not unreasonable to think that an overly negative stimuli would have a backfiring effect and possibly decrease the likelihood of action.

In the next chapter, I look specifically at measuring what was expected to be the moderator in this study: future self-continuity. Measuring psychological experiences and processes has always been a challenge, with self-report measures often utilised for their speed and cost-efficiency (as opposed to interview or observation). However, in this chapter I used two types of future self-continuity measure and found they do not correlate well, despite supposedly measuring the same concept. I explore this in more detail in the next chapter and consider the implications of using self-report measures for psychological concepts.

## Chapter 5b

# Measuring future self-relevance for retirement saving decisions

### 5.1 Introduction

In the previous chapter, I explored the influence of a light-touch vignette based intervention on retirement saving. I took two measures of future self-continuity during this study and expected that they would yield similar within-participant responses given they measured the same concept. However, they did not correlate well and therefore, in this chapter, I present the results of a study exploring the validity of the future self-continuity scale (FSCS) and the newly developed future self-continuity questionnaire (FSCQ). The convergent and discriminant validity of each is also examined with previously tested measures. The results are then discussed in relation to their contribution to understanding the concept of future self-continuity but also a broader discussion of the challenges of measuring internal concepts. This is an important addition to this thesis given the measure of psychological concepts and attitudes is often crucial to understanding *why* people behave as they do. Their value is limited to the extent to which they can accurately measure the concept they are intended to measure.

## 5.2 Literature review

Many individuals would rather spend their money now than save it for the future, even if employer matching, tax incentives and investment returns mean it will often be worth more in the future. The phenomenon to discount the future beyond that which is rational (i.e. through uncertainty and inflation) is found in multiple domains including health (e.g. Barlow et al. 2016), addiction (e.g. Robles et al. 2011; Yi et al. 2010) and pro-environmental behaviours (Milfont et al. 2015). Some interventions have been suggested to increase retirement saving, with a focus on contextual factors as a means of overcoming biased discounting (Beshears et al. 2008; Thaler et al. 2004). One focus in recent years has been on interventions which increase the psychological connection felt between the present and the future self (Bryan et al. 2012; Hershfield et al. 2011; Marques et al. 2018). In particular, research has focused on the anchoring of time intervals to events which are personal to an individual and have found that it significantly reduces temporal discounting (Kwan et al. 2015; Sasse et al. 2015; Schacter et al. 2015). The effect is often interpreted in terms of construal level changes from abstract to concrete (Trope et al. 2000; Trope et al. 2003) giving the perception of increased temporal proximity to the future self which in turn increases the continuity between the temporally distinct selves, and results in reduced discounting of the future. Consequently, being able to reliably and validly measure the continuity between the present self and different versions of the future self is important.

Future self-continuity refers to the extent to which an individual perceives a connection between the present and future self. It is often conceptualised in terms of the similarity and interconnections between the present and future self which leads to a fluid experience of identity through time (Sedikides et al. 2018). Arguably, it is challenging to empirically measure as an individual may lack insight into their own relationship with different temporal selves; yet, its existence is frequently measured with self-report as there is no way to objectively measure the internal experience. Arguably, the measure most frequently used is the Future Self Continuity Scale (FSCS; Hershfield et al. 2009) which builds on the

Inclusion of Other in the Self Scale (Aron et al. 1992), and uses Euler circles to represent the degree of overlap between the present and the future self in terms of similarity at a specified point in time.

The visual nature of the FSCS makes it easy to grasp and its simplicity means it takes a matter of moments to complete. However, independent of its usability, the sensitivity of the measure is limited (Kamphorst et al. 2017b), and while the test-retest reliability is reasonable, the validity is low to adequate (Hershfield et al. 2009; Sokol et al. 2019a). The FSCS also includes only similarity as a dimension which may be problematic since people can see themselves as changing in certain aspects of the self while maintaining self-continuity. For instance, many people see themselves as ‘growing’ and would expect to change over time (Sokol et al. 2019b). Therefore, Sokol et al. (2019a) developed the Future Self-Continuity Questionnaire (FSCQ) which includes similarity but with the addition of vividness and positivity subscales too, which the authors propose makes it a more sensitive measure of future self-continuity. As a result of the added subscales, the FSCQ takes slightly longer to administer with 10 questions but early indications suggest it has moderate validity (Sokol et al. 2019a).

This study therefore aims to add to the literature assessing the validity of the long established and widely used FSCS, comparing it with the FSCQ, a measure which is arguably more aligned with the current understanding and conceptualisation of future self-continuity. In order to further explore the validity of the scales, the ‘Future’ and ‘Past negative’ subscales of the the Zimbardo Time Perspective Inventory (ZTPI) were also compared. While the study does not seek to claim that one measure is better than another, it does seek to highlight the challenges of measuring future self-continuity and the need to continue to validate measures on different populations. If both measures are indeed measuring future self-continuity, it is expected that:

H1: The FSCS and FSCQ will be moderately to strongly positively correlated with each other, with the similarity subscale of the FSCQ having a particularly strong positive correlation.

H2: Both the FSCS and FSCQ will correlate positively with the ‘Future’ subscale of the ZTPI.

H3: Both the FSCS and FSCQ will not correlate, or correlate negatively with the ‘Past negative’ subscale of the ZTPI.

## 5.3 Method

### 5.3.1 Participants

As an extension of Chapter 5, the original data were collected as part of that study using a combination of Amazon M-Turk<sup>15</sup> and Prolific<sup>16</sup> in three rounds.<sup>17</sup> The purpose of this study was to explore the validity of future self-continuity measures and therefore data from Wave 1, Wave 2 and Wave 3 is utilised.

In the initial data collection round, referred to as Wave 1, a total of 209 participants were recruited with 31 people being removed from the analysis as they did not complete the survey and 1 additional person removed for being under 18. In total, 177 participants were used in the present analyses and ranged in age from 18 to 65 ( $M = 33.44$ ,  $SD = 10.06$ ). The majority were male (67%) and in full-time work (62%) and had an undergraduate degree or above education (74%). Many were also currently contributing to a pension scheme (69%).

In Wave 2, a total of 100 participants were recruited with 12 removed from the analysis as they incorrectly answered at least one of the two attention questions, resulting in a final sample size of 88 people. In this sample, the majority were male (59%), in full-time work (51%) and had an undergraduate degree or above (72%). The mean age was 31.64 ( $SD = 10.62$ ) with a range from 18 to 66 years.

Finally, Wave 3 the sample consisted of 315 people and were recruited from Prolific. A

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<sup>15</sup>Wave 1 and 2

<sup>16</sup>Wave 3

<sup>17</sup>Wave 1 was collected in September 2019. Wave 2 was collected in November 2019 in order to explore the validity of the future self-continuity measures given the results of Wave 1 and Wave 3 was collected in October 2020 in order to increase the sample size of Wave 1 and Wave 2.



total of 15 people were removed for incorrectly answering at least one of the two attention questions or for failing to complete the survey. The sample ranged in age from 18 to 65 ( $M = 35.85$ ,  $SD = 11.93$ ) with a majority being female (75%), in full-time work (50%) and had a minimum of an undergraduate degree (61%). Together, when the data from all three waves are combined, the average age of the sample was 34.42 ( $SD = 11.27$ ) and between 18 and 66 years old, the majority were female (57%), in full-time work (54%) and had a minimum of an undergraduate degree (67%).

### **5.3.2 Procedure and materials**

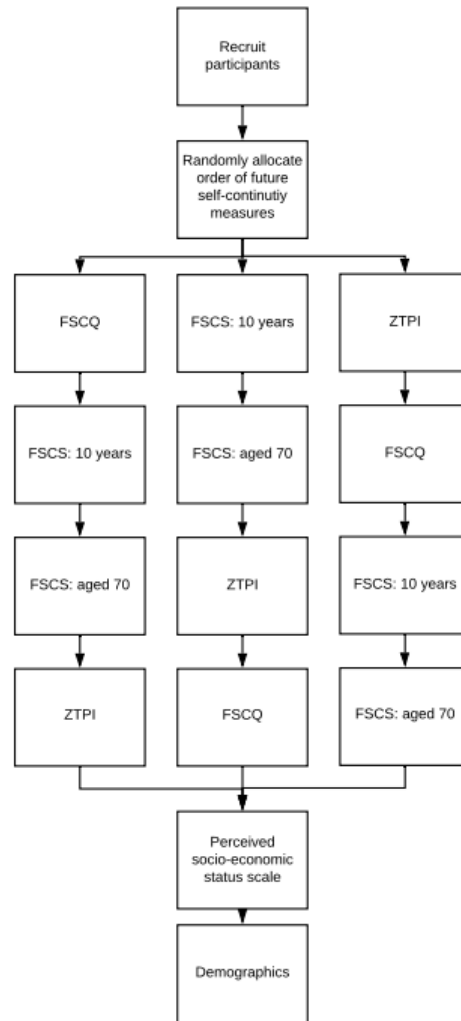
Participants in Wave 1 and Wave 3 were first shown a retirement task - a full description of which can be found in Chapter 5 - followed by a series of questionnaires (see Figure 5.1 and Figure 5.2). Participants in Wave 2 completed only the set of questionnaires on future self-continuity as outlined in Figure 5.3.

#### **The Future Self-Continuity Scale**

Ersner-Hershfield's and colleagues' Euler circles Future Self-Continuity Scale (FSCS) (Hershfield et al. 2009) is often used to measure future self-continuity in recent retirement studies (e.g. Hershfield et al. 2011). Using this measure, participants select a two-circle diagram which best describes how similar they feel that their present self and future self are. There are seven diagrams to choose from where the degree of overlap between the circles varies such that a greater overlap indicates a greater feeling of similarity between the present and the future self (and a greater score from between 1 and 7). It has previously been reported to have adequate test-retest reliability ( $r = .66$ ) and predictive validity (Hershfield et al. 2009; Hershfield et al. 2011).

In the present study, participants were asked to complete two FSCSs, one imagining how similar their present self and self in 10 years' time would be, and a second on how similar their present self and their self at 70 years old would be.

Figure 5.3: A flow diagram of the experimental design of Chapter 5b, Wave 2



### The Future Self-Continuity Questionnaire

The Hershfield et al. (2009) FSCS contains only one dimension of connectedness: similarity. However, it is thought that future self-continuity comprises of 3 factors; namely, similarity, positivity and vividness (Hershfield 2011; Sokol et al. 2019a). Therefore, I also include the recently developed Future Self-Continuity Questionnaire (FSCQ) in the present study in order to compare it to the existing measure of future self-continuity.

This measure includes 10 questions including ‘do you like what your personality will be like 10 years from now?’ and ‘how vividly can you imagine what your family relationships will be like 10 years from now?’. All questions were answered on a 6-point Likert scale from ‘not at all’ (1) to ‘perfectly’ (6) and were reverse coded where appropriate.

Previous studies have found good internal consistency with average scores of  $\alpha = .85$  for the similarity subscale,  $\alpha = .80$  for the vividness subscale, and  $\alpha = .89$  for the positive affect subscale. Across all three samples in the present study we find the internal reliability to be similar at  $\alpha = .81$ ,  $\alpha = .77$ , and  $\alpha = .82$  for similarity, vividness and positive affect respectively.

### **Zimbardo's Time Perspective Inventory (ZTPI) (Wave 2 and 3 only)**

Only the future and past negative subscales of Zimbardo's Time Perspective Inventory (ZTPI) were used, comprising of a total of 23 questions. Items on both subscales were rated in terms of how characteristic an individual felt them to be of themselves on a 5-point Likert scale from 'very uncharacteristic' (1) to 'very characteristic' (5). It has good internal consistency for both the 'Future' ( $\alpha = .75$ ) and 'Past negative' ( $\alpha = .85$ ) scales (Hershfield et al. 2009) which is consistent with the present study which finds the Cronbach's alpha to be  $\alpha = .73$  and  $\alpha = .86$  respectively.

The negative past subscale was included to provide divergent validity as it should not be correlated with future self-continuity as it measures the past (Sokol et al. 2019a). It includes items such as 'even when I am enjoying the present, I am drawn back to comparisons with similar past experiences'.

The future subscale should provide convergent validity as it has been found to correlate with measures of future self-continuity (Sokol et al. 2019a). It includes items such as 'I keep working at difficult, uninteresting tasks the they will help me get ahead'.

## **5.4 Results**

The analysis in Chapter 5b was conducted because the results of the study in Chapter 5 suggested that the correlation between the FSCS and FCSQ are not as strong as one might expect if the measure the same construct. Therefore, for transparency, I present these result of Wave 1 (from Chapter 5) separately in Section 5.4.1 before presenting the results of all the data together in Section 5.4.2.

### 5.4.1 Wave 1 analysis

In Wave 1, measures of both the FSCS and the FSCQ were taken and a Pearson's correlational analysis conducted (Table 5.4). The results suggested that there are weak correlations between the FSCQ and FSCS,  $r = .21$ ,  $p < .001$  (for 10 year FSCS) and  $r = .26$ ,  $p < .001$  (for the FSCS aged 70). This compares to Sokol et al.'s (2019) findings of  $r = .46$  ( $p < .01$ ),  $r = .52$  ( $p < .01$ ) and  $r = .53$  ( $p < .01$ ) for their respective samples.

The correlation between the similarity subscale of the FSCQ with the FSCS's was more strongly correlated with the 10 year FSCS ( $r = .21$ ,  $p < .001$ ) than vividness was ( $r = .15$ ,  $p < .05$ ) and positive valance ( $r = .11$ ,  $p > .05$ ). Given these results, it was decided that additional data should be collected and a measure of convergent and divergent validity included (in the form of the ZTPI).

Table 5.4: Pearsons correlation between FSCS (10 years and aged 70) and the FSCQ (and its subscales) in Wave 1

		FSCQ				FSCS	
		Similarity	Vivid	Positive	Total	10 years	Aged 70
FSCQ	Similarity	1.0000					
	Vivid	0.2876***	1.0000				
	Positive	0.3031***	0.5106***	1.0000			
	Total	0.7701***	0.7503***	0.7472***	1.0000		
FSCS	10 years	0.2054***	0.1470**	0.1087	0.2111***	1.0000	
	Aged 70	0.2220***	0.2273***	0.1396***	0.2640***	0.5609***	1.0000

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

### 5.4.2 Main analysis

Using kernel density plots the distribution of data were visualised for the two main measures: The FSCQ and the FSCS (10 years and aged 70). The distribution of the data appeared to be close to or approaching normal distribution.

A Pearson's correlation between FSCQ, each of its subscales, and the two measures of the FSCS was conducted (Table 5.5). It was expected that the FSCQ would correlate with the FSCSs given they are both measuring future self-continuity. However, the correlation between the FSCQ total score and the FSCS in 10 years ( $r = .30, p < .001$ ) and in 70 years ( $r = .38, p < .001$ ) are relatively weak considering they are supposedly measuring the same construct (albeit stronger than in Wave 1 only).

The FSCQ's subscale measure of similarity may be expected to be more akin to the FSCSs given the latter measure only similarity, however the correlations for these were positive but low,  $r = .29, p < .001$ , for the aged 70 scale and  $r = .28, p < .001$ , for the 10 years' scale.

The two FSCSs would also be expected to correlate reasonably well with each other given they measure an identical concept at different points in time, indeed this is moderate ( $r = .5918, p < .001$ ) and the lack of a stronger correlation arguably reflects the greater connection we feel to our near future selves compared to our distant future selves.

Similarly, there should be correlation between the subscales of the FSCQ given they measure components of the same construct. However, the correlations are weak to moderate, with the greatest relationship being between the positivity and vividness subscales ( $r = .47, p < .001$ ) and weakest between similarity and positivity ( $r = .30, p < .001$ ).

In Wave 2 and 3, two subscales of ZTPI were also measured and compared to the FSCSs and FSCQ. The future subscale correlated significantly and positively with the FSCS for 10 years into the future however the correlation is very weak ( $r = .11, p < .01$ ). It also did not correlate with the total score on the FSCQ or FSCS for age 70 suggesting there is no convergent validity between the measures.

The past negative subscale measures a retrospective view of the self rather than a prospective view and therefore it is expected to be negatively correlated with FSCSs and FSCQ (or not correlated at all). The correlations are weak with the FSCQ total score significantly and negatively correlated ( $r = -.14, p < .01$ ) to the past negative subscale. This is driven largely, as may be expected, by a negative correlation between the past negative subscale and the future positive FSCQ subscale. The past negative subscale also significantly negatively correlates with the FSCS in 10 years ( $r = -.26, p < .001$ ) and aged 70 ( $r = -.20, p < .001$ ).

Table 5.5: Pearsons correlation between FSCS (10 years and aged 70) and the FSCQ (and its subscales) in all three waves.

		FSCQ				FSCS		ZTPI	
		Similarity	Vivid	Positive	Total	10 years	Aged 70	Past negative	Future
FSCQ	Similarity	1.0000							
	Vivid	0.3044***	1.0000						
	Positive	0.2983***	0.4668***	1.0000					
	Total	0.7947***	0.7359***	0.7158***	1.0000				
FSCS	10 years	0.2803***	0.1869***	0.1926***	0.3023***	1.0000			
	Aged 70	0.2865***	0.3520***	0.2187***	0.3804***	0.5918***	1.0000		
ZTPI	Past negative	-0.0720	-0.0667	-0.2203***	-0.1437**	-0.2635***	-0.1952***	1.0000	
	Future	0.0515	0.0529	0.0962	0.0834	0.1116*	0.0404	0.0065	1.0000

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$



## 5.5 Discussion

The ability to accurately measure cognitive abilities has long been debated in psychology and the present study examines this in relation to future self continuity. The theory of future self continuity posits that the degree of self-perceived connection between present and future selves is an important marker for many intertemporal behavioural decisions (like retirement saving) as well as the severity of some psychopathology (e.g. anxiety, depression and hopelessness). To date, the FSCS has been the primary means of assessing future self-continuity, and in the present analysis, this was compared to the more recently developed FSCQ which includes three subscales to align with the current theoretical conceptualisation of future self continuity. If measuring the same construct (future self continuity) it was expected that these measures would correlate well together.

The results of the present study suggest that while the FSCS and FSCQ are supposedly measuring the same construct they correlate positively but weakly. In particular, it was expected that the similarity subscale of the FSCQ and the FSCS would correlate strongly given this is the only dimension of continuity that is measured in the latter however this was not the case. There was some evidence of discriminant validity when comparing the measures to the ‘Past Negative’ subscale of the ZPTI, although no evidence of convergent validity from the ‘Future’ subscale of the ZPTI despite it and the future self continuity measures being directed towards the future.

Our results suggest that the two measures of future self continuity are not necessarily measuring either the same construct; or, same parts of a broader construct. It is possible, although unlikely, that the sample can explain the divergence in findings from previous tests of validity (Sokol et al. 2019a). For example, the FSCQ was designed to allow for different relationships in different contexts depending on the population used. For example, in the case of depression, one may expect a lower score on the positivity subscale due to a negative present-to-future narrative when perceiving ones own self-worth (Sadeh et al. 2012). While we did not ask participants health questions, the sample was not taken from a clinical population and therefore this almost certainly does not explain the

difference. In fact, the present study was recruited for using online platforms in a similar way to the previous studies assessing the validity of the measures.

Another possibility for the weak relationships is that the simplicity of the FSCS which, while advantageous in terms of attention and understanding, may lack precision, as one must decide between just seven overlapping circles (none of which overlap completely). The definition of ‘similarity’ is also left open to interpretation (although some studies do explicitly define similarity in regards to likes, interests, values and ideals, see Bartels et al. 2010). In order to address this, a dynamic version of the FSCS has been developed, allowing for a continuous measure of similarity which also allows for distance between the circles as well as complete overlap (Kamphorst et al. 2017a). Despite this, to my knowledge, it has not been validated, and so while it may increase precision, it is unclear if it is a better measure than the 7-point scale of the FSCS.

While the evidence presented in this study alone is insufficient to determine whether the FSCS is a valid measure of future self-continuity, it does extend our knowledge of the concept of future self-continuity and its apparent complexity. This was of course a small study with limited scope and future research may wish to explore the validity of such measures in specific contexts and distances from the present self. Ultimately, establishing a valid measure of future self-continuity is important for the continued exploration and discussion of the effect of this construct on both clinical and behavioural outcomes.

## 5.6 Conclusion

The results of Chapter 5b suggest that more consideration of the measurement of future self-continuity is needed in order to ensure that it accurately measures the concept. This raises a broader question of the challenge of including internal constructs when trying to understand what moderates behaviour. If done well, it can be a valuable tool in targeting interventions; however, when it cannot be done accurately it has the potential to mislead the interpretation of research and possibly (negatively) affect the interventions suggested.

In the next chapter, I move away from the imagining of the future self and towards the

affect of past decisions and retrospective thinking on retirement saving decisions. In Chapter 6 I explore the concept of inaction inertia on retirement saving decisions in the UK context where automatic enrolment dominates.

# Chapter 6

## Stuck in the past? Inaction inertia and the role of action-state orientation, time perspective, regulatory mode and regret in the UK retirement saving context

### 6.1 Introduction

Until this point, the previous empirical chapters have included interventions that aim to reduce present bias by vividly imagining the personal future. In this chapter, the focus on temporal perspective remains but with a shift towards the impact of past decisions on present choices. As our past choices can affect the decisions we make in retirement (e.g. Krijnen et al. 2020), a light-touch intervention that uses a letter which minimise the impact of this retrospective thinking and regret may be beneficial for improving retirement contributions.

In this chapter, the concept of inaction inertia - the inaction on a good opportunity

that results from missing a previous, even better, opportunity - is explored in relation to automatic enrolment. Two experiments are run to explore inaction inertia in the UK retirement system along with interventions based in prospective thinking, action orientation and regulatory mode.

## 6.2 Literature review

Many people do not take advantage of the opportunity to save early for retirement, effectively missing out on ‘free’ money through employer matches, tax relief and compound interest. In the UK, prior to the introduction of automatic enrolment,<sup>1</sup> only 8.2 million people were estimated to have an occupational pension (2011). While this has since increased drastically to 17.3 million people (2018) thanks to policy changes (Office for National Statistics 2019c), the proportion of income saved remains low with 75 percent of people contributing 5 percent or less (Office for National Statistics 2021). This level is too low for many people to have a comfortable retirement (Office for National Statistics 2021). Greater understanding is therefore needed as to why people under save, so solutions can be developed to encourage greater engagement with pensions and more optimal long-term saving decisions.

In order to do this, we must first better understand the reasons why people forgo financially attractive retirement saving opportunities (from tax incentives and compound interest). It is of course true that the full attractiveness of starting to save early is not well understood by many individuals; when estimating the impact of compound interest on savings many people lack insight into exponential growth and therefore grossly underestimate the value of starting to save early. McKenzie et al. (2011a) found that even when students were given a calculator to estimate the effect of compound interest over four different time periods, they did not differ in their median response compared to a group that could not use a calculator. If an individual makes a deposit of \$400 per month

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<sup>1</sup>Automatic enrolment was introduced in 2012 (as part of the Pension Act 2008) and requires all employers to enrol employees aged between 22 and state pension age, earning more than £10,000 a year, normally working in the UK and not already be part of a qualifying scheme into a workplace pension scheme.

and there is a 10% annual return rate, participants' median response in both groups of the study is 10% of what it should have been, representing an underestimation to the value of \$2.2 million over the course of 40 years.

While highlighting the exponential growth of saving can improve the motivation to save (McKenzie et al. 2011a), such attempts can also serve to remind employees of the opportunities to save in the past that they have already missed. This highlighting of the missed opportunity may be a contributing factor that decreases the motivation to save - a phenomenon known as inaction inertia (Tykocinski et al. 1995). Commonly studied in the consumer literature, inaction inertia is the tendency for information about the attractiveness of a missed opportunity to affect future decisions about that product or service, resulting in a reluctance to take up subsequent, less attractive, but worthwhile opportunities (e.g., Arkes et al. 2002; Tykocinski et al. 1998b; Tykocinski et al. 1995; Zeelenberg et al. 2006). For instance, those told that they had missed an attractive fixed annual return rate of 9 percent on their (fictional) investments were less likely to take the current offer of a 3 percent fixed annual return than those told they had missed a 4 percent return (Krijnen et al. 2020). This presence of inaction inertia for large differences is seen across domains including: monetary misses (Krijnen et al. 2020), consumer products (Zeelenberg and van Putten 2005), investment decisions (Tykocinski et al. 2004) and international negotiations (Terris et al. 2016).

More recently, retirement saving has also been studied as a possible context for inaction inertia with potentially considerable implications (Krijnen et al. 2020). This is because people frequently miss attractive opportunities to start saving (or saving more) when they are younger and when compound interest means the cost of saving a retirement pot of a given size is less. As with all investment products, the saving opportunity can also change over time due to fluctuations in the investment markets, as well as changes in an individual's employment situation and the public policy context (e.g. incentive reduction). However, although such abrupt changes are often studied — a discount that is discontinued, an investment that falls in value, a policy that changes — in retirement saving the primary change is often more subtle for the consumer. This is because month-

on-month compound interest makes it marginally more expensive to save the same final pot size (all else equal), yet this change in opportunity is often less obvious when viewed monthly (than over the course of years or decades) and can therefore be underestimated by individuals (Krijnen et al. 2020).

In a series of studies examining inaction inertia in retirement saving for the first time, Krijnen et al. (2020) demonstrated that inaction inertia is induced by both retrospective returns and contributions. In one experiment, Krijnen and colleagues tested whether participants would be less likely to enroll in a retirement plan when reminded of how much (less) it would have cost in the distant past (ten years) compared to the recent past (one year).<sup>2</sup> They found those in the distant past condition were less likely to enroll than those in the proximal past. This was driven, at least in part, by an underestimation of how savings become less attractive over time delays. Similar underestimations are seen with other products (e.g. ski passes) and have been explained by devaluation — if the product was so heavily discounted before then it must actually have a lower value. However, in the case of retirement saving this is arguably more accurately explained through an underestimation of exponential changes, as demonstrated by Krijnen et al. (2020), in combination with the retrospective nature of the missed opportunity.<sup>3</sup>

Krijnen et al. 2020<sup>4</sup> suggested that inaction inertia only occurs in retrospective framing and not when the same loss is projected forward (and implicitly indicates the ‘miss’ of the past). They asked participants to read a focal opportunity where they had the opportunity to enrol into a retirement scheme at the cost in contributions of \$500 every month. Participants were randomly assigned to see either a large (10 years) or small (1 year) difference and the opportunity was framed either into the past or the future. In the past condition they were told how much it would have cost them if they enrolled at the previous time point (1 year or 10 years) and the future framed condition were told how much it would cost them if they delayed their decision into the future (either by 1 year or 10 years). The results demonstrated that, in line with an inaction inertia explanation,

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<sup>2</sup>Experiment 2.

<sup>3</sup>Experiment 3.

<sup>4</sup>Experiment 4

those who had the large retrospective delay (10 year) were significantly less likely to enrol in the retirement scheme. However, when this delay was framed into the future, the inaction inertia disappears. This suggests that it is not the exponential worsening of opportunities itself which results in inaction inertia but rather the past framing of this.<sup>5</sup>

In the UK, the introduction of automatic enrolment in 2012 has led to a substantial change in saving for retirement with coverage increasing from 55 percent to 87 percent for those with workplace pensions in the private sector (Department for Work and Pensions 2020a). Therefore, as the level of pension enrolment at the default minimum contribution is high amongst private sector workers, the missed opportunity is not a complete lack of saving but rather the missed opportunity to save *more* (and sufficiently) for retirement. The decision has moved from not saving at all (a complete miss) before automatic enrolment to not saving enough for an ‘adequate’ retirement (partial miss) in the present. This may have an impact on the extent to which inaction inertia is experienced. Given many individuals in the UK are already saving, it is possible that automatic enrolment provides a buffer against the feeling of loss and negative emotion of regret which are thought to be present when deciding whether to increase contributions. Therefore, it is interesting to examine whether this context does indeed provide a safeguard against inaction inertia.

The representation of the “emotional consumer” who is more concerned with avoiding pangs of regret than making an economically optimal decision has been widely considered in the consumer literature, although not in retirement saving. Two types of regret are typically studied: anticipatory and experienced regret with the empirical and conceptual difference often not clear.<sup>6</sup> Anticipated regret refers to the regret an individual expects to experience if they take the focal opportunity; “one might expect to feel like a ‘sucker’ if one bought a product that now costs a lot more than it did a short time ago” (Arkes et al. 2002, p. 378) and avoiding the second purchase opportunity (Tykocinski et al. 1998a), or choosing a different brand (Tsiros 2009), eliminates the possible regret that

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<sup>5</sup>Experiment 5.

<sup>6</sup>Tykocinski et al. (1998a) has previously stated that they cannot distinguish “which of these processes, escape or avoidance, motivates inaction inertia” (p. 615) when discussing their results.



would accompany it.<sup>7</sup>

However, this type of regret is not included in this trial and instead we include the possibility that an individual actually *experiences* the regret of the missed opportunity and seeks to avoid an exacerbation of the current feeling rather than evasion of anticipatory regret. This is because findings by Arkes et al. (2002)<sup>8</sup> cast doubt on anticipatory regret as the primary regret mechanism.<sup>9</sup> Regret is a negative comparison-based emotion characterised by feelings of sadness, repentance or disappointment and is generally considered unpleasant. According to Kahneman et al. (1982), people are most likely to experience regret when one believes that the negative outcome could have been easily avoided. In the case of missing a discount (Tykocinski et al. 1995), the opportunity to live closer to work (Zeelenberg et al. 2006), or a missed job opportunity (Foster et al. 2017), the counterfactual where the negative outcome is avoided can be brought to mind with relative ease, intensifying the feeling of regret at not having acted sooner to change the outcome. Indeed, this is perhaps why a desirable offer missed by a day is more regrettable than one missed by 5 days (Tykocinski et al. 2001),<sup>10</sup> because it is so much easier to imagine having gone to the shop a day earlier than 5 days earlier. The influence of such experienced regret on retirement saving decisions has not previously been studied and therefore this study will examine whether it can provide an explanation of inaction inertia. The miss is far less overt than in other inaction inertia paradigms and so the effect may be attenuated by the context.

Frequently examined alongside regret is the valuation of the initial opportunity (given it is likely to impact the experienced regret). If an individual misses the opportunity to

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<sup>7</sup>In an example of this, Tykocinski et al. (1998a) (Experiment 2, see also Experiment 1) asked students how likely they were to take up an opportunity to rent a flat 12 minutes away from their university campus, when previously told they missed an opportunity to live 2 minutes (large difference) or 10 minutes (small difference) away from campus. In order to manipulate regret, half of participants were also told that if they took the focal opportunity, they would pass the attractive but missed flat on their way to university – serving as a constant reminder of what could have been. For these individuals, inaction inertia was more common, supporting the notion that regret avoidance may be key to understanding why people forgo subsequent opportunities.

<sup>8</sup>Experiment 2.

<sup>9</sup>This study was conducted with only 12 participants per group and was examined more recently in a series of conceptual replications (of Arkes et al. (2002), Butler et al. (2000), and Tykocinski et al. (1998a)) using slightly larger samples by Zeelenberg et al. (2006).

<sup>10</sup>Experiment 1.

purchase a ski pass at a heavy discount, then they may experience cognitive dissonance: “I love skiing but I didn’t purchase the ski pass when it was on offer”. One can infer that through their own lack of action on the first opportunity that they may actually have a lack of personal interest (self-perception theory) and denigrate the first item to reduce the uncomfortable feeling from the dissonance: “I don’t like skiing in that resort so I didn’t mind missing the offer”. As a result, people may not be motivated to act on subsequent opportunities and choose not to purchase the pass, in this instance, because of this. This dissonance explanation was examined by Tykocinski et al. (1995) who varied the reason for missing the initial opportunity to either individuals’ own negligence or an existing family vacation during the time of the offer which stopped them being able to act on the initial offer. It was expected that the personally responsible group would experience cognitive dissonance (see Cooper et al. 1984) and experience inaction inertia but not those who missed the opportunity through no fault of their own. Contrary to this, personal responsibility did not affect the magnitude of the inaction inertia effect. Instead, the perceived attractiveness of the outcome was suggested as a more promising theoretical explanation (see Tykocinski et al. (1995)).<sup>11</sup>

Based on the logic that a product offered as a bargain is seen as less valuable (Forehand 2000), Arkes et al. (2002)<sup>12</sup> posited that the price of the missed opportunity may be used to judge the value and attractiveness of the subsequent opportunity. Using Tykocinski et al.’s 1995 ski pass scenario, an offer of \$10 discount on an \$100 pass was made having previously missed the opportunity to buy it at \$40 or \$80. In addition to the likelihood to buy the pass at its current \$90 price tag, participants were also asked about their level of regret and the highest amount they were willing to pay for the pass now. The behavioural intentions were in line with inaction inertia and regret was greatest for those who saw the large (as opposed to small difference); however, participants who missed the opportunity to purchase at \$40 were only willing, on average, to pay only \$84.05 for the pass compared to \$96.97 for those who missed the opportunity at \$80. People therefore think the pass is too expensive in the former condition, valuing it lower. Using mediation analyses, the

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<sup>11</sup>Experiment 6.

<sup>12</sup>Experiment 3.

results suggested that the attractiveness of the offer and likelihood to take it up reduced to non-significance when regret and valuation were entered into the model separately and reduced it to zero when entered together. This suggests that both regret and valuation are important predictors of inaction inertia, particularly when enacted together. In the present study we include a valuation of the attractiveness of the missed opportunity.

In the remainder of this chapter, I discuss two experiments that provide an insight into the influence of an automatic enrolment context on retirement saving as well as the influence of regret and the perception of attractiveness on the decisions made. This allows for a greater understanding of the situations in which inaction inertia may influence retirement saving decisions. In the first experiment, the effect of prospective versus retrospective framing is explored where an individual experiences a partial miss (as in the case of UK automatic enrolment where individuals are saving something but not enough to maintain their standard of living in retirement). It is expected that:

H1: Those who see the retrospective framing will be less likely to take the second opportunity than those in the prospective conditions.

We also include a control condition in the current study where no miss is presented to participants to examine what the ‘default’ behaviour is when no reference to the loss is made. It is expected that those in the control group will behave similarly to those in the retrospective condition and be less likely to stake up the subsequent opportunity than those in the prospective condition.

H2: It is expected that those with higher scores of experienced regret will take up the subsequent opportunity at lower rates than those with lower scores of regret.

H3: The attractiveness of the missed opportunity will be associated with the likelihood to act, with those who perceive the first opportunity as more attractive more likely to take up the subsequent opportunity.

In our first experiment, we also examine the effect of action-state orientation for the first

time in the retirement domain of inaction inertia. People are often motivated to avoid the feeling of loss, however they differ in how they deal with past missed opportunities (losses). Those who are state orientated are said to dwell to a greater extent on what could have been, unable to let go of the past. Other, action orientated individuals, get over failures with relative ease to focus on the present. It is thought that those who are more action orientated are less inhibited by the missed opportunity when making decisions in the present than those who are state orientated (Kuhl 1981; van Putten et al. 2009). This is because, those who are action orientated tend to get over negative events quickly, focusing on how they can solve a situation. At the other end of the spectrum are state orientated people who ruminate on the past and how it makes them feel in the present, taking possible emotional states from the past and future and comparing them to the one currently experienced. These individuals are more influenced by the missed opportunity when deciding whether to take action on a present opportunity and are accordingly less likely to take it up. While we all have a disposition toward one of these orientations, mindset induction can also be used to direct an individual toward a particular end of the scale when making a decision (Van Putten et al. 2009) suggesting it may hold promise as an intervention.

Van Putten et al. (2009)<sup>13</sup> asked participants to decide whether to book onto a trip to Rome. Half of participants learned that they had missed the opportunity to book the trip for €100 (large difference); the other half missed the opportunity to purchase it at €165 (small difference) compared to the current offer of €170 price. Those who were state orientated were more influenced by the attractiveness of the missed opportunity, exhibiting inaction inertia in the large difference condition. On the contrary, those high in action orientation exhibited no inaction inertia compared to the small difference condition suggesting action orientation is an important factor on the likelihood to take up the subsequent opportunity. This was found even when individuals in both orientations feel similarly bad about having missed the previous opportunity.<sup>14</sup> The perceived attractiveness of the missed opportunity did moderate the decision with action orientated

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<sup>13</sup>Experiment 2.

<sup>14</sup>See Experiment 1.

individuals relying on the missed opportunity less when determining the value the present opportunity, resulting in weaker inaction inertia effects than those in the state orientated condition.<sup>15</sup> It may therefore be determined that the capacity to regulate earlier missed opportunities is crucial in consumer decision making, as it may affect the extent to which subsequent opportunities are considered or not (e.g. Jostmann and Koole, 2007; Jostmann et al., 2005; Koole and Jostman, 2004).

H4: Those with mindset induced action orientation will be more likely to act on the subsequent opportunity than both the control group and those who are induced to have a state orientated mindset.

## 6.3 Experiment 1

### 6.3.1 Method

#### Participants

A total of 562 participants from Prolific<sup>16</sup> based in the UK completed the survey on Qualtrics. Participants were eligible for the study if they were between 35 and 55 years old and were removed from the analysis if outside this group (4 participants). This age group was chosen in order to make it easier for them to realistically imagine ten years into the past or future in regards to saving for retirement (i.e. they were of working age ten years in the past/future). Only participants who completed the entire survey and correctly answered the attention check were included in the analysis, resulting in a final sample of 548 participants of which 65% were female and 59% had an undergraduate degree. The average age was 43 years with a standard deviation of 5.8 years. The majority of participants had some form of pension saving already (66%).

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<sup>15</sup>These findings were later replicated with mind-set induced orientation where half of participants wrote down how to improve their situation (action orientation), and the other half wrote down how they felt about the situation (state orientation) (Experiment 1).

<sup>16</sup>An online research participant pool.

Table 6.1: Number of participants in each treatment condition in Experiment 1.

	Control	Retrospective	Prospective
<b>Control</b>	63	54	67
<b>Action orientated</b>	62	56	54
<b>State orientated</b>	58	72	62

## Design and measures

Participants were randomly assigned to one of nine groups in a 3 (control, retrospective, prospective) x 3 (control, action orientated, state orientated) between-subjects design (see Table 6.1). Each group had between 9.85% and 11.5% of the sample with the difference due to the removal of those who got the attention question wrong or who were assigned a condition but withdrew their data prior to submitting their responses.

All participants first read about a missed opportunity asking them to consider increasing their contributions from a minimum level (£200) to a higher level which would afford a more comfortable retirement (£250). The message was in the form of a letter and included a summary of the figures presented and information on how the living ‘comfortably’ in retirement figure was reached (see Appendix C.1). The statement read:

*“Imagine that ten years ago, you enrolled in Company A’s retirement saving plan. At the time you received the following letter which said:*

*Welcome to the Retirement Master Trust Pension Scheme. You have been enrolled at the minimum contribution level of £200 per month. If you choose to increase your contribution and pay an extra £50 per month on top of the minimum (£250 in total) you will be able to live comfortably in retirement.*

*You forget about the letter and remain at the minimum.”*

In order to ensure that participants had carefully read, and understood, the scenario, they were next asked: “Thinking about the previous letter, how much was the optional additional contribution?”. The correct answer was £50 and although participants could continue with the survey regardless of their answer, those who answered incorrectly were removed from the analysis ( $N = 20$ ).

On the following page, participants were all told that they had considered increasing their contributions over the last ten years but had never gotten around to doing it. They were then told they had received a letter this month about increasing their contributions. The letter seen differed depending on whether participants were randomly assigned the control (see Appendix C.2, retrospective (see Appendix C.4 or prospective (see Appendix C.3 condition (see Table 6.2). The figures used were based on the large difference conditions from Krijnen et al. (2020). There was only a ‘large’ (ten year) difference condition. This is similar to the strategy taken by researchers such as Kumar (2004) who similarly included only a large difference condition compared to a control group rather than a large difference compared to a small difference.

Table 6.2: Messages seen by participants in the control, retrospective and prospective conditions in Experiment 1.

Control	Retrospective	Prospective
“You have been a member of the pension scheme for ten years and are currently contributing to your pension at the minimum level of £200 per month. If you choose to increase your contribution and pay an extra £215 per month on top of the minimum (£415 in total) you will be able to live comfortably in retirement.”	“You have been a member of the pension scheme for ten years and are currently contributing to your pension at the minimum level of £200 per month. If you had increased your contributions ten years ago you would have needed to pay an extra £50 per month on top of the minimum to live comfortably in retirement (£250 in total). Now, if you choose to increase your contribution you will need to pay an extra £215 per month on top of the minimum (£415 in total) to be able to achieve the same wealth and live comfortably in retirement.”	“You have been a member of the pension scheme for ten years and are currently contributing to your pension at the minimum level of £200 per month. If you choose to increase your contribution and pay an extra £215 per month on top of the minimum (£415 in total) you will be able to live comfortably in retirement. If you delay this increase for another ten years, you will need to pay an extra £510 on top of the minimum (£710 in total) to achieve the same retirement wealth and live comfortably in retirement.”

Next, participants were randomly assigned to see the control, action-orientated, or state-orientated message. In the control condition participants were simply asked to skip to the next page. In the action-orientated participants were asked: “With the previous

scenario in mind, make a list of 3 things which you could do to improve your retirement saving situation” and in the state-orientated condition participants were asked: “With the previous scenario in mind, describe how contributing to retirement makes you feel.” In both conditions the statements were accompanied by a free-text box.

The outcome variable was based on the measure used by Krijnen et al. (2020), and asked participants: ‘Given that you would now need to put in £215 per month extra (total £415) to live comfortably in retirement, how likely is it that you would make the optional additional contribution this month?’. Participants responded on a 7-point rating scale from ‘extremely unlikely’ (1) to ‘extremely likely’ (7).

Finally, participants were asked ‘How attractive do you think the retirement saving offer from ten years ago was?’ on an 11-point scale from ‘extremely unattractive’ (0) to ‘extremely attractive’ (10) and ‘How much do you regret having missed the saving opportunity from ten years ago?’ on an 11-point scale with the endpoints marked ‘no regret’ (0) to ‘very much regret’ (10) (based on scales by Zeelenberg et al. 2006). Measures of age, gender, education level and having a pension scheme were also taken.

### **6.3.2 Results**

#### **Balance checks**

First a series of balance checks were conducted to ensure that the demographic composition of each condition was comparable, this was done using OLS regression (see Table 6.3). All demographic characteristics measured (age, gender, education, and having a pension account) were similar across the conditions compared to the control ( $ps > .05$ ). This was further confirmed with a Chi-square test ( $ps > .05$ ).

#### **Main analysis**

The data were analysed using OLS linear regressions and presented in Table 6.4, with the outcome of inaction inertia (score from 1 to 7 with lower scores indicating greater inaction inertia) regressed on the independent variables (for mean scores see Appendix C.1). In



Table 6.3: OLS regressions and Chi Square for balance checks for multiple demographic variables of the conditions in Experiment 1.

	Age	Gender	Education	Pension
Control and Action	0.171 (1.002)	0.0266 (0.0968)	0.201 (0.182)	-0.0279 (0.0787)
Control and State	-1.724 (1.020)	-0.116 (0.0896)	0.245 (0.173)	0.161 (0.0899)
Retrospective and Control	-0.399 (0.994)	0.127 (0.0832)	0.138 (0.181)	0.0265 (0.0843)
Retrospective and Action	1.665 (1.038)	0.0813 (0.0850)	0.0972 (0.182)	0.0337 (0.0838)
Retrospective and State	0.827 (1.024)	-0.109 (0.0847)	0.216 (0.168)	0.133 (0.0811)
Prospective and Control	-0.200 (1.011)	0.0805 (0.0815)	-0.0742 (0.192)	0.0884 (0.0817)
Prospective and Action	-0.270 (1.095)	-0.00265 (0.0892)	-0.0291 (0.195)	0.138 (0.0879)
Prospective and State	0.0742 (1.043)	0.0428 (0.0846)	0.0402 (0.182)	0.101 (0.0868)
Constant	42.60*** (0.709)	1.651*** (0.0606)	3.492*** (0.126)	1.270*** (0.0564)
Chi square	184.291 (.092)	31.2311 (.147)	35.8281 (.293)	15.5106 (.488)
<i>N</i>	548	548	547	548

Huber-White standard errors in parentheses.

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

Column 1, each of the groups are included in the model with the control group (those that saw no reference to the miss and did not see action-state orientated messages) as the baseline. Here, only those that saw the retrospective condition followed by the control (i.e. not action or stat orientated message) exhibited greater inaction inertia than those that saw both controls ( $p > .05$ ). This held true even when accounting for age, gender, education and having a pension account (Column 4).

In Column 2 the temporal orientation is considered regardless of which action-state orientated/control message was seen and in Column 3 the action-state orientation is considered regardless of the temporal orientation. When considered individually, neither the temporal framing of the message (prospective versus retrospective) nor the orientation (action versus state) resulted in a significantly different likelihood to increase contributions than the control conditions (see Column 2 and 3 respectively). Including age and education in the models resulted in lower levels of inaction inertia ( $ps > .05$ ) although this had little impact on the coefficients of the treatment groups (see Column 5 and 6). Gender was also significant ( $ps > .05$ ) but negative such that males exhibited lower propensity to save than females. Interestingly, whether or not an individual had a pension scheme in the real world did not affect the propensity to save.

### **Further analysis**

Regret and attractiveness were moderately correlated ( $r = .48$ ,  $p < .001$ ) such that as attractiveness of the opportunity increases, so too does regret at having missed it. The correlation between regret and inaction inertia ( $r = .19$ ,  $p < .001$ ) and attractiveness and inaction inertia ( $r = .15$ ,  $p < .001$ ) are also weak but positive suggesting that both have very little impact on inaction inertia scores in this study.

We also ran the same regression models with regret and attractiveness as the dependent variable instead of inaction inertia. In the regret models (where lower scores indicate lower regret), there was no significant difference in regret scores between the treatment conditions and control (see Appendix C.2). Similarly, the attractiveness of the perceived missed opportunity (where lower score indicates lower perceived attractiveness) did not

Table 6.4: OLS regression of treatment group on inaction inertia also controlling for the influence of demographic factors.

	1	2	3	4	5	6
Control	-0.241			-0.311		
and Action	(0.317)			(0.300)		
Control	0.245			0.202		
and state	(0.337)			(0.320)		
Retrospective	-0.585*			-0.566*		
and Control	(0.284)			(0.278)		
Retrospective	0.202			0.149		
and Action	(0.333)			(0.333)		
Retrospective	-0.242			-0.378		
and State	(0.297)			(0.292)		
Prospective	0.370			0.446		
and Control	(0.320)			(0.302)		
Prospective	0.397			0.430		
and Action	(0.341)			(0.324)		
Prospective	-0.0154			-0.00366		
and State	(0.324)			(0.328)		
Retrospective		-0.203			-0.229	
		(0.184)			(0.179)	
Prospective		0.251			0.331	
		(0.196)			(0.187)	
Action			0.140			0.0779
			(0.192)			(0.186)
State			0.0152			-0.0814
			(0.185)			(0.183)
Age				0.0331*	0.0335*	0.0306*
				(0.0132)	(0.0132)	(0.0133)
Gender				-0.412**	-0.422**	-0.420**
				(0.149)	(0.149)	(0.152)
Education				0.360***	0.355***	0.341***
				(0.0782)	(0.0790)	(0.0801)
Pension				-0.109	-0.0926	-0.0706
				(0.162)	(0.162)	(0.163)
Controls	No	No	No	Yes	Yes	Yes
Constant	3.048***	3.044***	3.011***	1.199	1.152	1.333
	(0.218)	(0.136)	(0.128)	(0.758)	(0.751)	(0.759)
<i>N</i>	548	548	548	547	547	547

Huber-White standard errors in parentheses.

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

The reduced  $N$  when the controls are added is due to one person not providing their education.

differ by condition (see Appendix C.3).

### 6.3.3 Experiment 1: Discussion

Experiment 1 examined the influence of prospective and retrospective messaging on inaction inertia as well as the influence of perceived attractiveness and regret on the decision when the ‘miss’ was partial rather than complete, as in the UK context. The use of action-state orientated mindsets and prospective and retrospective framing were also examined to explore their influence on reducing any inaction inertia effect.

The results of this research paint a somewhat complex picture of inaction inertia when viewed with other research in this domain. First, our findings suggest that inaction inertia is greater in retrospective messages compared to the control and prospective messages when participants do not go on to see either a state or action orientated message. This is weakly in line with Krijnen et al.’s (2020) finding that inaction inertia exists in retirement, albeit the size of the effect we detect is smaller, presumably because the missed opportunity is only partial due to the automatic enrolment scenario presented.

The result suggests that the addition of either a state or action orientated thinking can be used to reduce inaction inertia. Previous evidence has posited that the capacity to regulate earlier missed opportunities is often crucial in consumer decision making, as it may affect the extent to which subsequent opportunities are considered or not (e.g. Jostmann et al. 2007). While action orientation is thought to decrease inaction inertia, state orientation is thought to have no impact, or perhaps increase, levels of inaction inertia (van Putten et al. 2009). While one may argue that the results are indicative of a deep processing (as opposed to shallow processing) explanation (i.e. *both* manipulations require more thought),<sup>17</sup> the extant literature typically finds deep processing to be associated with greater regret (Tykocinski et al. 2004; Tykocinski et al. 1998b), a finding not supported in the present results.<sup>1819</sup> However, it is also possible that it simply causes

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<sup>17</sup>Zeelenberg et al. (2006) tested this notion and found that those asked to think deeply about their decision to take up a subsequent holiday opportunity were more likely to do so than shallow thinkers.

<sup>18</sup>See also Tykocinski et al. (1995)(Experiment 4) who compared shallow versus deep thinking in inaction inertia and found the latter to reactivate regret and exacerbate it.

<sup>19</sup>See also Tykocinski et al. (2004) who found people avoided processing additional information about a

people to think about the choice and realise that, while not as good as the initial offer, the second offer is still better than not taking it at all or delaying the decision into the future.

A second reason the findings of this study suggest inaction inertia is complex is that there is little difference between the prospective message and the control. Previous studies have found little difference between retrospective messages and the control but not prospective messages. It is possible that the prospective message was not salient enough in the present study. For instance, the influence of the prospective message has been found to be more powerful when framed into the distant future with pot size as opposed to contributions per month which is relatively proximal (Krijnen et al. 2020). The reason for this is perhaps two-fold: first, it is difficult to deny the attractiveness of an opportunity when you see the final pot size; and second, the ‘loss’ from monthly contributions is still emphasised when expressed as contributions but not with final pot size.<sup>20</sup>

Finally, we examined the influence of regret and attractiveness on inaction inertia and while there were no significant differences in either condition, there was a positive correlation between both regret and attractiveness and inaction inertia. This went in the opposite direction than expected such that the more regret participants felt from missing the attractive initial opportunity, the *more* likely participants were to take up the subsequent opportunity, on average. Similarly, the more attractive on average they viewed the previous option, the more likely they were to state an intention to take up the subsequent offer.

While not what expected, the finding for regret has been seen in other studies, most notably Zeelenberg et al. (2006). Moreover, it was also found that those who had pension accounts in real life in the present study felt less regret perhaps indicating that the hypothetical nature of the decision, and known reality of one’s actual retirement saving decisions, influenced the choices made in this study. In another experiment, Zeelenberg

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previous decision (i.e. engaged in shallow processing) when they had greater regret.

<sup>20</sup>For evidence on the effect of loss framing on inaction inertia, see Tykocinski et al. (1995) and Westfall et al. (2012).

et al. (2006) found that when the initial offer is unique the level of regret is greater but the likelihood to act on the subsequent offer is also higher. This may be similar to what occurs in the present study given that the nature of retirement saving means that the offer is unique and will never be offered again (at least at the same value, all else equal). This finding contradicts the escaping regret explanation of inaction inertia and suggests that people do not always act in accordance with the negative emotion they experience.

The finding that as the perceived attractiveness of the missed opportunity increased so too did the propensity to accept the second opportunity suggests that individuals were also not devaluing the subsequent opportunity in the face of the initial offer. This may be because, in spite of the manipulation, participants were naturally more action orientated. This seems unlikely given previous studies, using a similar manipulation, find a difference between state and action mindset induction (Van Putten et al. 2009). Therefore, arguably a more reasonable explanation is that it is far easier to devalue a product where the specification can change or a different brand can be chosen (e.g. Arkes et al. 2002; Zeelenberg et al. 2006) than savings where the monetary value remains the same. As, generally speaking, people are either not familiar with or do not apply their knowledge of compound interest – and consequently the exact cost of not saving earlier and true attractiveness of the initial opportunity is not known – the past may not be seen as such a loss versus the focal opportunity in the present study.

It is challenging in the present study to assess the presence of inaction inertia, and pinpoint why the effect may be different, as we do not include the small versus large difference condition typical in inaction inertia research. Moreover, participants in the current trial experienced a partial rather than the complete miss typical in the extant research. The impact of this key methodological difference cannot be determined in the present study as no ‘complete miss’ comparison group was utilised. The second experiment addresses these points while examining the impact of regulatory mode on behaviour.

## 6.4 Experiment 2

A 2013 report suggested that price contrast is the single biggest determinant of uptake of the second offer in inaction inertia paradigms (Van Putten et al. 2013), but this could not be explicitly examined in Experiment 1. In accordance with this explanation, an individual simply compares the price of the focal opportunity to that which they saw previously and makes their decision to act based on the size of this difference. In their seminal collection of studies, Tykocinski et al. (1995),<sup>21</sup> and more recently Chen et al. (2021) in a series of replications, concluded that only when the missed opportunity was large (versus small) did the subsequent acceptance of an offer decrease.

In another example of price contrast, Tykocinski et al. (2001)<sup>22</sup> randomly assigned participants to see a price contrast for the missed opportunity which was either large or small compared to the focal opportunity. Additionally, the reason for the unavailability was manipulated to be either that it never existed or that it sold out. In the former case, participants were told that the price quoted in the advertisement was a typo and that the deal, in fact, had never existed. In doing this, the price contrast of the attractive offer remained, yet the possibility of negative emotions like regret influencing the decision were reduced. Regardless of the context of unavailability, both groups experienced inaction inertia in the large difference group. However, the inaction inertia was significantly greater in the sold-out condition than the typo. The inaction inertia in the typo group is arguably most simply accounted for by a price contrast explanation. However, given the effect was far stronger for the real missed opportunity, it is clearly not the only influential factor and suggests that other factors may be equally important, including regret and attractiveness which we again examine in Experiment 2.

In a divergence from previous inaction inertia research, the first experiment presented the missed opportunity as a partial, as opposed to a complete miss. That is, even when an opportunity to save for a ‘comfortable’ retirement is missed, an individual had the reassurance that one had still saved *something* for an ‘adequate’ retirement. This perhaps

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<sup>21</sup>Experiment 2.

<sup>22</sup>Experiment 2.

provides a buffer against regret, making it easier to opt for the focal opportunity at a later date (along with the fact that the loss is consequently smaller). As complete misses were not included in Experiment 1 it is unclear if the weak inaction inertia effect was due to the partial nature of the miss or simply a failure to replicate the inaction inertia effect. This will be included in the present study.

Finally, we examine the influence of regulatory mode on inaction inertia. Similar to action-state orientation, regulatory mode theory posits that those with locomotion mindsets move swiftly when making decisions, preferring to ‘just do it’ and make a change, acting first and thinking later (akin action orientation and implementation mindsets). Conversely, those with an assessment mindset are concerned with careful thought and consideration of decisions with a focus on ‘doing the right thing’ (comparable to state orientation and the deliberative mindset). They tend to have a higher standard for personal performance and a greater fear of making the wrong decision (Pierro et al. 2011). They may also spend more time thinking deeply about a decision increasing the likelihood of bringing counterfactuals to mind and increasing the feeling of regret. As with action-state orientation, regulatory mode is a personality tendency but can be manipulated based on the situation (e.g. Avnet and Higgins, 2003) which makes it a possibly interesting factor when considering how best to reduce inaction inertia.

When making a decision about a focal opportunity, the size of the previously missed opportunity can influence the reference point individuals use to assess it (Arkes et al. 2002). People with strong assessment orientations tend to make comparisons in order to help them make the right choice, and are therefore likely to be more sensitive to the magnitude of a missed opportunity. Indeed, those who have stronger assessment orientations are more likely to use existing friends and family as reference points when forming impressions of new people (Pierro et al. 2009).

Mathmann et al. (2017)<sup>23</sup> manipulated assessment and locomotion mindsets before using the well-established holiday inaction inertia scenario (Tykocinski et al. 1995) with small

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<sup>23</sup>Experiment 1.



and large missed opportunities to induce inaction inertia. The results suggested a significant interaction between the size of the missed opportunity and the regulatory mode with those in the assessment condition affected by the size of the missed opportunity to a greater extent than the locomotion condition. This result is supported in a number of follow up studies including in a field study which supported the notion that the effect was at least partly mediated by valuation judgements.<sup>24</sup> The assessment orientation is therefore identified as a key motivational factor for those to whom the size of the missed opportunity matters and may be explained by decreases in value judgements for these individuals (likely because of the strong motivation to compare options). Zhang et al. (2016)<sup>25</sup> conducted a similar test of inaction inertia using natural variation in regulatory mode and experimental manipulation of it and found assessment mode to be negatively correlated with likelihood to act on the missed opportunity which could not be explained by differences in regret.

It is therefore expected that in the present study:

H5: Those in the partial miss condition will exhibit less inaction inertia than those in the complete miss condition, and;

H6: that those with higher levels of assessment orientation may exhibit greater levels of inaction inertia than those high in locomotion orientation.

### 6.4.1 Method

#### Participants

Three hundred and ninety-three participants were eligible to participate if they had not participated in Experiment 1. In total, 15 participants were removed for having answered the attention question incorrectly to make a total of 378 participants. Participants were recruited to be between 25 and 65 years old and had an average age of 40.15 years ( $SD = 11.14$ ), and were mostly female (66%).

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<sup>24</sup>Experiment 4.

<sup>25</sup>Experiment 1, 2 and 3.

## Design and measures

All participants initially completed the regulatory mode scales developed by Kruglanski et al. (2000) which measure an individual's disposition towards assessment and locomotion orientations. The scale contains two subscales with twelve items measuring assessment mode (e.g. 'I often critique work done by myself or others') and locomotion orientation (e.g. 'When I decide to do something, I can't wait to get started'). Items were responded to on a scale from 'Strongly disagree' (1) to 'Strongly agree' (6) and reverse coded where necessary. The Cronbach's alpha was .82 and .81 for locomotion and assessment modes respectively.

The scales have previously demonstrated a high predictive validity on a range of participant populations (e.g. Kruglanski et al. 2000) and cultures (e.g. Guo and Fend, 2015; Pierro et al., 2013). Locomotion and assessment orientations have also been found to be conceptually distinct from related constructs including conscientiousness and openness to experience (from the Big Five) and action-state orientation (Kruglanski et al. 2000).

Participants were then randomly allocated to one of four groups in a 2 (small versus large temporal difference) x 2 (complete miss versus partial miss) between-subjects design. The messages were based on those by Krijnen et al. (2020) and, while this information was not shared with participants, were calculated so that the final pot size approximated £364,244. In the partial missed opportunity conditions, this is the 'comfortable' retirement figure with the 'adequate' retirement figure being calculated to be around £291,395. Table 6.5 provides an overview of the conditions and differences in manipulation. Following this, participants completed an attention check which asked them to indicate from two options how much the focal offer was for.

Table 6.5: Messages seen by participants in each of the four conditions in Experiment 2.

	First message	One year Second message	First message	Ten years Second message
Total miss	Suppose you are 34 years old right now. You recently started working at a new job. The company offers the possibility to enroll in the company's pension plan. In a letter about the plan it says: "If you contribute £427 every month, you will be able to live comfortably in retirement."	You are now 35 years old, and the past year you repeatedly considered enrolling into the company's pension plan, but you never got around to doing it. This week, you receive another letter about the possibility to enroll in the retirement plan. The letter says: "If you had enrolled one year ago, you would have put in £427 per month. To accumulate the same wealth, you would now have to put in £454 each month."	Suppose you are 25 years old right now. You recently started working at a new job. The company offers the possibility to enroll in the company's pension plan. In a letter about the plan it says: "If you contribute £250 every month, you will be able to live comfortably in retirement."	You are now 35 years old, and the past ten years you repeatedly considered enrolling into the company's pension plan, but you never got around to doing it. This week, you receive another letter about the possibility to enroll in the retirement plan. The letter says: "If you had enrolled ten years ago, you would have put in £250 per month. To accumulate the same wealth, you would now have to put in £454 each month."
Partial miss	Suppose you are 34 years old right now. You recently started working at a new job. The company enrolls you into the company's pension plan. In a letter about the plan it says: "You will be enrolled to contribute £200 each month, however if you increase this to £427, you will be able to live comfortably during retirement."	You are now 35 years old, and the past year you repeatedly considered increasing your contributions in the company's pension plan, but you never got around to doing it. This week, you receive another letter about the possibility to increase your contributions in the retirement plan. The letter says: "If you had increased your contributions one year ago, you would have put in £427 per month to save enough for a comfortable retirement. To accumulate the same wealth, you would now have to put in £443 each month."	Suppose you are 25 years old right now. You recently started working at a new job. The company enrolls you into the company's pension plan. In a letter about the plan it says: "You will be enrolled to contribute £200 each month, however if you increase this to £250, you will be able to live comfortably during retirement."	You are now 35 years old, and the past ten years you repeatedly considered increasing your contributions in the company's pension plan, but you never got around to doing it. This week, you receive another letter about the possibility to increase your contributions in the retirement plan. The letter says: "If you had increased your contributions ten years ago, you would have put in £250 per month to save enough for a comfortable retirement. To accumulate the same wealth, you would now have to put in £291 each month."

Next, participants were asked “How attractive do you think the retirement saving offer from ten years [one year] ago was?” on an 11-point scale from ‘extremely unattractive’ (1) to ‘extremely attractive’ (11) and “How much do you regret having missed the saving opportunity from ten years [one year] ago?” on an 11-point scale with the endpoints marked ‘no regret’ (1) to ‘very much regret’ (11) (based on scales by Zeelenberg et al. 2006). Finally, the dependent outcome was based on the measure by Krijnen et al. (2020), and asked participants to indicate on a 7-point scale from ‘extremely unlikely’ (1) to ‘extremely likely’ (7) how likely they were to take up the focal opportunity in the next month.

The notion that saving earlier for retirement is beneficial is commonly spoken about in the media, and by employers and providers. Therefore, it possible that in this research people anticipate the ‘correct’ behavioural change and adjust their behaviour in line with this in order to ‘please’ the researcher. Therefore, in order to examine this possibility in the present research, all participants were asked upon completion of the study to indicate what they thought the study was about.

## 6.4.2 Results

### Balance checks

Initially, age and gender were regressed on the condition a participant was allocated to in order to ensure that they did not significantly differ by group. It was found that neither were significant ( $ps > .05$ ). Chi square analyses confirmed that the groups were balanced with neither gender ( $\chi^2(9)$ ,  $N = 378 = 5.7977$ ,  $p = .760$ ) nor age ( $\chi^2(120)$ ,  $N = 378 = 123.9902$ ,  $p = .383$ ) being significantly different.

### Main analysis

An omitted category OLS regression was used with the constant indicating the outcome for the group experiencing a complete miss one year ago. The ‘partial’ variable is coded 1 if it was a partial miss and 0 otherwise and the ‘ten years’ variable is coded 1 if the

Table 6.6: OLS regression of the conditions on inaction inertia, regret and attractiveness.

	Inaction inertia	Regret	Attractiveness
Partial miss	.2936 (.2678)	-.6240 (.4307)	-.2358 (.3681)
Ten years	-.0694 (.2541)	1.9670*** (.3804)	1.3113*** (.3705)
Partial miss*	.7362* (.2678)	.1318 (.5588)	.7963 (.4492)
Ten years			
Constant	3.6*** (0.1878)	6.3474*** (.2970)	5.8316*** (.2680)
<i>N</i>	378	378	378

Huber-White standard errors in parentheses.

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

miss was ten years ago and 0 otherwise.

The results showed no evidence of inaction inertia for the complete miss condition as participants in the ten year complete miss condition ( $M = 3.53$ ,  $SD = 1.69$ ) were no less likely to enrol in the scheme than those in the one year complete miss condition ( $M = 3.60$ ,  $SD = 1.83$ ,  $\delta = .0694$ ,  $p > .05$ ) (Table 6.6, Column 1).

An inaction inertia like effect in retirement saving is however induced by the passing of time in the partial miss condition, this is such that those in the ten year condition were more likely to increase their contributions ( $M = 4.56$ ,  $SD = 1.69$ ) than those in the one year condition ( $M = 3.89$ ,  $SD = 1.85$ ).

The same regression was then run with regret at missing and perceived attractiveness of the missed opportunity as the outcome variable (Table 6.6). For regret, those in the one year complete miss condition ( $M = 6.35$ ,  $SD = 2.89$ ) were significantly less likely to regret having the missed opportunity than those in the ten year complete miss condition ( $M = 8.32$ ,  $SD = 2.35$ ,  $p < .001$ ). Those who experienced a partial miss one year ago ( $M = 5.72$ ,  $SD = 3.02$ ) were also less likely to regret missing the opportunity than those in the ten year partial miss condition ( $M = 7.82$ ,  $SD = 2.53$ ). Regret was also positively correlated with the likelihood to take up the subsequent opportunity ( $r = .49$ ,  $p < .001$ ).

With perceived attractiveness of the miss, those in the one year complete miss condition ( $M = 5.83$ ,  $SD = 2.61$ ) were more likely to think the missed opportunity was unattractive than those in the ten year complete miss condition ( $M = 7.14$ ,  $SD = 2.53$ ,  $p < .001$ ). Similarly, those in the one year partial miss condition thought, on average, that the miss was less attractive ( $M = 5.60$ ,  $SD = 2.45$ ) than the ten year partial miss condition ( $M = 7.70$ ,  $SD = 2.09$ ). Perceived attractiveness of the first opportunity was also positively correlated with the likelihood to take up the subsequent opportunity ( $r = .52$ ,  $p < .001$ ).

The level of inaction inertia when considering locomotion score (Table 6.7, Column 1) and assessment score (Table 6.7, Column 2) were also run. The results suggest that neither regulatory mode significantly affects the likelihood to take up the subsequent opportunity ( $p > .05$ ). That is, none of the four conditions significantly differ from each other in regard to locomotion or assessment scores.

### **Further analysis: Demand characteristics**

In total 350 comments were left in relation to what participants thought the study was about. Of these, 72 (21%) stated that they thought the study was about attitudes, thoughts and feelings towards retirement saving (e.g. ‘Looking at the relationship between attitudes to work and saving’). A further 61 (17%) of comments stated uncertainty about what the study was about (e.g. “Don’t know”). For the most part, it did not seem like participants were aware of what the study was specifically looking at. There were however a few people who correctly (or closely) considered what the study was about including comments such as “seeing how much we dwell on past decisions”, “to see if the difference in a year affects people’s answers” and “to evaluate whether a putting off making a financial decision for the future initially becomes more of a priority when the cost is higher some time later”. However overall, I do not consider that the majority of participants are substantially influenced by demand characteristics in the present research.

Table 6.7: OLS regression of inaction inertia on the conditions when including locomotion and assessment orientations in the model.

	(1) Inaction inertia	(2) Inaction inertia
Partial miss	-.4386 (1.665)	-.9034 (1.555)
Ten years	-1.1999 (1.4132)	-.4980 (1.3515)
Partial miss*	.4429 (2.1774)	-.1486 (2.0138)
Ten years		
Locomotion	.0073 (.0230)	
Locomotion*	.0152 (.0343)	
Partial miss		
Locomotion*	.0234 (.0292)	
Ten years		
Locomotion*	.0061 (.0446)	
Partial*Ten		
Assessment		-.0003 (.0204)
Assessment*		.0251 (.0321)
Partial miss		
Assessment*		.0093 (.0277)
Ten years		
Assessment*		.0183 (.0414)
Partial*Ten		
Constant	3.2485** (1.0999)	6.3474*** (.2970)
<i>N</i>	378	378

Huber-White standard errors in parentheses.

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

### 6.4.3 Experiment 2: Discussion

It was expected that, consistent with the phenomena of inaction inertia, those who experienced the large difference miss in the complete miss group would be less likely to act on a subsequent opportunity than participants experiencing a small difference in the complete miss group (Tykocinski et al. 1995). However, I find no evidence of this in the present research which, while somewhat surprising (see Arkes et al. 2002; Pittman et al. 2008; Van Putten et al. 2009; Van Putten et al. 2013), is not totally unheard of (Chen et al. 2021). Although it is tempting to try and explain what might have ‘gone wrong’ in this experiment, or suggest a potential remedy, it is also true that inaction inertia has only been studied in one previous group of studies in relation to retirement (Krijnen et al. 2020), and only in the US context where the saving context is arguably very different. This means it is plausible that the effect simply does not exist in this context. For example, the likelihood to act in the present study is overall lower than the previous Krijnen et al. (2020) study. This perhaps reflects the fact that in the UK the money is truly illiquid in a way that is less true in the States, increasing the potential penalty of acting if one needs, or might need, access to the money in the future. Expecting a similar scenario to work as previously expected in a context where the peripheral opportunity costs of a choice are different would perhaps be unreasonable.

Inaction inertia has not been explored in the partial miss context which is more akin to the choice framework in the UK following the introduction of automatic enrolment and was therefore also studied in Experiment 2. In this case, the cost of the miss remains small regardless of whether there is a one or ten year miss because people are saving something rather than nothing in both scenarios. Indeed, inaction inertia does not necessarily explain the results as participants were less likely to act in the small difference (1 year) miss condition than the large difference (10 year) condition. It is not unprecedented for participants in the small difference condition to, on average, exhibit more inaction inertia (see, Zeelenberg et al. 2006); however arguably a more reasonable explanation in the present study is simply a focus on the monetary value. Paying around £450 in contributions in the one-year condition is a considerable amount more than around £300



in the ten-year condition. While both figures are high, £400+ would be unaffordable for most people, even if they wanted to contribute more to their retirement.

In this experiment, participants were also asked their level on two regulatory modes: locomotion and assessment, with the expectation that those with greater levels of locomotion mode will exhibit lower levels of inaction inertia, on average, than those with lower levels of locomotion orientation or high assessment orientation. Contrary to Zhang et al. (2016), in both partial and complete misses, the influence of regulatory mode had no moderating effect on inaction inertia and therefore it may be suggested that, in this context at least, the decision is not driven by a predisposition for assessment-type or locomotion-type orientations. One factor that applies in the case of both the complete and partial miss is the investment context: the opportunity will never repeat again. It is not the same as missing an offer on a consumer good where it is plausible that the offer may return at a later date. Even if people don't fully appreciate the extent of their miss (due to a lack of understanding around exponential growth) they may still realise that saving today is cheaper than starting tomorrow or at some point in the future. Evidence suggests that when an opportunity will not come around again people exhibit less inaction inertia than when it will (Zeelenberg et al. 2006).<sup>26</sup> In this instance, there are no other choices, perhaps minimising the impact of different regulatory modes on the decisions. Individuals high in assessment orientations may therefore have been aware that if looking to minimise loss, the best decision is to act now to minimise the loss that would be felt in the future.

The final concepts explored in this experiment were experienced regret and attractiveness. The results suggest that the more regret a participant experienced after missing the initial attractive opportunity, the more likely participants were to act on the focal opportunity. While not as predicted, this is similar to the findings of Zeelenberg et al. (2006)<sup>27</sup> who too found that regret increased the likelihood to act<sup>28</sup> and suggest that when a miss is unique (i.e. it will not return again) then regret is greater but so too is the likelihood to

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<sup>26</sup>Experiment 3.

<sup>27</sup>Experiment 2.

<sup>28</sup>Experiment 1, 3, 4, 5.

act.

There is also some evidence of devaluation of the missed opportunity with decision makers who were less likely to act on the subsequent opportunity also rating the attractiveness of the missed opportunity as lower than those who act. Such devaluation may stem from a frustration at missing the previous opportunity such that the “preferences underlying a choice may be shaped by the constraints” (Elster 1982, p. vii). In this sour grapes hypothesis, in order to comfort themselves having missed an opportunity, the decision maker convinces themselves that the offer was not that great to begin with. However, as level of regret increases in the current experiment, so too does the level of attractiveness of the miss suggesting that individuals are not devaluing as a way to cope with the regret of a miss. This is perhaps because it is arguably more difficult to devalue a monetary outcome than it is when buying a good or experience (where quality etc. may vary and so can be more easily devalued).

## 6.5 Conclusion

Under saving for retirement is pervasive in the UK despite successful attempts to improve the coverage of pension schemes. It is estimated that 38 percent of working age people may be falling short of sufficient retirement saving, many of whom are likely to have not adhered to the common advice of ‘start saving early’ (e.g. Brotman 2019; Investopedia 2021; Lunn 2018; National Employment Savings Trust 2021a) and have consequently forgone opportunities to save more for less.

Amongst those already saving for retirement, the present studies provide minimal evidence for the widespread levels of under saving still seen being caused by inaction inertia. Other factors, including a lack of understanding around how much to save, complex financial decision making, a lack of connection to the future self, the illiquid nature of retirement saving, financial constraints and inertia may instead play a greater role in under saving than inaction inertia, and such alternative explanations should be further explored.

In the future study of inaction inertia, conceptual replication in the laboratory, would help determine whether inaction inertia exists in the UK retirement context. Moreover, while laboratory studies are limited in their generalisability, they would be valuable in randomly assigning people to missed opportunities in a way that is not possible in the real world for ethical reasons. This may be valuable in future to look at inaction inertia with factors such as appetite for risk, conscientiousness and financial literacy. This would provide an insight into which individuals are most likely to be affected by the missed opportunity, if at all.

While the results of the current research were not as expected, these studies provide some evidence of contextual difference in inaction inertia effects, specifically when applying previous findings to contexts where automatic enrolment is prevalent (as in the UK). Indeed, in these instances, inaction inertia may have a no (or at best very weak) effect on decisions to increase contributions. Other studies similarly suggest that context matters. In a replication study of Tykocinski et al. (1995), Chen et al. (2020) found most successful replications (i.e. strong inaction inertia effects) came from studies with clear monetary implications and large differences between different conditions. However, in the present study, the larger differences were in the complete miss condition where no inaction inertia was exhibited. Instead, it is possible that inaction inertia was exhibited only in the partial miss condition simply because the opportunity was unaffordable and therefore the household finances are important to consider when evaluating specific financial decision making processes.

Overall, it is perhaps likely that the uniqueness of the retirement saving offer and the inability to substantially devalue it when it has a cash value may mean that, in this context, individuals are simply unable to deny the attractiveness of acting on subsequent offers. If this is the case, then presenting such materials to pension members may be valuable in getting them to act on contribution changes without inadvertently causing a ‘backfiring’ effect that has been cautioned in much of the previous inaction inertia literature.

In the next chapter (Chapter 7), I move away from the effect of time on decisions and, in light of the interventions tested having limited or no impact, look at the value of a light-touch policy instrument already used by the UK government to encourage retirement saving.

# Chapter 7

## How does the introduction of the money purchase annual allowance affect pension opt-out behaviour?

### 7.1 Introduction

Up until this point, this thesis has primarily focused on light-touch interventions that have the potential to nudge individuals to increase their retirement contributions. The preceding interventions have been linked by their emphasis on time perspective, either that of imagining the future (as in Chapter 4 and 5) or the influence of past decisions on the present (as in Chapter 6). As may be noted, these had little to no impact on the hypothetical decisions being made and therefore as policy tools are unlikely to be a valuable direction for policy makers looking to make a step change to the retirement saving landscape.

In this chapter, I change my perspective, looking instead at an existing public policy that was implemented to encourage additional saving. The purpose of this is to consider the impact of a particular policy tool - Freedom and Choice (F&C) - on saving behaviour for a group of individuals who have been given the opportunity (through the policy)

to replenish some of the retirement savings that they have accessed ahead of their final retirement. If they utilise this policy for that purpose then it would be expected that they would opt-out of their workplace pension at a lower rate than before the policy was introduced, because there are gains in employer contributions and tax-relief to be made. For the government, there is a balance to be had between allowing individuals to re-build their pension pots and stopping people recycling pension contributions for tax gains. This chapter therefore adds to the overall thesis on encouraging more optimal saving behaviour by examining whether people do opt out at lower rates following the introduction of the policy and if they do, how widespread this behaviour is.

When the adoption of public policy and programmes occurs, the political, bureaucratic and social considerations and implications of a policy that often characterise the development and implementation of said policy do not suddenly resolve when a binding decision is made in favour of one option over another. With any implementation there are risks and uncertainties which, while mitigation may be considered, do not abate when the policy is introduced, and therefore the conversation must move from determining the best public policy option to evaluating the impact of the policy on both intended and unintended outcomes. In the present study I look at the introduction of F&C, examining whether there is actually a decrease in opt-out behaviour following its introduction that could be indicative of people recycling contributions.

A typical policy evaluation would include an evaluating body determining a scope of evaluation (including the policy to be evaluated, the outcomes, the time period etc.) and the evaluation criteria, gathering the relevant information and data for analysis and then using this to draw conclusions and publish recommendations (e.g. Dunn 2015; Fischer 1995; Nagel 2002). While there is considerable variation in the process to policy evaluation, the present study does not seek to to a complete policy evaluation but rather examine the effect of a policy on a specific outcome - opt-out behaviour. In this context a complete evaluation would arguably need to look into the impact on revenue loss to the government, awareness of the policy amongst employees, and implications of the policy on other areas of pension legislation, none of which I seek to do here. Nonetheless, this

research has the potential to shed greater light onto whether the introduction of this policy has been utilised by individuals given the potential benefits to their saving pots that they would stand to gain.

In this chapter, I first provide an outline of the background to the research, the objectives and specific research questions I hope to answer in the chapter (Section 7.2). Next I provide a description of the data provided by the National Employment Savings Trust (Nest) and the strategy for the analysis (Section 7.3). Finally, I present the analysis and results (Section 7.4) and discuss the implication of these findings both for this particular policy and within the broader context of this thesis (Section 7.5).

## 7.2 Literature review

In April 2015, the UK Government introduced radical changes to the UK pension system called Freedom and Choice (F&C), which allowed those aged over 55 to access their defined contribution pension flexibly.<sup>1</sup> This meant that, from 2015, individuals had the freedom to make financial decisions at retirement which best suited their personal circumstances; and, rather than compulsory annuitisation of their savings, people could choose to annuitise, ‘drawdown’, take cash or do a combination of these options without restriction. In effect, this legislation made pension pots liquid saving accounts for those aged over 55 years old.<sup>2</sup>

As a result, this change in legislation increased the benefit of remaining enrolled in a pension scheme for those aged over 55 years old, relative to people aged 54 and below by giving workers the ability to simultaneously take and contribute to their pension pot. A person aged 55 could continue to contribute to a pension, receiving benefits like 20 or 40 percent tax relief on contributions, employer match contributions and possibly income tax and National Insurance reductions, all while also taking money from their pension

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<sup>1</sup>For more details on the system before the 2015 changes, and the circumstances with which you could take for pension savings ‘flexibly’, see HM Treasury (2014a).

<sup>2</sup>Subject to the Money Purchase Annual Allowance limit of £10,000 additional contributions in some cases.

pot in cash. Before the introduction of the policy, those wanting to take their pension at 55 years old had to (in most circumstances) annuitise, and therefore received a ‘fixed income’ rather than the flexibility of cash. This compares to a person aged 54 with otherwise the same circumstances who both before and after the introduction of F&C could not withdraw money from their pension easily and so receive the same benefits when contributing (i.e. tax relief and employer matches) but without the access and liquidity of saving.

At the margin, we would therefore expect the F&C legislation to reduce the number of opt-out decisions of people aged 55 years old and above (essentially to zero), while having no effect on those decisions for their younger peers.<sup>3</sup> This is because a considerable amount of additional saving can be gained without losing the liquidity of that money - an individual can contribute to their pension, receive the tax relief and employer match, and then withdraw that money with relative ease, and without penalty. Consider, for example, a 55 year-old employee earning £50,000<sup>4</sup> with 3 percent employer contributions.<sup>5</sup> They would be missing out on approximately £1,312.80 per year of ‘free’ money by choosing to opt out. Yet, they could put £2,188 into their retirement account (5 percent minimum employee contribution), of which tax relief would make up 20 percent, receive the employer match of £1,312.80 and then, with a small time and effort cost, remove the money again if needed. Using this strategy, people could stand to gain a minimum of 3 percent of their salary plus tax relief (more if their employer offers a more generous match or they benefit from reduced income tax or NI) almost instantaneously every year that they are over 55, and, crucially, can do so without decreasing their consumption or liquid assets outside of the pension scheme.

In spite of the relatively large gains to be made from a ‘contribute and withdraw’ strategy, evidence from different domains suggest that it is often an under utilised approach by individuals. In the US, tax rules mean there is a trade-off to be made between ad-

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<sup>3</sup>Opting out refers to the decision not to participate in the workplace pension scheme that is made in the first 30 days of being automatically enrolled.

<sup>4</sup>Qualifying earnings of £43,760 (2020/21).

<sup>5</sup>Note that this is the current minimum employer contribution. In April 2015, when F&C was introduced, this was 1 percent.



ditional mortgage payments and retirement contributions where it is generally beneficial to reduce mortgage prepayments in order to increase retirement contributions. Amromin et al. (2007) estimate that, using data from the Survey for Consumer Finance, at least 38 percent of people prepaying their mortgage at the time of the research would have benefited from paying into tax-deferred retirement accounts instead, with a median gain from the switch estimated to be worth as much as 17 cents per dollar (around \$400 per year). Indeed, there is evidence for unexploited arbitrage gains across the financial domain despite potentially large financial implications (Bergstresser et al. 2004; Duflo et al. 2006; Gross et al. 2002; Li et al. 2010).

The dominant use of strategies which do not maximise potential arbitrage gains has also been found when the decision is more akin to the F&C. Choi et al. (2011) studied employer matches in seven companies in the US where employees aged  $59 \frac{1}{2}$  could have their contribution matched up to a threshold whilst maintaining relatively unconstrained access to their retirement savings and continuing employment. Yet, they find that between 20 and 60 percent of older employees (depending on the company) did not contribute up to the match threshold, effectively leaving “\$100 bills on the sidewalk” (Choi et al. 2011, p. 748). For some this was not a small miss but as much as \$7,596 (or 6 percent of salary) in one year. In an arguably more extreme case of failing to monopolise on the ‘free’ money offered by employers, an analysis in the UK of 25 DB pension schemes which did not require an employee to make *any* contributions, found that only half of eligible employees (51 percent) enrolled themselves in the scheme. This represents a failure to take advantage of an offer which is both incredibly lucrative and risk free to the employee (Benartzi et al. 2007).

Opt-out rates from workplace pensions are highest among the over 55s (Department for Work and Pensions 2020b) suggesting that many people do not make use of the legislation to maximise the employer match. However, more pertinent here is whether the introduction of the ability to simultaneously contribute to and take cash from your pension in 2015 resulted in any *change* in behaviour compared to before its introduction, and to those not affected by the change (under 55s). If people are aware of and make use

of the fact that the system can be used to maximise employer contributions and tax relief without making savings illiquid then, relative to under 55s, it would be expected that the opt-out rate for the over 55s decreased following the introduction of F&C. If this is not the case then the opt-out rate of over 55s and under 55s should follow similar trends before and after the introduction of the policy. I examine this using a quasi-experimental design on a large sample of Nest member data.

## 7.3 Data, variables and empirical model

In this section I will first describe the data and the primary outcome measure. The empirical strategy used will be a difference-in-difference framework and therefore the rationale for this, and the empirical model utilised, is described. This is followed by a description of the tests run in order to determine the validity of the empirical strategy.

### 7.3.1 Sample

For the analysis I make use of a data set provided by Nest that captures members of the pension scheme at the point of interest in April 2015 as well as six months before and after (6 September 2014 to 5 October 2015).<sup>67</sup> Nest is a not-for-profit pension scheme established by Parliament and run to ensure all employers have access to low-charge, high quality pension provision following the introduction of automatic enrolment in October 2012. It is open to all employers regardless of size as well as the self-employed and those who receive a pension pot through a divorce settlement. At the time of the reforms of interest in April 2015, only employers with more than 50 employees *had* to automatically enrol employees.<sup>8</sup>

By the end of March 2015 (when the reforms we are interested in took place), Nest had approximately 2 million members and reported an average opt-out rate across age groups

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<sup>67</sup>The full data set went from September 2014 to April 2018.

<sup>7</sup>I also used data in the analysis for six months either side of July 2016 in order to run robustness checks (6 December 2015 to 5 January 2017).

<sup>8</sup>Staging completed for existing employers on 1 April 2017.

of 7 percent (National Employment Savings Trust 2016).<sup>91011</sup> The Nest pension scheme was in a time of substantial growth owing to the staging of automatic enrolment occurring from October 2012 to April 2017. Due to the large volume of new joiners to the scheme, this makes it an ideal sample to explore opt-out behaviour.

The introduction of the F&C policy can affect individuals contributing to a pension aged over 55 years at the time of the change. They are therefore defined as the treatment group<sup>12</sup> and are compared to a control group of similar others who were not subject to the policy change because they were 54 or younger. Both groups were subject to other tax and allowance changes that occurred simultaneously (Gov.UK 2015). It is not possible to precisely determine the age of participants in the data set as date of birth information could not be provided in the anonymous data set. Instead, we used month-end age data in order to determine which group participants should be allocated to. At the margin, there were 628 people who turned 55 years old in April 2015. It is likely that most of them were 54 at the point of change as 6 April is early in the month, and so the decision was made to treat them all as such.<sup>13</sup>

### 7.3.2 Outcome variable

The dependent variable in this study is a binary indicator of whether an individual ‘opts out’ of their workplace pension with Nest. Opt out refers to anyone who leaves the scheme within one calendar month of being enrolled by their employer<sup>14</sup> through

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<sup>9</sup>See Table 7.2.

<sup>10</sup>As of 2020, Nest is the largest workplace pension in the UK by membership with 10 million members (National Employment Savings Trust 2021c).

<sup>11</sup>As of 2020, approximately 47 percent of members are female (National Employment Savings Trust 2021c) and 28 percent are aged between 22 and 30 (National Employment Savings Trust 2021b). The median annual earnings for active Nest members is £19,600, lower than the national average but in line with the expectations of the pension reforms which targeted those on low to moderate incomes (National Employment Savings Trust 2021b). The scheme is primarily used by small employers with 1 percent of employers having more than 250 employees but making up approximately 51 percent of members (National Employment Savings Trust 2022a).

<sup>12</sup>Although not all will be affected.

<sup>13</sup>Their inclusion in the analysis as either 55 or 54 year olds does not have a substantial impact on the results.

<sup>14</sup>Opt out also applies to those who opt in too.

Table 7.1: Sample size and demographics for the main analysis on opt out behaviour in April 2015.

Grouping (Years)	Sample size (n)		Gender (% female)		Employer size (Modal group)	
	Opt out	Active	Opt out	Active	Opt out	Active
45-54	16,429	174,900	52	49	50-249 (29%)	50-249 (30%)
55-64	18,465	82,952	50	47	5000+ (35%)	50-249 (29%)
54	1,805	14,281	51	49	50-249 (31%)	50-249 (29%)
55	2,145	14,075	58	53	5000+ (36%)	50-249 (30%)

the opt-out mechanism,<sup>15</sup> and is the primary outcome of interest in this study (it does not include leaving the employer). However, opt out only applies to individuals who are eligible for automatic enrolment<sup>1617</sup> and not those who are already contributing to their pension with the respective employer. If an individual leaves the scheme or stops contributing after the opt-out window has closed, they are coded in one group in this analysis as a ‘leaver or ceaser’.

The widest sample used for the current study is those aged between 45 and 64 at the point of policy change (6 April 2015) and who enrolled between 6 September 2014 and 5 October 2015 (and opted out, if applicable, between 6 September 2014 and 5 October 2015). A more stringent criteria is also applied for defining the treatment (55 year old) and control (54 year). This brings in an element of a regression discontinuity design and is likely to be a better sample given 54 year old’s are likely to be more similar to 55 year olds in factors other than policy eligibility than 45 year olds are to 55 to 64 year olds when the broader sample parameters are used. The sample size, gender and employer size for each sample can be found in Table 7.1.

As you would expect, for the period of interest (6 October 2014 to 5 October 2015), the level of opt out seen in the present study is consistent with the pattern of opt outs seen by

<sup>15</sup>The one month period typically begins three working days from the date an employer enrolled an employee. It can be delayed for up to 3 months.

<sup>16</sup>To be eligible for automatic enrolment you must be aged between 22 years old and State Pension Age, earn a salary of over £10,000 per year, spend the majority of working hours in the UK, not already be part of a qualifying workplace pension scheme with that employer.

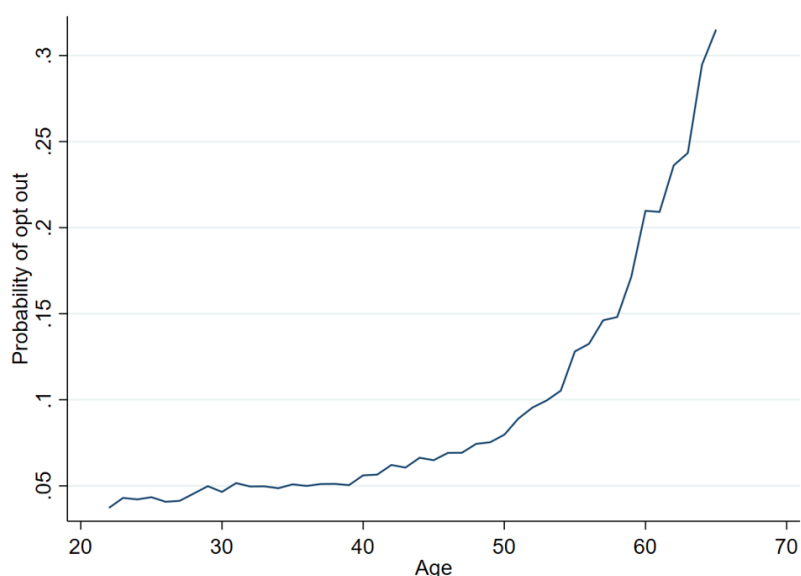
<sup>17</sup>Employees are enrolled every time they start with a new employer or re-enrolled if they previously opted-out. They must be re-enrolled within a 6 month window on every 3rd anniversary of the employer’s duty date. This did not occur at all until circa October 2015.

Table 7.2: Opt-out rates in the Nest Corporation pension scheme between 2012/13 and 2017/18 taken from National Employment Savings Trust (2022a) and reflective of the period of employer staging where automatic enrolment was being introduced. The opt-out rates between 6 October 2014 and 5 October 2015 are taken from the present sample. Both are presented by age and gender.

Age	Opt-out rates			
	2012/13 to 2017/18		6 Oct'14 to 5 Oct '15	
	Females (%)	Males (%)	Females (%)	Males (%)
22-25	4.5	3.5	5.1	3.3
26-30	5.5	4.5	5.5	3.6
31-35	6.2	5.6	5.8	4.4
36-40	6.7	6.4	5.8	4.6
41-45	7.6	7.4	6.8	5.6
46-50	9.0	9.0	7.6	7.0
51-55	11.9	11.7	10.8	9.7
56-60	18.2	16.0	17.0	14.3
61-65	26.4	25.0	26.3	21.7
All	8.0	7.2	7.3	5.6

age in Nest Insight's Retirement Saving in the UK report for the same period (National Employment Savings Trust 2022b, see Table 7.2). Generally speaking, the probability of opting out of the pension increases with age across schemes (Department for Work and Pensions 2013a; Department for Work and Pensions 2013b) and this is echoed in the Nest data, particularly on the approach to state pension age between 55 and 65 (see Figure 7.1).

Figure 7.1: Pearsons correlation between age and probability of opting out.



### 7.3.3 Empirical strategy

The causal impact of the introduction of the F&C on likelihood to opt out is established using a quasi-experimental difference-in-difference and triple difference designs. It is used to obtain a causal estimate of an outcome where different subgroups are affected at different points in time by a particular policy or intervention. Difference-in-difference estimation is a popular way to estimate causal relationships, particularly in public policy where it is not always possible, or ethical, to randomise participants to a treatment or control conditions. The retrospective nature of the research and the fact that it would not be feasible to randomise some people to receive the legislative change and not others due to the policy being based on age, means that difference-in-difference provides a useful tool to compare the differences in outcomes as a result of the legislation. This is done by comparing the difference in opt-out rates before and after the intervention's introduction on April 6 2015 for those 55 years old and older, and affected by the legislation, to those under 55 years old and unaffected by the legislation. This sequential difference over time and between the estimated effect of being treated and the assumed counterfactual of no treatment result in the DiD estimate:

$$Y_{ig} = \alpha + \beta_1 t_t + \beta_2 g_i + \beta_3 t_t(g_i) + \delta_t + \epsilon_i$$

Where:

- $Y$  is the outcome variable of whether someone opts out (1) or remains active (0) (in the secondary analyses this becomes 1 if an individual leaves/ceases or 0 otherwise);
- $\alpha$  is the intercept;
- $t$  is the time variable which is 0,...,  $T_0$  before the date of change and  $T_0+1$ ,...,  $T$  after;
- $g$  is the variable for group allocation with those aged 55 or over coded as 1 and those 54 or under coded as 0;

- $\beta_3$  is the difference-in-difference estimate (the average effect of the policy change on opt-out behaviour for the treated group);
- $\delta_t$  is a fixed effect term for time;
- $i$  is the subscript denoting the individual  $i$ ; and,
- the error term is  $\epsilon$  (clustered at  $i$ ).

The model that was pre-registered was similar to the above proposed model with the exception that it included  $\beta_4 C$ , a vector for gender, employer and employer size, all of which are control variables and did not include the fixed effects.<sup>18</sup>

An individual appears in every time period of the data after they enrol, possibly resulting in month-on-month correlation within any given individual. Therefore, there are individual-level latent effects that can be accounted for using the fixed effect model. The model eliminates the time invariant factors which in this instance include the controls such as gender, employer and employer size as they are perfectly colinear with the fixed effect.<sup>19</sup> As the model does not have the canonical difference-in-difference set up using a two-period binary treatment but instead has multiple periods, it is assumed that the difference-in-difference effect is homogenous across both time and individuals. This works in the present analysis where there may be unmeasured time-invariant confounders but the treatment is not staged.

A triple difference analysis was also run where the assumptions for a difference-in-difference do not hold:<sup>20</sup>

$$Y_{ig} = \alpha + \beta_1(t_t \cdot g_i \cdot c_i) + \beta_2(g_i \cdot c_i) + \beta_3(T_t \cdot c_i) + \beta_4(t_t \cdot g_i) + \beta_5 g_i + \beta_6 t_t + \beta_7 c_i + \epsilon_i$$

Where:

<sup>18</sup>see <https://doi.org/10.17605/OSF.IO/X7UDS>

<sup>19</sup>Although, if added would reduce the variance and therefore could improve the power of the model.

<sup>20</sup>This was not pre-registered as it was not anticipated a priori.

- $Y$  is the outcome variable of whether someone opts out (1) or remains active (0) (in the secondary analyses this becomes 1 if an individual leaves/ceases or 0 otherwise);
- $\alpha$  is the intercept;
- $t$  is the time variable which is  $0, \dots, T_0$  before the date of change and  $T_0+1, \dots, T$  after;
- $g$  is the variable for treatment allocation with those aged 55 or over being treated;
- $c$  is the indicator for an observation of someone aged 53;
- $\beta_1$  is the parameter of interest, the difference-in-difference-in-difference estimate (the average effect of the policy change on opt-out behaviour for the treated group, accounting for the differences in age);
- $\beta_2$  to  $\beta_4$  are estimators for double differences;
- $\beta_5$  to  $\beta_7$  are estimators for linear trends;
- $i$  is the subscript denoting the individual  $i$ ; and,
- the error term is  $\epsilon$  (clustered at  $i$ ).

### 7.3.4 Tests for validity of the identification strategy

There are a number of assumptions that must hold for a difference-in-difference analysis to be a suitable statistical method. First, there can only ever be one of two treatment histories for an individual in the data: never treated (or control group) or not treated pre-intervention and treated after (or treatment group). This is the consistency assumption in difference-in-difference and is the reason why  $g$  is always either 0 or 1 with 1 only possible when  $t > T_0$ . Of course, each individual has the potential for two outcomes but we only observe the one that corresponds to their treatment status. As a consequence, the consistency assumption links the potential outcome  $Y_{ig}$  at time  $t$  for treatment  $g$  to give the outcome  $Y$  for each individual.

In a related manner, we also assume that the future treatment does not affect past



outcomes so that when an individual is in the pre-intervention time period the potential outcome for being treated in the future or not treated in the future are the same - this is the arrow of time assumption. It is also monotonic such that when a person becomes eligible for the intervention they cannot become ineligible (i.e. become younger again).

Arguably, the most important consideration when utilising a difference-in-difference design is that the identification of the treatment condition is assumed to be ‘as good as random’ (as true randomisation is not possible). Indeed, the appeal of difference-in-difference lies in its simplicity and potential to evade many of the endogeneity issues which can arise when comparing heterogeneous groups (Meyer 1995). The ‘good as random’ assumption is central because the statistical properties of random assignment are key for establishing estimates which have causal impact (Glymour et al. 2016). Of course, ‘as good as random’ is not the same as ‘random’ and a reliance on statistics to achieve this assumption is of course less favourable than where randomisation can be achieved.

As previously mentioned, the ‘treatment’ group in this case are eligible to take advantage of the F&C legislation and are therefore aged 55 years or over. Of course, the assignment to treatment conditions is therefore not, in reality, as good as random as over 55s may be systematically different to under 55s in a number of ways, both observable and unobservable. Therefore, it is possible that the groups are not statistically independent of any measured (or unmeasured) factor which may also influence the outcome. For instance, in the present case it is not unreasonable to think that the over 55s may have saved more for retirement meaning that additional savings are not needed and opt out is more likely. In order to account for this, difference-in-difference imposes a number of assumptions which restrict the influence of possible confounds by assuming that variables which vary across groups (e.g. income) are time invariant and that time-varying confounders (e.g. concurrent policy changes) are group invariant. These twin claims are referred to as the common (or parallel) trend assumption which, in this case, rests on the expectation that there are parallel trends in opt-out rates between the treatment and control in the months prior to the policy introduction. Using this assumption (White et al. 2014), it is thus possible to circumvent the problem that one cannot control for the

influence of unmeasured observable and unobservable characteristics.

Given the validity of difference-in-difference, and the debate around its value, revolve around this assumption and the possible endogeneity of the intervention itself, we test this assumption in the data by modelling the level of opt outs in the treatment and control 6 months prior to the legislative change on 6 April 2015. Examining the trends pre-reform is highly desirable and often recommended as “best practice” in difference-in-difference studies (Fredriksson et al. 2019). The parallel lines do not need to be linear as the time fixed effect accounts for flexible time trends.

The relevance and contention of the parallel trends assumption was demonstrated in the influential paper by Card et al. (1995) which concluded using a quasi-experimental DiD design that the minimum wage increase in New Jersey had minimal negative impact on fast-food restaurant employment. However, the parallel trends assumption was implicitly assumed and, in a later paper, with access to additional data pre-dating the minimum wage increase, the authors find little to no visual support of the parallel trends assumption for the control and treatment groups (Card et al. 2000). Therefore, other time-varying factors perhaps seem more important to employment than the minimum wage policy itself, substantially reducing the validity of the findings. It is that which we seek to avoid by testing the parallel trends before the analysis.

The parallel trends were examined visually on a graph for, in this case, for the broad age group in the six months prior to the policy introduction (see Figure 7.2). Locally Weighted Scatterplot Smoothing (LOWESS) were used to fit a smooth curve. The treatment and control group remain close to parallel throughout particularly, and crucially, as the point of change approaches. The initial rise in opt out between October and December is due to the definition of the parameters in the model. It is thought that a combination of smaller sample size and the fact that the enrolment data begins from 6 September and the opt-out data from 6 October contributes to this. Therefore, for those joining at the beginning of September, they are only captured in the October data as ‘opt outs’ if they opt out towards the end of their opt-out window (and in some cases only the final day of

their window) making rates appear lower.

In order to confirm that the trends are indeed parallel, an augmented regression that allows for the group-specific linear trends over time was conducted. In order for the common trends assumption to be valid, the null hypothesis must be rejected. However, in this instance it was significant ( $\beta = .0045$ ,  $p < .001$ , 95% CI [.0036, .0054]) suggesting a violation of the parallel trends assumption. While the importance for difference-in-difference is whether the groups are parallel, the regression also indicates that an individual who was eligible for the policy change is significantly more likely to opt out than those ineligible, suggesting there are large structural differences in outcomes between the treatment and control. In the difference-in-difference framework, it is crucial to establish that the treatment and control group are equivalent in all meaningful ways (observed and unobserved) other than the grouping variable (in this instance, age). Given the differences in the coefficient for treatment and control, it is not unreasonable to think that in the analysis, those aged 45 are perhaps less prepared for retirement than those aged 64 and therefore their motivation to opt out may be very different, affecting the internal validity of the results.

Therefore, the analysis was re-run with with the restricted age range of 54 for the control and 55 for the treatment group (see Figure 7.3). The results suggest that the common trends assumption is still violated ( $\beta = .0028$ ,  $p = .036$ , 95% CI [.0002, .0055]). On the basis of this, it was decided that a triple difference may be a more appropriate statistical test given the fundamental assumptions are not supported for the difference-in-difference.

A triple difference estimate adds an additional comparison group to the analysis and estimates the treatment effect using a difference-in-difference-in-difference design. As demonstrated in the parallel trends analysis above, there is a time-varying confounder that is different across the treatment and control (i.e. group variant). Therefore, an addition of another control which is exposed to the time-varying confounder but is not affected by the treatment must be selected. In this instance, age is the only logical variable for this and for the broad age group analysis would mean an age group of 35 to

Figure 7.2: Parallel trends for probability of opt out pre-intervention. Control = 45-54 years old, Treatment = 55-64 years old.

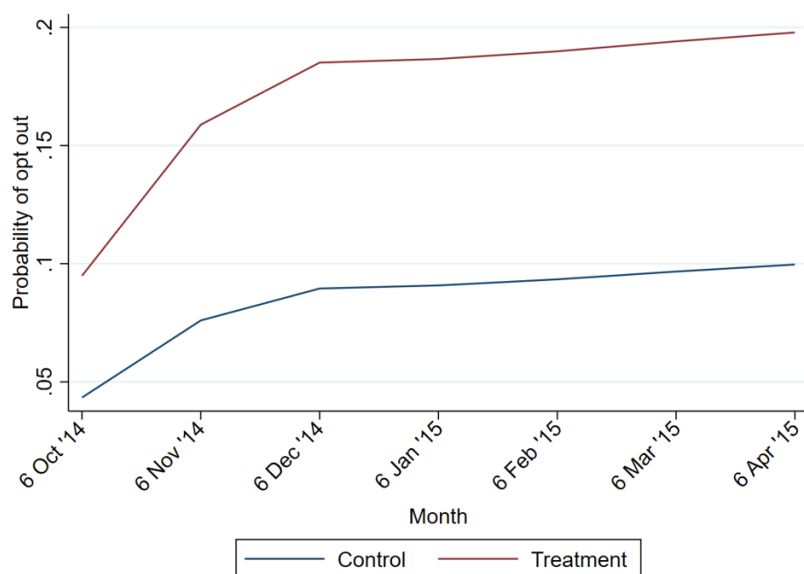
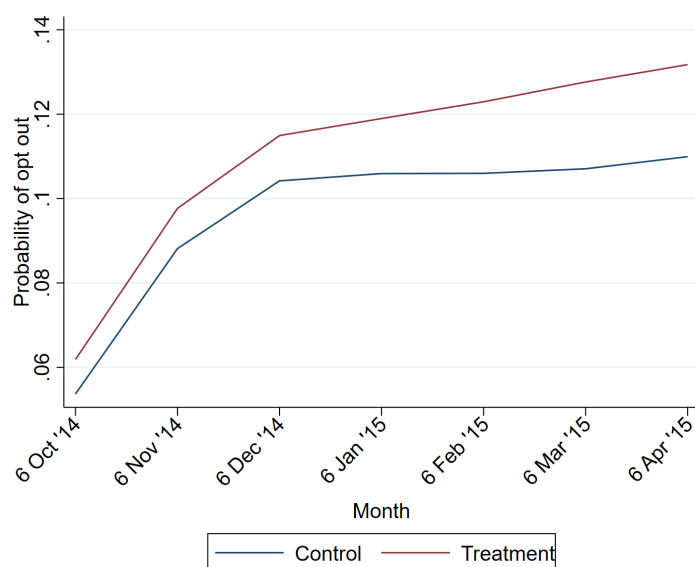
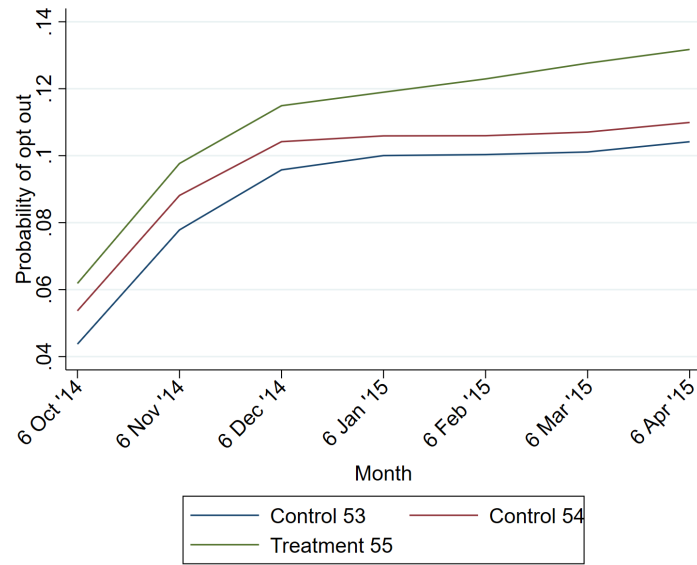


Figure 7.3: Parallel trends for probability of opt out pre-intervention. Control = 54 years old, Treatment = 55 years old.



44 years old. Given these individuals would likely be substantially different to the other control and treatment groups this is not conceptually a good control, and therefore we focus our attention at the narrower age bands (given behaviour change is likely to occur at the margin, this is not problematic). In this instance, where the treatment group are those aged 55 and the control is those aged 54, an additional control group of age 53 is likely to be suitable.

Figure 7.4: Parallel trends for probability of opt out pre-intervention with a triple difference. Control 53 = 53 years old, Control 54 = 54 years old, Treatment 55 = 55 years old.



In order for the assumptions of the triple difference to hold, the relationship between the controls must be parallel - that is, they both include the time-variant confounder - but the control should not be affected by the intervention of interest. The results suggest this is the case as the regression is insignificant ( $\beta = .0021$ ,  $p = .116$ , 95% CI  $[-.0005, .0046]$ , Figure 7.4).

## 7.4 Results

### 7.4.1 Primary analysis

Following the test for the parallel trends, a triple difference was conducted for the restricted age groupings (Table 7.3).<sup>21</sup> In this model *Post time period* is the primary variable of interest and uses the seven pre-treatment periods in order to calculate a trend for those aged 55. The likelihood to opt out decreases in the post-intervention period compared to the pre -period for those aged 55 ( $\beta = -.0047$ ,  $p = .002$ , 95% CI  $[-.0085,$

<sup>21</sup>The results of the difference-in-difference regression analysis for the 6 April 2015 F&C policy change for both the broad (45 to 54 years old in control and 55 to 64 year olds in treatment) and narrow (54 year olds in control and 55 years olds in treatment) age bands are presented in Appendix D.2; although, are of limited value given the aforementioned violation of the parallel trends.

-.0008]) suggesting that there is a significant decrease in opt out behaviour at the point of change in this group compared to the controls, albeit very small. This change is illustrated in Figure 7.5. The rate of opt out does not significantly differ by gender or employer size over the time periods ( $p > .05$ ).

Table 7.3: Probability of opt out in broad and restricted age bands in the triple difference analysis.

	Opt out	Standard error	Confidence interval (95%)
Condition			
Aged 54	.0076	.0072	[-.0064, .0217]
Aged 55	.0201**	.0004	[.0012, .0027]
Time	.0019***	.0004	[.0012, .0027]
Condition*Time			
Aged 54	-.0002	.0005	[-.0012, .0009]
Aged 55	.0007	.0006	[-.0004, .0018]
Post time period	-.0047**	.0020	[-.0085, -.0008]
Condition*Post			
Aged 53 post	-.0008	.0026	[-.0059, .0043]
Aged 54 post	.0019	.0027	[-.0033, .0071]
Constant	.0881***	.0049	[.0785, .0976]
<i>N</i>	336,295 (1)	336,295 (1)	336,295 (1)

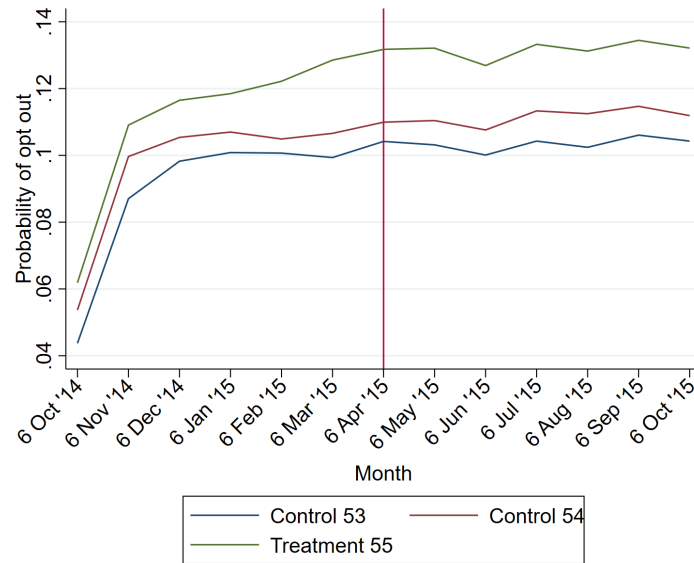
\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

(1) 47,303 clusters. Once people join and do not opt out they remain in the data set until they leave.

## 7.4.2 Secondary analysis

It is possible that, employees who are already enrolled in a pension but may have been considering stopping their contributions do so at a lower rate on average following the introduction of F&C on 6 April 2015. In the Nest data, it is not always possible to distinguish between those who have left the scheme (i.e. where they have left their employer) and where they have ceased contributing (i.e. stopped contributing), as, at this time period, the latter only appears in the data when a member ceases contributing

Figure 7.5: Parallel trends for probability of opt out pre-intervention with a triple difference. Control 53 = 53 years old, Control 54 = 54 years old, Treatment 55 = 55 years old.



through the online system.<sup>22</sup> If they stop contributing through their employer (a more common approach) or leave the employer, they can appear either as a ‘leaver’ or a ‘ceaser’ depending on the option selected by the employer. This means it is not accurate to attempt to distinguish between the two.

While it is possible that the introduction of F&C affects both opt out and cessation behaviour, it theoretically should not affect the proportion of leavers differently in the treatment and control. That is, any change in policy should affect inframarginal savings decisions, but not whether people choose to leave their jobs or not. Therefore, it is reasonable to assume that any difference in behaviour between the treatment and control group across the point of change for those in the leavers and ceasers data should be attributable to cessation as opposed to leaving behaviour in the identification strategy. In the analysis, the outcome is binary: cease/leave (1) and remain enrolled (0). Those who have opted out are removed from the data as they previously made an enrolment decision. A further 347 people were removed from the analysis because they have a ‘leave

<sup>22</sup>The DWP’s automatic enrolment evaluation report (Gov.UK 2020), use HM Revenue and Customs’ Real-Time Information system reports on those who have ‘stopped saving’ directly from employers’ payrolls (from all schemes). They combine opt outs and cessation to create a figure of those who have stopped saving in a particular month (regardless of when they enrolled).

Table 7.4: Probability of leaving or ceasing contributing in broad and restricted age bands in a difference-in-difference analysis.

	Model 1 (Broad age band)		Model 2 (Restricted age band)	
	DiD regression	Standard error	DiD regression	Standard error
Time				
6 Feb '16	.0353***	.0014	.0384***	.0047
6 Mar '16	.0717***	.0017	.0760***	.0056
6 Apr '16	.1129***	.0019	.1151***	.0062
6 May '16	.1628***	.0021	.1565***	.0066
6 Jun '16	.2131***	.0022	.2062***	.0071
6 Jul '16	.2701***	.0023	.2594***	.0076
6 Aug '16	.3465***	.0024	.3408***	.0083
6 Sep '16	.4116***	.0025	.4040***	.0088
6 Oct '16	.4703***	.0026	.4573***	.0093
6 Nov '16	.5325***	.0027	.5218***	.0098
6 Dec '16	.5881***	.0028	.5685***	.0102
6 Jan '17	.6180***	.0028	.6021***	.0106
Treated	.0157***	.0038	.0182	.0105
Time*Treated (DiD)	-.0027***	.0005	-.0053***	.0013
Constant	.0159***	.0017	.0166**	.0068
<i>N</i>	670,022 (1)	671,730 (1)	74,558 (2)	74,558 (2)

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

(1) 64,161 clusters. Once people join and do not opt out they remain in the data set until they leave.

(2) 7,173 clusters. Once people join and do not opt out they remain in the data set until they leave.

date' prior to their enrolment in the scheme.

The parallel trends assumption held (see Appendix D.16 and Appendix D.17) and so a difference-in-difference estimate was run with the probability of leaving or ceasing contributions as the dependent variable (Table 7.4). Model 1 includes the broad age range and Model 2 includes the restricted age range. The coefficient of interest in both models is the *Time\*Treated* variable which indicates the difference-in-difference estimate accounting for the trends in treatment and control before the policy was introduced, when neither treatment and control could simultaneously access and contribute to their pension (without penalty), and after when only the treatment group had access.



The coefficient is negative and statistically significant at the 99.9 percent confidence interval ( $\beta = -.0027$ ,  $p < .001$ , 95% CI  $[-.0036, -.0017]$ ) with the broad age definition indicating that the policy reduces the probability of leaving or ceasing by 0.27 percentage points among the treated group compared to the control in the post-policy time period compared to the pre-policy time period (Model 1). For the restricted age group the regression is significant with the probability of ceasing or leaving in the post- versus pre-time periods for the treated group ( $\beta = -.0053$ ,  $p < .001$ , 95% CI  $[-.0079, -.0027]$ ). The difference increases to a 0.53 percentage point difference in the treatment and control across the time periods with the more stringent age grouping (Model 2).

In the restricted age groups, the difference between the treatment and control groups' rate of leaving/ceasing before the change is very small. However, following the policy change the gap begins to start widening between 6 April 2015 and 6 October 2015 (Figure 7.6 and to a lesser extent in the broad age groups, see Appendix 7.7). This is such that the treated 55 to 64 year olds are increasingly less likely to opt out than the 45 to 54 year old control group in the period following the policy introduction. The fact that the rate is lower also suggests that the over 55s are not responding to the broader F&C legislation by leaving their employer at higher levels.

Figure 7.6: Difference-in-difference regression for those that leave/cease contributing (treatment group = 55 years old).

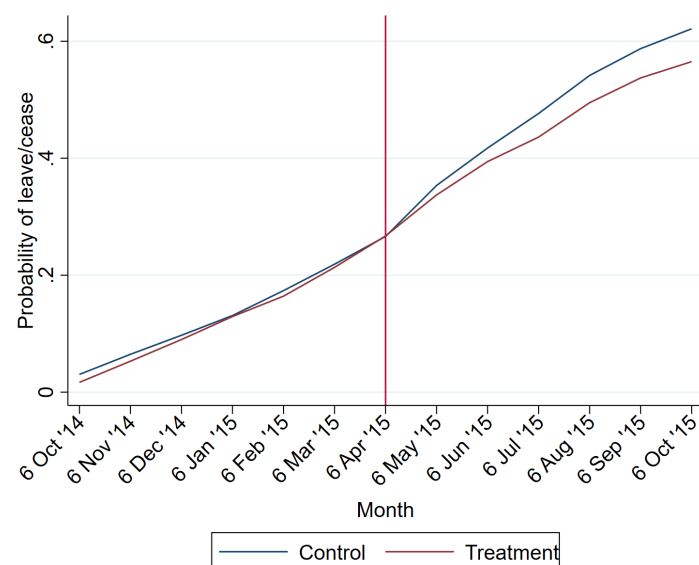
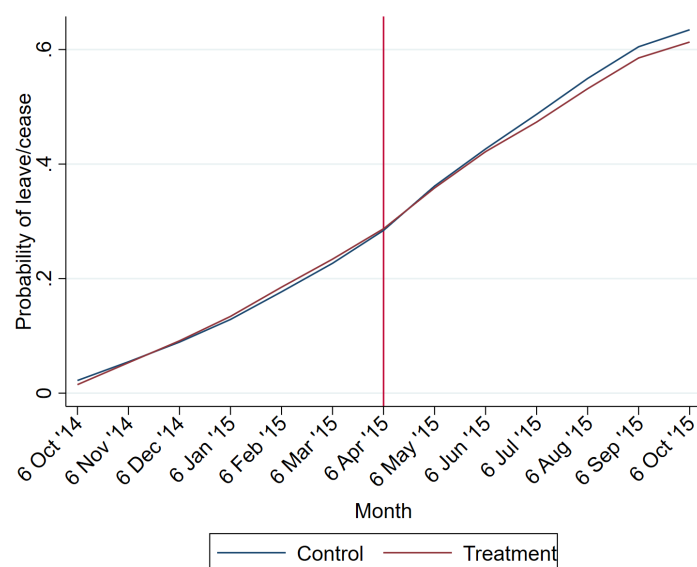


Figure 7.7: Difference-in-difference regression for those that leave/cease contributing (treatment group = 55 - 64 year olds).



### 7.4.3 Robustness check

#### A non-related time period

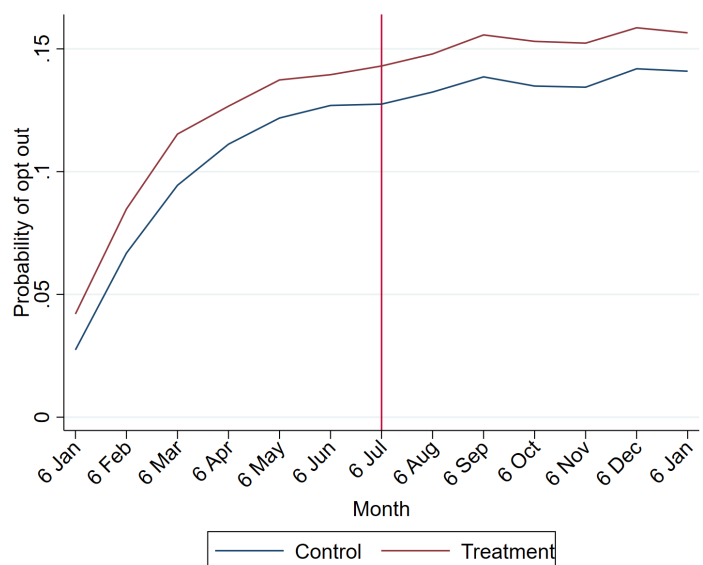
The same analysis was run at a point in which no policy changes were made to the pensions system in order to provide a stronger case for the difference-in-difference seen around the point of interest in April 2015 to be attributed to the policy change and not simply monthly fluctuations. This date was determined ex ante to be 6 July 2016 with a 6 month pre- and post-trial period to align with the main analysis (see Appendix D.1).<sup>23</sup>

The results for the broad age group parameters suggests that the parallel trends assumption is violated ( $\beta = .0062$ ,  $p < .001$ , 95% CI [.0053, .0070], see Appendix D.10), but in the narrow age grouping the assumption holds ( $\beta = -.0008$ ,  $p = .462$ , 95% CI [-.0031, .0015], see Appendix D.11). It does not make sense conceptually to do a triple difference with the broad group and therefore, we focus at the margin on the restricted age group.

The difference-in-difference estimate for the restricted age groups is insignificant ( $\beta = .00007$ ,  $p = .871$ , 95% CI [-.0008, .0009]) suggesting that there is no change in behaviour between the groups at a different point in time (Figure 7.8).

<sup>23</sup>See <https://doi.org/10.17605/OSF.IO/X7UDS>

Figure 7.8: Difference-in-difference for probability of opt out pre 6 July 2016. Control = 54 years old, Treatment = 55 years old.



A triple difference with leaving and ceasing as the dependent variable<sup>24</sup> results in a significant difference in leaving/ceasing behaviour in the post the 6 July 2016 time point suggesting that there are perhaps normal fluctuations in the leaving and ceasing rate ( $\beta = .0085$ ,  $p = .023$ , 95% CI [.0012, .0158], see Figure 7.9). This analysis is complicated by the fact that the way leavers and ceasers are recorded in the data changed in October 2015, meaning the comparison between April 2015 and July 2016 is not like-for-like.

### Pension pot with a value over £10,000

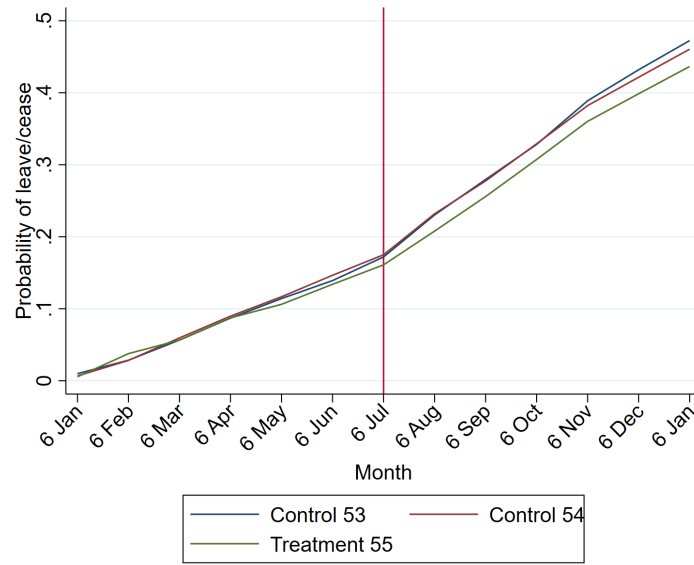
While the government wanted to encourage use of the new flexible options (HM Treasury 2014b, p. 15), they also perceived a risk that people would avoid income tax (and possibly National Insurance contributions too) by diverting their pay into a pension, benefiting from tax relief and employer matching and then immediately withdrawing. The Money Purchase Annual Allowance (MPAA) was one way to reduce the prevalence of this happening by limiting the amount of contributions that could be ‘recycled’ to receive tax relief to £10,000.<sup>25</sup><sup>26</sup> Therefore, those with a pot size greater than £10,000

<sup>24</sup>For parallel trends, see Appendix D.7, D.8 and D.9

<sup>25</sup>The exact trigger events for the MPAA are somewhat complex, see <https://www.gov.uk/hmrc-internal-manuals/pensions-tax-manual/ptm056520>

<sup>26</sup>The MPAA since 2017 is £4,000.

Figure 7.9: Triple difference for probability of leaving or ceasing pre 6 July 2016. Control 53 = 53 year olds, Control 54 = 54 year olds, Treatment = 55 year old.



arguably have more friction (through a greater number of eligibility considerations) and therefore may be less effected by the potential gains following the introduction of F&C.

In order to determine whether members were likely affected by the MPAA, we received the pension pot values as of April 2015 for those with an account open. In the Nest pension scheme at the time, fewer than 25 people aged between 45 and 64 had a pot balance of greater than or equal to £10,000<sup>27</sup> and so this confirms that the vast majority of members are unlikely to be affected in reality by the MPAA (before considering the other eligibility criteria). This is perhaps unsurprising given the scheme had only been open for a couple of years at the time and staging meant many members had been in the scheme even less time than this. The scheme also has a high proportion of low and mid salary earners with default minimum contributions at 2 percent, and so accumulating a pot of £10,000 may take a considerable amount of time.

A natural log of pot value was created in order to make the data normally distributed. Using a triple difference where being aged 55 is the treatment, 54 is the control and age 53 is the second control, no members had a pension pot value of £10,000 ( $M = 73.12$ ,  $SD = 157.74$ ). The opt-out outcome was regressed on treatment group and whether or

<sup>27</sup>No one aged 54 or 55 had a balance of £10,000 or more.

not they were in the pre- or post- intervention time period. The results suggest that the pot values do not significantly differ between the groups nor do those with smaller pots opt out at a lower rate. This suggests that the size of the pot had little impact on deciding whether or not to opt out, at least at this time in the scheme's history where pot values were low and few people would have had the additional consideration of MPAA limitations.

## 7.5 Discussion

The introduction of the F&C legislation in April 2015 allowed those aged 55 years old and older to draw down on their pension and take cash lump sums in a way that, up until that point, was more restricted.<sup>28</sup> This gave workers the opportunity to take their pension (including their 25% tax-free lump sum) while continuing to make contributions to their pension and receive employer matches and tax-relief - potentially hundreds of pounds of additional 'free' money with little friction. In this Chapter, I explored the impact of this policy on the level of opt-out behaviour given that such a policy should make it less desirable to opt out amongst the over 55s. The results suggest that the introduction of F&C did decrease the probability of opting out for 55 year olds, although the difference is very small. I conducted robustness checks in order to determine whether this was due to simple month-to-month fluctuations in participation and find that when the same analysis is conducted on July 2016, the opt-out figure is insignificant (at  $p > .05$ ), suggesting the opt out decrease seen in April 2015 is the result of the policy change rather than month-to-month variation.

These results suggest that a small number of people were have been influenced by the increased flexibility introduction of the F&C, but far fewer than those who *could* have stood to benefit hundreds of pounds with minimal effort. Indeed, it would be expected that opt-out rates for the over 55 year olds would be almost zero following the intro-

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<sup>28</sup>Prior to April 2015, those using the flexible draw down options available were required to prove they had secured a minimum income of £20,000 for life, and, therefore, in most cases had no need to make further saving provisions for their retirement. Under the new system, from April 2015, individuals no longer have to meet this criteria, and so saving after their pension is accessed may be desirable.

duction of the policy given the risk-free gain. However, it is possible that individuals have a deferred DC pension outside of Nest that has a value over £10,000 which, if they accessed, would trigger the MPAA; perhaps decreasing the incentive to use a contribute and withdraw strategy. This seems like an unlikely explanation for the small decrease here as the MPAA would only affect a small number of people (HM Treasury 2017) and so, regardless of its influence, the F&C should still have resulted in a lower level of opt out than was seen.

In 2016, at the time the F&C legislation was introduced, the flexibility of accessing your pension through a cash lump-sum and draw down as well as the previously available annuities was widely publicised (Money Box Radio 4 2014; Peachy 2015; Watt et al. 2014). At the time, there was concern people would splurge on luxuries or be frivolous but politicians defended against such claims and reasoned that the “best people to trust with money are the people who earn that money in the first place” (UK Parliament 2014, Column 255, para 3). The access to cash was heard by the consumer and in a July 2017 report, it was estimated that over one million pots had been accessed since April 2015 with 72 percent of consumers under 65 accessing their pot, mostly taking lump sums (Financial Conduct Authority 2017a). Therefore, it does not appear that the lower than expected decrease in opt-out rates following the introduction of the policy was the result of not understanding that there was now an opportunity to take cash. Rather there is either a lack of understanding about the potential gains from continuing to contribute, the friction is too great to engage with a contribute and withdraw strategy, an already adequate pension pot has been achieved or there is a concern that an individual would trigger the MPAA. All of these explanations feel unlikely with the exception that people simply do not realise there is money to gain, although it is not possible to determine without further research. The findings are however in line with behaviour seen in other financial decisions and therefore perhaps serves to highlight that a lack of awareness or perhaps confidence in managing finances makes navigating the pension world ‘optimally’ a challenge.

Overall, the ‘contribute and withdraw’ strategy requires some time and effort (albeit

minimal) to execute but can have substantial benefits for an individual. Results from the extant literature suggest that people frequently do not optimise such strategies even when the gains are comparatively greater. While we find some effect in the present study, the size is small and provides further support of the notion that people leave \$100 - or in this case £100 - bills on the sidewalk (Choi et al. 2011).

## 7.6 Conclusion

This chapter details the effect of the F&C legislation on opt-out behaviour in the Nest pension scheme was examined to determine whether people utilised the policy by opting out of their workplace pension at lower rates; and, therefore, whether the government has reason for concern about the recycling of pension contributions. I found that there was evidence of reduced opt out following the policy introduction but no evidence that the behaviour of people already enrolled changed their behaviour (i.e. by ceasing contributing at lower levels). This suggests that the policy was effective at encouraging individuals to remain enrolled in their pension when a natural point of change existed. Whilst it may be expected that the opt-out level would be near zero (which it is not), any change in saving behaviour is worth considering given the implications for tax relief costs to the government. This is particularly true given the primary role of F&C was not to change pre-retirement behaviour and such secondary outcomes have not been widely considered when evaluating the success of the F&C legislation where, instead, the focus has been on the methods of access and decumulation over time (see Department for Work and Pensions 2020c; House of Commons Library 2019).

While not by definition a nudge intervention due to the change in underlying economic incentives, this intervention is light-touch and, in line with the preceding findings in this thesis on other light-touch interventions suggests that its value is minimal when looking to change saving behaviour. With this in mind, in the final empirical chapter (Chapter 8) I move away from pension saving specifically and towards more broad concepts of financial wellbeing and financial capability. If retirement saving behaviour cannot be

impacted directly with light-touch interventions, then perhaps their value lies more in improving individuals' financial confidence and behaviours to support decision making in the future.



# Chapter 8

## Financial wellbeing and capability of widening participation students and a text message intervention to improve it

A version of this chapter is being peer reviewed by the Journal of Widening Participation and Lifelong Learning.

### 8.1 Introduction

In this chapter, I examine the impact of a light-touch text message intervention on the financial wellbeing and capability of widening participation students in English universities. At first this may seem like a departure from the rest of the thesis where the link to retirement saving is more explicit; however, young people's financial attitudes and saving behaviour are often formed by the socialisation they experience during childhood (e.g. Ameriks et al. 2003; Cronqvist et al. 2015) and compounded during early adulthood as they experience relative financial independence for the first time. Therefore, attempting to improve the financial capability of university students has the potential to have long-

lasting effects for the financial behaviour and decision making of adults: building good habits, improving understanding of products and services, and raising awareness of financial risk, all of which could serve them as they enter the workforce, and start contributing to a pension, when they leave university. While the long-term impact of financial capability is not studied in the current chapter, I do explore the research question outlined in Chapter 3 - Can a light-touch intervention be used to increase the financial capability of widening participation students in English higher education institutions? This is the primary focus in this chapter.

While financial education has resulted in somewhat mixed results for changing financial behaviour (Fernandes et al. 2014; Kaiser et al. 2020; Miller et al. 2015), building financial capability through encouraging students to seek out information and help relevant to their personal financial needs has begun to demonstrate promise in improving financial wellbeing and behaviour (Haleem et al. 2022; Vaaler et al. 2021). Students with greater financial literacy are also, on average, better able to manage their debts upon leaving university (Artavanis et al. 2020; Markle 2019), which may put them in a better position for saving for long-term financial goals post university. Indeed, evidence from the British Household Panel Survey (BHPS) finds that financial capability is persistent over time with having low (as opposed to high) financial capability doubling the probability of low financial capability in subsequent years (from 15% to 30%; Taylor 2011). Low financial capability was also associated with lower life satisfaction (equivalent in size to being unemployed compared to in full-time employment), lower levels of saving, and lower income. Crucially, these impacts to life outcomes occur even after accounting for contemporaneous financial capability, mediators and confounders, and suggests that improving financial capability could have not only immediate effects (e.g. to psychological wellbeing), but also longer lasting impacts on mental health, saving behaviours, living standards and income (Taylor 2011). Consequently, an intervention targeted at improving the financial capability of young people, while they're still at university, may be an important time to avoid long-term difficulties.

Financial education in itself is often not considered a 'nudge' as it does not use System

1 processing (Kahneman 2011)<sup>1</sup> or change the choice architecture. Despite, that it has shown some success particularly when it is delivered in a just-in-time way (Fernandes et al. 2014). Therefore, in this study I seek to examine the impact of a text message intervention that nudges individuals to seek out information and support with the money management on financial capability and wellbeing measures. One criticism of financial education is that it is often most effective among those who are already educated or have higher levels of financial wellbeing (e.g. Chin et al. 2020; Hoffmann et al. 2018),<sup>2</sup> and therefore in this study I focus on widening participation students, a group known to be particularly financially vulnerable.<sup>3</sup>

In the remainder of this chapter, a summary of the literature is presented along with the primary research hypotheses. As with previous chapters, much of the relevant literature is also presented in Chapter 2 but some specific literature is presented here. This is followed by a description of the method used. Finally, the results and a discussion thereof are presented, including the implications of the research from a public policy perspective.

## 8.2 Literature review

In an increasingly complex financial world, the importance of enhancing financial capability is widely recognised. It is arguably one of *the* key life skills which can have considerable ramifications on wellbeing, affecting quality of life and downstream outcomes such as poverty, depression and indebtedness (Hastings et al. 2013). The complex issues and widespread impact mean that improving financial capability and wellbeing is a priority in many countries, and accordingly the UK have a dedicated financial capability strategy aimed at addressing this.<sup>4</sup> It is focused on “improving people’s ability to manage money well, both day to day and through significant life events” as well as individuals’

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<sup>1</sup>Although nudges using System 2 can still be considered nudges in some instances.

<sup>2</sup>Consistent with enrichment theory.

<sup>3</sup>Reduced processing costs from enrichment theory lead to increased search behaviour among those educated. This study targets those who need a ‘nudge’ to engage with search behaviour. See ‘feeling of knowing’ rationale for the opposing argument (Chin et al. 2020).

<sup>4</sup>See <https://www.fincap.org.uk/>

“ability to handle periods of financial difficulty”.<sup>5</sup>

Although all age groups can face challenges around financial capability and resilience (Cummins et al. 2021), this can be particularly pertinent for university students. Undergraduates are often (although not exclusively) young people on the verge of adulthood and who are experiencing relative financial independence for the first time: paying bills, engaging in debt management and balancing financial priorities (e.g. Xiao et al. 2009). Frequently, they do not have complete dependency on parents and carers but equally often do not have the enduring responsibilities associated with normative adulthood (Arnett 1998). Their low levels of income and financial inexperience and knowledge mean they are often considered a vulnerable consumer group (Smith et al. 1997) and can experience greater financial issues. This life stage is also sensitive for mistakes which could lead an individual to postpone future financial planning (Lusardi et al. 2010), influence financial attitudes (Shim et al. 2010) and affect their overall capability well into adult life (Taylor 2011; The Money Advice Service 2014).

The implications of such financial challenges can be severe with one in three students having to cut back on food due to financial constraints (National Union of Students 2021), and 27.6 percent of 18 to 24 year olds reporting food insecurity, the highest of all age groups (Pool et al. 2021). Food insecurity can result in a number of negative psychosocial (as well as physical) outcomes including stress, feelings of hopelessness or being undeserving of help, fear of disappointing family and anger towards institutions for not providing enough support (Meza et al. 2019). It can also result in lower academic performance (Weaver et al. 2020) both directly and indirectly through poorer mental health (Martinez et al. 2020) and greater rates of drop out (Roberts et al. 2000; Roberts et al. 1999). Indeed, as many as 65 percent of students self-report their finances affecting their mental health, and 36 percent say it affects their relationships (Save the Student 2021). The Covid-19 pandemic, ongoing at the time of the present research, has perhaps also compounded the issue with part-time work not frequently available for an extended period in sectors like retail and hospitality, and the income of people who formally supported

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<sup>5</sup>See <https://www.fincap.org.uk/en/articles/UK-strategy-detail>

students hit by furlough and job loss (National Union of Students 2021).

Compared to the general student population, those from widening participation<sup>6</sup> backgrounds are more likely to be on lower incomes, have less financial support and have been found to be more worried about the financial aspects of higher education, including the accrual of debt and balancing finances whilst at university (Department for Education 2019; Hordósy et al. 2019). Together this can reduce the quality of their student experience and lead to lower levels of wellbeing as well as greater levels of drop out and poorer academic performance amongst these groups (Department for Education 2019). Financial capability and wellbeing can therefore be particularly important for the success of widening participation students in higher education and is therefore of interest to higher education providers.

Save the Student (a UK-based website that provides free and impartial advice to students on how to manage their money) estimates that over two thirds of students arrive at university without the financial understanding to manage their money “making a tough financial situation that much tougher for students.” (Brown 2020). In the UK, approximately a third of people do not make a budget, one in six have difficulties identifying the balance on their bank statement, and 90 percent do not read the full terms and conditions when utilising a financial product (Money Advice Service, 2013). Sixteen to 24 year olds have the lowest financial capability of any age group (Office for National Statistics 2015), and 18 to 24 year olds’ rating themselves as the least confident and knowledgeable in managing money (Financial Conduct Authority 2017b).

Yet, students are not ignorant of such challenges with 74 percent wanting to improve their financial education (Brown 2021). To address this, teaching financial education has arguably been the primary intervention for helping young adults (and the population more broadly) improve their financial decision making, and typically refers to the passing on of financial knowledge. From this perspective, risky financial decision making and poor financial resilience can be avoided if an individual becomes more financially knowl-

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<sup>6</sup>A government educational policy which attempts to increase the numbers of young people entering higher education from under-represented backgrounds.

edgeable (Lusardi et al. 2014). Afterall, knowledge is supposedly power (see Garbinsky et al. 2014) and higher aggregate levels of financial knowledge are associated with better financial decisions which contribute to greater levels of financial wellbeing (e.g. Hilgert et al. 2003; Sabri et al. 2012). However, while intuitive that those who do not behave in an economically rational way must either lack information or the ability to understand it (Garcia 2013), financial education alone has frequently been found to be insufficient for shaping financial behaviours (Fernandes et al. 2014). The frequent reliance on correlational evidence can also result in misleading conclusions and its effectiveness is highly variable depending on its presentation and an individual's existing attitudes and beliefs (Bernheim, 2014). Moreover, it is often expensive relative to its impact (or perhaps more often – unreported) and can be most beneficial to those already more confident in financial matters. It is therefore not surprising that some are sceptical of its value (Fernandes et al. 2014). Regardless, it is undeniable that there are still many who are either misinformed or uninformed around financial matters (Akben-Selcuk et al. 2014; Lusardi et al. 2010) and would benefit from solutions which address this while also improving financial and overall wellbeing.

The availability of information on building good financial behaviours (e.g. budgeting and saving) when a student is often not the issue but rather students are overwhelmed by the quantity of information presented and their engagement with such materials is often related to their financial confidence (Money and Pensions Service 2021). Therefore, the current study aims to improve financial wellbeing and capability by utilising a series of short text messages encouraging beneficial financial behaviours and sign posting useful resources and financial support. It is hoped that the messages will improve aspects of financial capability including financial confidence, attitudes, behaviours and perception of control which may lead an individual to engaging in greater levels of information and help seeking through a realisation of its importance (OECD 2005). Overall, it is hoped that such messages will result in an improvement in financial capability and wellbeing. To date, few studies have looked at how to engage students in improving their own motivation to seek financial information for themselves and the present study will examine one such

intervention.

### **8.2.1 Financial wellbeing**

Financial wellbeing is defined as “feeling secure and in control [of your finances]. It’s about making the most of your money from day to day, dealing with the unexpected, and being on track for a healthy financial future. In short: financially resilient, confident and empowered” (Money and Pensions Service 2022, para 1). Perhaps unsurprisingly, low income, accumulating overdraft fees, loans, and credit cards can all make university a financially stressful time, reducing wellbeing. It is one of three factors noted as an explanation for the decline in student mental health in recent years (University of York 2016, see also Brown 2016). Three out of four people at university worry about money and as many as 75 percent of students saying that worrying about their finances impacts their mental health, including greater anxiety, stress and feelings of hopelessness (Blackbullion 2021). Financial difficulties lead some to discontinue their studies with 48 percent reporting that they had considered dropping out or deferring due to money worries (Blackbullion 2022). Many studies corroborate these findings including Heckman and colleagues who find 7 in 10 students are stressed about their personal finances (Heckman et al. 2014).

Financial stress has been linked to reactive rather than proactive approaches to financial management (Serido et al. 2014b) and can impact overall personal wellbeing too (Bond et al. 2021). Poor financial wellbeing can also lead to less optimal outcomes that are specific to education, with students low in financial wellbeing more likely to drop out (or consider dropping out) of university (Azmat et al. 2017; Department for Education 2019; Save the Student 2022), have lower academic performance (often directly through low financial wellbeing or indirectly through things like a necessity for part-time work; e.g. Davies et al. 2012). It can also affect mental and physical health and relationships (Save the Student 2022) which can directly and indirectly impact broader wellbeing, and affect sleep, concentration, motivation and productivity (Furtuna 2007).

For many, lack of financial resources is the primary reason for low financial wellbeing. It is estimated that the average student maintenance loan falls £439 below an average student's expenses creating financial stress and hardship (Save the Student 2022). However, having sufficient resources is not the only component that contributes to wellbeing; financial stability, personality, understanding of one's own situation and financial capability all play a role (Montalto et al. 2019). Indeed, those with objectively identical financial situations may consider their personal financial wellbeing more or less positively (Grable et al. 2013). Therefore, interventions which improve the management of money, and attitudes towards it, may be beneficial for improving financial wellbeing without changing income levels (although this is not to say that an increase in income would not yield a benefit too).

Higher education institutions recognise the impact financial wellbeing can have on outcomes and university and the influence of financial skills and capability on future financial success. Given finances can impact overall student experience, performance and likelihood to drop out, it is unsurprising that many universities offer resources and support to improve financial wellbeing through improved capability.

### **8.2.2 Financial capability**

Financial capability encompasses a set of skills and concepts that are valuable throughout the lifespan but can also alleviate the financial stress and anxiety (i.e. poor wellbeing) students feel in the short term. These concepts include financial knowledge, resources, inclusion (or accessibility), habit, behaviour and confidence (e.g. Çoşkun et al. 2020; Money and Pensions Service 2015; Xiao et al. 2017). The World Economic Forum names financial capability as one of the 'critical 21st-century skills' (World Economic Forum 2015) and the Sustainable Development goals set by the United Nation lists sound financial decision making in their goals for 2030 (Desa et al. 2016). Despite its presence on both national and international agendas, it remains worryingly low in the UK with strategies needed to improve outcomes.



Many studies have demonstrated a clear connection between financial wellbeing and aspects of capability such as financial knowledge or behaviour (e.g. Białowolski et al. 2020; Hilgert et al. 2003; Robb et al. 2011; Shapiro et al. 2012; Tang et al. 2015; Xiao et al. 2017), with evidence suggesting that those with higher financial capability are likely to achieve financial wellbeing (Xiao et al. 2017). While models of financial capability vary, in this study I use the developmental model of financial capability developed by Serido et al. (2013) specifically to explain how young adults acquire financial capability. The conceptual model includes three elements: financial knowledge, self-beliefs and financial behaviour which can all impact financial (and overall) wellbeing. This model was chosen because it acknowledges the changes in processing that occur in late adolescence (e.g. 18 to 24 years old), where individuals develop a more relativistic view of the world (e.g. that decision making is not about choosing the ‘right’ action but rather the most adaptive action for the current situation based on previous experience and knowledge). Moreover, young adults also start using complex decision-making processes (accounting for knowledge, personal values and responsibilities) in a more sophisticated way than they have up until this point. Each element of the model is explained in more detail below.

### **8.2.3 Financial knowledge**

Financial knowledge is perhaps the most widely researched component of financial capability and refers to an individual’s knowledge on a range of financial topics (e.g. compound interest, budgeting, investing etc.). Its ubiquitousness is partly because it is an intuitive explanation that individuals may not make optimal financial decisions because they lack the financial literacy to do so. Indeed, young adults have been found to have low levels of financial literacy (Lusardi et al. 2010) and evidence suggests a positive association between financial knowledge and behaviours (Fan et al. 2017; Hilgert et al. 2003; Van Rooij et al. 2012). For example, high future earnings and saving rates are correlated with the financial knowledge of university students (Danes 1994) and the likelihood of facing financial difficulties after graduation increases with less financial knowledge (Hira 2002). Financial education (i.e. improving financial knowledge) is also associated with financial

behaviours like the reduced use of pay day lending services by young adults with higher levels of knowledge (Harvey 2019).

Many studies draw conclusions that low levels of financial knowledge can lead individuals to make uninformed or inappropriate decisions. In an early study, Danes et al. (1987) examined students' knowledge of credit cards, insurance, personal loans, record keeping and overall financial management. They posit that students often have a basic and general knowledge of financial topics but that information on specific topics was often lacking. More recently, Xiao et al. (2014a) found an association between financial behaviour of university students before and after their time at university and find those who are more knowledgeable have lower risky payment behaviour.

Despite the association between financial knowledge and responsible financial behaviour, evidence for the direct link between improved financial knowledge and financial behaviour is, at best, inconclusive (McCormick 2009). Lührmann et al. (2015) argued that financial education (i.e. providing students with knowledge on financial topics) is a beneficial way to develop students' interest in financial topics and improve their financial behaviour. Yet in a review of literature, it has been suggested that financial literacy can predict as little as 0.1 percent in financial behaviours (Fernandes et al. 2014). Therefore, while a basic knowledge of financial concepts and products is undoubtedly important (Chen et al. 1998), its impact on behaviour is likely to be through other mechanisms including self-beliefs. Tang et al. (2016) suggest that financial knowledge in and of itself cannot drive positive financial behaviours but that self-esteem (financial confidence) is associated with behaviours while others suggest it is financial attitudes that are more important than knowledge in shaping behaviour (Dwiastanti 2017).

#### **8.2.4 Financial self-beliefs**

Social cognitive theory, one of the theories which was used to develop the developmental model of financial capability, proposes that self-beliefs - and the working models that arise from them - are important for an individual's ability to understand how the financial

concepts that they learn work and apply them to their own financial life. These self-beliefs encompass financial attitudes, perceived behavioural control and financial self-efficacy.

### **Financial attitudes**

Financial attitudes, such as perceiving credit cards as costly or viewing budgeting as important, influence a broad range of financial behaviours (e.g. Çoşkun et al. 2020; Hayhoe et al. 2000; Jorgensen et al. 2010; Zachary Finney et al. 2018). Yet, despite this, the success of financial education programmes is often measured through knowledge acquisition rather than a change of financial attitudes which may actually be more beneficial for shaping behaviour. For example, it is increasingly being found that the relationship between financial literacy and financial behaviour is mediated by familial socialisation (Jorgensen et al. 2010; Khawar et al. 2021; Shim et al. 2010). This is perhaps because such socialisation impacts the attitudes an individual has about money. In fact, one study suggests parental socialisation does not actually impact financial knowledge itself but does affect behaviour through a mediation of financial attitude (Jorgensen et al. 2010).

In alternative models, it has been suggested that financial attitudes affect financial management behaviour through the moderation of financial knowledge (Asandimitra et al. 2021; Niazi et al. 2019; Qamar et al. 2016). Financial attitudes may affect the degree of concentration and attention one pays to financial issues. For instance, Albeerdty et al. (2015) found financial attitude to be a key determinant of financial capability in university students and that it also improved financial understanding. Such attitudes can also lead to information search behaviours which can improve outcomes (Burgess 2005).

### **Perceived behavioural control**

Perceived behavioural control refers to the belief that a particular behaviour will result in an expected outcome (Bandura 1977). It can be reflected in an individual's belief in their ability to access resources and opportunities that may hinder financial behaviour. Some have suggested financial knowledge as a proxy - or at least a variable that strengthens or weakens behavioural control - given literacy can affect comprehension of a product and

its application, and so an individual can understand what needs to be done to execute a money management behaviour if they have greater knowledge (Asandimitra et al. 2021). Indeed, it also likely interacts with financial attitudes with favourable financial attitudes leading to greater perceived behavioural control which may then impact the intention to perform certain behaviours. The study of perceived behavioural control is mostly included in the application of the Theory of Planned Behaviour and has been found to be correlated with the intention to invest money (Raut et al. 2018), intention to use credit cards (Anastasia et al. 2020), and the intention to save, making it likely an important component to improve.

### **Financial self-efficacy**

Financial confidence, or self-efficacy, refers to an individual's belief in their ability to manage their finances effectively (Lown 2011). It is distinct from perceived behavioural control with the latter referring more to locus of control and the former being a person's perceived personal ability to achieve a behaviour (Bandura 1977). Financial confidence is sometimes defined in terms of perceived financial knowledge (Bialowolski et al. 2020) or subjective financial knowledge (Xiao et al. 2017) although this is arguably a simplification of the concept used for an outcome measures.

Financial confidence affects financial behaviours with less confident consumers thought to be less likely to seek out investment advice (Porto et al. 2016), participate in the stock market (Xiao et al., 2014) and be more vulnerable to poor products and services (e.g. Financial Conduct Authority 2021). Some studies find that students have relatively high levels of financial confidence (e.g. Bartholomae et al. 2021) with researchers suggesting that it is this, rather than financial knowledge per se, that explained the influence of financial education on behaviour (Vlaev et al. 2017; Xiao et al. 2017). Consequently, this should be considered when examining the success of an intervention as it can have a negative influence where those high in confidence may not seek out information even though their *actual* knowledge is low (Radecki et al. 1995). In other words, you increase the perception they can manage their money without them actually having the skills to

do so.<sup>7</sup>

## 8.2.5 Financial behaviour

Financial behaviours are another component of financial capability. They are a phenomenon that has been measured at the general (e.g. budgeting, credit usage) and specific level (e.g. enrolment in a specific product). They are the culmination of self beliefs and the action (or lack thereof) that ultimately affects an individual's financial position both now and in the future. Many students are considered 'vulnerable consumers' with low financial capability and a lack of engagement in financial behaviours (Xiao et al., 2015). As a result they can be particularly likely to make poor financial decisions and are often susceptible to high interest repayments on loans, financial fraud and are vulnerable to increasingly complex financial markets (Xiao et al. 2017).

In a study on school- and university-based programmes, (Mandell et al. 2009) found financial education had little impact on financial literacy one to four years after the intervention but it did improve financial behaviours. Similarly, Susilowati et al. (2017) found that interventions that improved literacy and financial confidence also had a direct impact on financial behaviour. There is also an indirect effect of literacy and confidence on behaviour through financial attitudes. This suggests that improving self-beliefs can be important for ultimately affecting behaviour, and it is this improved financial behaviour that can also impact wellbeing.

## 8.2.6 The present research

Building on these self-beliefs that constitute the development of financial capability and with the understanding that financial education often yields underwhelming results (particularly relative to cost), it has been suggested that these beliefs can instead result in (and from) an individual's own search for information about financial topics. That is, financial information may be more effective at changing self-beliefs when an individual

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<sup>7</sup>So called 'finfluencers' may affect behaviour in this way, giving individuals the confidence to make financial decisions without the skills to make the right ones.

seeks out information relevant to their financial issue themselves rather than being educated on it per se. This was acknowledged in the 2005 OECD report which suggested that attention should be paid to the consumers' reluctance to seek out information as one of the key barriers to financial capability (OECD 2005).

This reluctance has been posited to primarily be due to the impression that finance is a complicated subject that frustrates consumers with the difficulty finding easy-to-understand, accurate information and leading to most information being provided by chance. Yet, if an individual can be encouraged to seek out information relevant to their financial topics of interest, then not only does the information have the possibility of affecting an individual's self-beliefs, but so too does the action of searching in and of itself (i.e. I am searching for the information so I must be interested in this).

The process of information seeking can be defined as “a process that includes multiple stages of question asking and refining, information gathering and evaluating... synthesis and use of information” (McCrory Wallace et al. 2000, p. 97). It builds on the notion of ‘just in time’ education which is provided as a person needs it and has shown promise at improving the effect of financial knowledge on behaviour. This is because the effects of financial education programmes often improve some financial outcomes but the effects decay rapidly. Therefore, just in time education that is presented when an individual must navigate a decision may link the education to a goal, increasing self-relevance, and allowing for behaviour to reinforce the remembering (Fernandes et al. 2014).

Information seeking similarly allows an individual to tailor the information they receive to their needs, personal objectives and goals making it more probable that an individual will remember. In an education setting, where research on information seeking is ubiquitous, Connaway et al. (2011) found that often the convenience of information guides how resources are chosen, with some people sacrificing the content of the resource in favour of other factors. Therefore, in the financial domain, an intervention that makes it easy to find high quality information is likely to be valuable although evidence in this domain is currently lacking.

Evidence suggests that activities that involve self-directed and voluntary financial learning are the most effective ways to improve financial behaviours (Mountain et al. 2021). This is partially because, as mentioned, those seeking information are likely to be more engaged in and motivated to learn about the topic they are seeking information on. However, this motivation may also be due to an understanding that an individual has a personal responsibility for their financial wellbeing (Pereira et al. 2020) or a reactive response to financial difficulties (Lim et al. 2014). Given this, focusing on those most likely to experience financial difficulties is likely to yield the greatest benefit (Lim et al. 2014). This is partially because to some extent building self-beliefs may be better than the knowledge obtained from financial learning per se. For example, Mountain et al. (2021) find that young adults with parental financial role models demonstrate better financial behaviours but often do so with low levels of financial knowledge. This suggests knowledge is not a pre-requisite for good financial behaviours. Similarly, Johansen (2013) found both a person's social environment and the availability of retirement information positively affected enrolment in a workplace pension.

In the case of university students, Vaaler et al. (2021) identified that students often lack the awareness of the financial information available, even though many realised the importance of financial literacy, and therefore drawing attention to it and encouraging students to seek out further detail themselves is likely to be beneficial. It is also often thought that the motivation to engage in information seeking behaviour is most common when an individual perceives a gap in their knowledge and realises the gap this lack of knowledge has on their life (Kahlor 2007; Yang et al. 2013). The need to satisfy some form of goal leads an individual to purposefully seek out information to change their state of knowledge (Wilson et al. 2000, p. 49). Although information can be acquired in both active (e.g. education programmes, conversations, internet searches) and passive (watching television adverts) ways (Wilson et al. 2000), it is the former that is sought out. When an individual seeks out their own information, they are also more likely to learn from it and put it into action. Research on information seeking in the domain of financial situations is in its infancy but it may be hypothesised that information seeking is

more likely to affect the perceived control an individual has over their financial situation as well as their financial self-efficacy because of the feeling of empowerment.

Help-seeking behaviour, a type of information seeking, can also be used as a coping strategy in times of financial stress (Grable et al. 1999) but is often underutilised by young people. In a study exploring the factors affecting take up of a peer-based financial support service at university, Britt et al. (2011) found that those with lower perceived net worth, higher mental health distress, greater age, lower perceived financial knowledge, and lower predicted income satisfaction were more likely to seek help (in that order of importance). Grable et al. (2001) would classify this type of peer support as non-professional help seeking along with things like talking to family and friends. The alternative is professional help seeking (i.e from financial advisors and stockbrokers) and they find that the decision to seek professional help is associated with a better financial behaviours, higher risk tolerance, higher financial satisfaction, higher age and home ownership. Financial behaviour and vulnerability are frequently intertwined (Brüggen et al. 2017; O'Connor et al. 2019) meaning that targeting financial capability interventions at the most vulnerable is likely to be most beneficial particularly when they encourage information and help seeking.

Given many higher education institutions recognise their role in equipping students not only with a solid education in their chosen field but also in offering services which will enhance and support student with life skills that provide a foundation for the complex decisions they need to make in their future lives. Financial education is often part of that equation with many universities offering some form of financial education or support to their students. However, limited resources mean that frequently universities can offer only limited activities, such as workshops or seminars, which are often poorly attended and have been shown in previous research to be limited in value. Some use financial education platforms like Blackbullion to fill the knowledge gap allowing students to tailor their education to areas that are of interest or concern to them. Still others offer personal guidance and peer-to-peer support for financial issues. Most also provide a hardship fund (although amount and eligibility vary by university) to support students through financial difficulties. While all of these interventions are positive they rely on students being aware



of them and engaging with them and therefore developing an intervention that signposts the resources available may be beneficial. Indeed, that is the aim of the present research and it will extend the small current literature in this domain.

## **8.2.7 Research question and hypotheses**

The current study extends existing understanding by examining how short text messages encouraging beneficial financial behaviours and sign posting useful resources may be used to improve financial capability and wellbeing perhaps through greater financial confidence, or information seeking. It is hoped that rather than providing financial education per se, the messages will give individuals a greater sense of control and, in line with the OECD's (2005) description, a realisation of the importance of seeking out information. The study will also examine how financial capability, and components within this including financial confidence, perceived control and financial attitudes affect both financial and more general wellbeing.

It is hypothesised that:

H1: Widening participation students who receive the text message intervention will have improved levels of financial wellbeing and higher than those who do not receive the intervention (controlling for baseline levels of financial wellbeing)

H2: Widening participation students who receive the text message intervention will have improved levels of financial confidence and higher than those who do not receive the intervention (controlling for baseline levels of financial confidence)

H3: Widening participation students who receive the text message intervention will have improved financial attitudes than those who do not receive the intervention (controlling for baseline financial attitudes)

H4: Widening participation students who receive the text message interven-

tion will have improved financial behaviours than those who do not receive the intervention (controlling for baseline financial behaviours)

H5: Widening participation students who receive the text message intervention will have improved levels of perceived financial control and higher than those who do not receive the intervention (controlling for baseline levels of financial control)

At the global policy level, young people have been identified as a priority for targeting financial education (Publishing et al. 2014). This is unsurprising given the wealth of research that suggests university students are stressed out by their finances (e.g. Save the Student 2022). Yet, few studies look specifically at vulnerable groups (for exception see Porto et al. 2016) and this is the first to my knowledge which focuses specifically on a light-touch financial intervention for widening participation students.

Widening participation students are a specific group of under-represented students in English universities. Widening participation agendas have been in place in higher education for many years and attempt to remove barriers for access to higher education, and improve progress, graduate outcomes and employability for those from disadvantaged backgrounds (Connell-Smith et al. 2019). This includes students who are care leavers, those low income households, mature students, those with disabilities and certain ethnic minorities.

Compared to the general student population, those from disadvantaged backgrounds have been found to be more worried about the financial aspects of higher education, including the accrual of debt and balancing finances whilst at university which can make them feel in less control of their money (Department for Education 2019). This can reduce the quality of their student experience and lead to greater levels of drop out (Department for Education 2019). This makes them particularly vulnerable to poor financial wellbeing and therefore the intervention is specifically targeted at them given the hypotheses that improving financial capability will improve financial wellbeing.

## 8.3 Method

### 8.3.1 Participants and procedure

Approximately 170 higher education providers were contacted to participate in the present study by the Centre for Transforming Access and Student Outcomes in Higher Education (TASO) via email newsletter<sup>8</sup> and social media channels. Higher education providers interested in participating contacted the research team directly and were provided with additional information about the study and how to participate ( $N = 25$ ). In total, fifteen higher education institutions from across England participated in the research.

All students invited to participate in the survey were ‘Home’ fee status paying and completing an undergraduate degree at an English higher education institution. Prior to August 2021, ‘Home’ fee status included both UK and EU nationals. However, following the UK’s departure from the European Union, those from the European Union, European Economic Area as well as Swiss nationals who are not registered as ‘settled’ or ‘pre-settled’ in the UK are no longer eligible for home fee status nor support from Student Finance and would be excluded from this study. UK students account for approximately 83 percent of full-time undergraduate students at UK institutions (Higher Education Statistics Agency 2021). In this study, ‘overseas’ students, and students undertaking postgraduate, diploma, and degree apprenticeships were not included owing to the substantial differences in fees and funding structures for these individuals.

In addition to being ‘Home’ fee status and on an undergraduate course, the students also had to meet the criteria for widening participation. While a list of widening participation criteria was provided to participating universities, each was free to define the eligibility within this in accordance with their own internal policy and procedures. This is because not all universities collected information on students in the same way and some had existing mailing lists or definitions that they preferred to use which included some but not all of the criteria or added other factors (how university’s define widening participation

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<sup>8</sup>See <https://taso.org.uk/news-item/new-research-opportunity-improving-the-financial-wellbeing-ofwidening-participation-undergraduates/>

can often be found in their Access and Participation Plans). For example, one university added estranged students, another carers and many did not include mature students. Regardless of the criteria used, all students were asked the same questions regarding their widening participation status in the survey and the demographic and socioeconomic participant characteristics are illustrated in Table 8.1.

Table 8.1: Participant demographic summary statistics in Wave 1 by university.

Demographic characteristic	Total	1	2	3	4	5	Higher Education Institution									
		6	7	8	9	10	11	12	13	14	15					
Female	70.69%	67.08%	88.89%	76.70%	63.58%	81.25%	77.78%	79.17%	61.90%	66.67%	69.66%	65.98%	70.00%	52.17%	74.77%	74.62%
Other gender	2.96%	8.07%	0.00%	1.94%	4.62%	3.13%	1.59%	0.00%	3.17%	1.33%	2.25%	1.03%	0.00%	0.00%	3.69%	1.14%
Average age	23.71	22.42	21.67	26.64	24.70	22.94	24.27	32.42	19.57	19.34	21.33	25.14	31.60	19.43	23.34	26.22
(SD)	(7.96)	(6.43)	(5.93)	(9.18)	(8.56)	(8.91)	(9.58)	(12.14)	(2.09)	(1.22)	(4.99)	(9.22)	(10.40)	(.79)	(7.88)	(8.40)
Asian	10.87%	2.48%	50.00%	10.68%	11.56%	31.25%	9.52%	0.00%	6.35%	38.67%	7.30%	5.15%	3.33%	39.13%	4.62%	16.67%
Black	8.57%	1.24%	5.56%	1.94%	12.72%	3.13%	3.17%	25.00%	4.76%	18.67%	9.55%	6.19%	26.67%	0.00%	4.62%	16.29%
Mixed	5.08%	3.73%	11.11%	2.91%	6.94%	3.13%	9.52%	16.67%	6.35%	1.33%	5.62%	6.19%	6.67%	17.39%	4.00%	3.03%
Other	2.96%	1.24%	5.56%	2.91%	3.47%	3.13%	0.00%	4.17%	3.17%	2.67%	1.69%	3.09%	13.33%	8.70%	2.15%	4.17%
First generation	61.94%	55.90%	61.11%	63.11%	54.34%	87.50%	46.03%	45.83%	46.83%	56.00%	70.79%	64.95%	66.67%	65.22%	68.92%	64.77%
Second year	33.87%	38.51%	0.00%	50.49%	32.95%	25.00%	38.10%	50.00%	20.63%	34.67%	41.01%	31.96%	33.33%	73.91%	31.38%	27.65%
Third year	25.65%	23.60%	0.00%	38.83%	29.48%	9.38%	19.05%	20.83%	15.87%	26.67%	28.09%	34.02%	20.00%	17.39%	31.08%	19.32%
Living at home	44.21 %	29.19%	72.22%	58.25%	44.51%	40.63%	38.10%	70.83%	6.35%	49.33%	27.53%	54.64%	76.67%	47.83%	35.69%	
Have a disability	29.37%	24.22%	22.22%	38.83%	32.37%	21.88%	50.79%	20.83%	37.30%	13.33%	19.10%	31.96%	13.33%	4.35%	36.31%	26.14%
Carer	13.59%	8.07%	5.56%	15.53%	14.45%	21.88%	14.29%	16.67%	5.56%	9.33%	11.24%	11.34%	26.67%	4.35%	13.85%	21.21%
Care experienced	1.83%	2.48%	5.56%	0.97%	3.47%	3.13%	1.59%	4.17%	0.79%	1.33%	0.56%	2.06%	3.33%	0.00%	2.46%	0.76%
Care leaver	2.60%	0.62%	5.56%	1.94%	4.62%	0.00%	0.00%	4.17%	0.79%	4.00%	0.56%	1.03%	16.67%	0.00%	1.85%	5.30%
IMD Q1	15.82%	15.03%	11.11%	7.53%	17.47%	10.00%	17.74%	4.35%	29.66%	8.70%	10.18%	15.91%	6.90%	0.00%	31.29%	3.21%
IMD Q2	16.46%	21.57%	11.11%	15.05%	19.28%	10.00%	27.42%	13.04%	20.34%	20.29%	17.96%	12.50%	0.00%	0.00%	20.41%	6.83%

The participating universities contacted eligible students via email, in most instances, during freshers week in the autumn term 2021. Of a target population of more than 35,000 students, a response rate (completed surveys only) across institutions of approximately 5 percent ( $N = 2,140$ ) was achieved. This is lower than some previous research (e.g., Benson-Egglenton 2019), although not dissimilar to Vaaler et al. (2021) who studied financial help seeking in students. The low response rate may be due to the fact that there is a considerable demand for attention in the first week of term, particularly for first years who may not yet have accessed their emails. For returning students, term often does not start until the following week and so many may not be regularly checking their university email accounts at the point at which the email was sent out. The survey was also open for a short time period (just over a week in most instances). There was a mix of universities choosing to personalise the email and send reminders to students which too may have affected individual response rate for each university.

In total, 1,389 people consented to being recontacted for the second survey and only these individuals were randomised to the treatment or control. Finally, a total of 303 people completed Wave 2 and were able to be matched to their Wave 1 response, representing a response rate of 22 percent (Table 8.2). The Wave 2 email came from the research team and not the university, was open for around 3 weeks and included one reminder email sent during this time. As an added incentive to participate, students had the opportunity to enter a prize draw to win a £250 gift voucher for each of the surveys completed (baseline and follow up).<sup>9</sup>

Table 8.2: Balance of treatment and control in baseline and follow up.

Condition	Wave	
	1	2
Control	672	179
Treatment	717	124
Total	1,389	303

<sup>9</sup>Kindly provided by What Works for Children's Social Care.

## 8.3.2 Measures

### General wellbeing

In order to get a measure of subjective wellbeing for participants we utilised the ONS4 questions which were developed by the Office for National Statistics for the Annual Population Survey (APS) in 2011 (Tinkler et al. 2011) (see Table 8.3). It has since been used as the standard for measuring national wellbeing in the UK and has been used in numerous surveys including on student samples in the Graduate Outcome survey (Higher Education Statistics Agency 2021; for a list of surveys utilising this measure see, Office for National Statistics 2018).

Table 8.3: Four measures of personal wellbeing in the ONS4.

Next I would like to ask you four questions about your feelings on aspects of your life. There are no right or wrong answers. For each of these questions I'd like you to give an answer on a scale of 0 to 10, where 0 is 'not at all' and 10 is 'completely'.	
Measure	Question
Life satisfaction	Overall, how satisfied are you with your life nowadays?
Worthwhile	Overall, to what extent do you feel that the things you do in your life are worthwhile?
Happiness	Overall, how happy did you feel yesterday?
Anxiety	On a scale where 0 is 'not at all anxious' and 10 is 'completely anxious', overall, how anxious did you feel yesterday?

### Financial wellbeing

#### *Subjective financial wellbeing*

In order to get an overall indication of subjective financial wellbeing the following question will be asked: 'How well would you say you yourself are managing financially these days?' This is taken from the Understanding Society Survey and is recorded on a scale of 'living comfortably' (1), 'doing alright' (2), 'just about getting by' (3), 'finding it quite difficult' (4), 'finding it very difficult' (5).

#### *The multidimensional subjective financial survey for emerging adults*

In order to get a more in-depth indication of financial wellbeing, the Multidimensional Subjective Financial Well-Being Scale for Emerging Adults (Sorgente et al. 2019) is also

used in the present study. This is a recently developed measure which recognises the importance the subjective perception of an individual's own financial condition as well as acknowledging the unique financial position of young adults.

Undergraduate university students are often emerging adults aged between 18 and 29 years (Arnett 2014). At this age, students are moving away from being adolescents, where social norms do not require them to be financially independent, but have also not yet achieved the markers often conceived to signal adulthood (completion of education, leaving the parental home, finding a full-time career, marriage and becoming a parent; Billari et al. 2010). This period of transition can be a time of financial uncertainty as an individual works towards the financial self-sufficiency that most notably marks adulthood (Arnett 1998).

Despite this unique position of emerging adults, few scales exist to measure the subjective financial wellbeing of this group, and current measures are typically more objective in nature (e.g. student loan debt, levels of financial aid, economic parental support; Sorgente et al. 2017). Where the subjective financial wellbeing of this group has been examined, the vast majority of studies cited in one review (22 out of 33, 76 percent) do not use a validated measure (Sorgente et al. 2017) instead opting for ad hoc or non-validated measures which make comparison to other studies and judgements of appropriateness challenging (Zumbo 2006).

Where validated measures have previously been used to examine this age group (eight out of 33 studies cited in Sorgente et al. (2017) use the Student Financial Well-Being Scale (Norvilitis et al. 2003) and the In Charge Financial Distress/Financial Wellbeing Scale (Prawitz et al. 2006) were popular, neither of which are suitable for European emerging adults. The Norvilitis et al. (2003) scale is US centric and relates mainly to aspects of debt which are not directly applicable to the UK. On the other hand, the Prawitz et al. (2006) scale does not take account of the specific challenges and developmental stage of emerging adulthood, instead focusing on all adults despite the differences between emerging adults and adults more generally. Aspects such as social comparison (Thomas et al. 2014)



and the perceptions of future financial wellbeing (Consumer Financial Protection Bureau 2015) can be more important for younger adults in addition to the greater dependence on parents.

Given this, Sorgente et al. (2019) developed an instrument examining the multidimensionality of financial wellbeing in the emerging adult population that is applicable to populations in Europe. The measure was created by examining 66 items identified in the Sorgente et al. (2017) review which were reduced through interviews to 25 items which were then validated as a scale. Following this, the scale, which was originally tested in Italy, was tested in other locations (i.e. Portugal) and validation in other countries is ongoing (e.g. Austria, Romania, Slovenia). While not yet validated on a UK sample, this instrument appears to have better face validity for a UK population compared to the alternative US measures of subjective financial wellbeing.

Participants responded to the 25 items on a scale from ‘Absolutely false’ (1) to ‘Absolutely true’ (5). The items fall into one of several dimensions: cognitive (general subjective financial well-being), behavioural (perceived ability to manage money), materialistic (perceived sufficiency of resources), relational (peer comparison) and temporal (expectations of the financial future. One item in the English version was changed for this study: ‘Sometimes I miss funds to buy things I need (reverse scored)’ was changed to ‘Sometimes I lack the funds I need to buy things I need’ (reverse scored). Total scores were between 25 and 125 with a higher score indicating greater financial wellbeing. The Cronbach’s alpha of the cognitive, behavioural, materialistic, relational and temporal subscales in Wave 1 (Wave 2) were .93, .84, .83, .80, .74 respectively in Wave 1 and .95, .87, .89, .83, .74 in Wave 2.

### ***Debt***

Level of debt is commonly taken to be an objective indicator of financial wellbeing and therefore is included in this survey alongside the subjective measures. We do not consider student debt within this due to the fact that it does not operate like most other loans in that repayments are not required where an individual earns under a certain threshold

and it is wiped after 30 years.<sup>10</sup> It is also not required to be paid back while an individual is accruing the debt at university, as our participants were.

## **Financial capability**

Financial capability is a multidimensional construct which does not yet have a standard scale of measurement (Shephard et al. 2017). Rather, a collection of measures are used to capture the attitudes and confidence of individuals as well as some of the behaviours they exhibit, for example saving regularly, tracking finances, long-term financial planning, or use of credit (Atkinson et al. 2016; Money and Pensions Service 2018). Here we use the following four measures of financial capability that map on to the developmental model: financial confidence, financial attitude, financial behaviour and perceived financial control.

### ***Financial confidence***

In order to measure financial confidence (self-efficacy), we utilised the Financial Self-Efficacy Scale (Lown 2011). This is a short scale comprising six items scored from ‘Exactly true’ (1) to ‘Not at all’ (4) including statements like ‘It is hard to stick to my spending plan when unexpected expenses arise’. The final item on the scale was ‘I worry about running out of money in retirement’ however this was changed to ‘I worry about running out of money in the future’ due to the fact that the majority of participants are unlikely to be saving into a pension<sup>11</sup> and it was considered that there would not be sufficient variation in scoring. Scores ranged between 6 and 24 with a higher score indicating greater financial self-efficacy. The Cronbach’s alpha in Wave 1 was .78 and in Wave 2 was .80.

### ***Financial attitude***

To measure financial attitude, we use Shim et al. (2010) widely utilised questions which ask emerging adults to ‘Indicate how favorably or unfavorably you feel toward each of the following activities’: Tracking monthly expenses, sticking within a budget, paying credit

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<sup>10</sup>To become 40 years in 2022/23.

<sup>11</sup>Automatic enrolment into workplace pensions begins from age 22.

card balances in full each month, saving money each month for the future, investing for long-term financial goals regularly (see also Serido et al. 2013). The scale was from ‘Very unfavourable’ (1) to ‘Somewhat unfavourable’ (2) ‘Neither unfavourable nor favourable’ (3) ‘Somewhat favourable’ (4) ‘Very favourable’ (5). This measure has been chosen due to the fact it has previously be utilised on student samples and is quick to complete. Total scores were calculated (between 5 and 25) with higher scores indicating more favourable financial attitudes. The Cronbach’s alpha was computed at .60 and .77 for Wave 1 and Wave 2 respectively.

### ***Financial behaviour***

In order to get an indication of financial behaviour, respondents were asked to indicate on a 5-point Likert from ‘Never’ (1) to ‘Very often’ (5) how often they engaged in the listed behaviours including tracking monthly expenses, budgeting, saving for emergencies and investing for long-term financial goals (Xiao et al. 2014). These items were developed for a student population and are similar to those developed and used by Perry et al. (2005) and Shim et al. (2010). The time frame to reflect on these behaviours in the original measures was 6 months however this was shortened to 2 months for the purpose of this study as the time between waves was between 10 and 12 weeks. Total scores were calculated (between 8 and 40) with higher scores indicating more frequent adoption of favourable financial behaviours. Cronbach’s alpha was .74 in Wave 1 and .71 in Wave 2.

### ***Perceived financial control***

The final component of financial capability included here is perceived financial control. This is measured in a single item where respondents are asked ‘When it comes to managing your money, how easy or difficult is it to stick to your plans?’ (Serido et al. 2013; Shim et al. 2009). Responses are on a scale from ‘Extremely difficult’ (1) to ‘Extremely easy’ (7) (originally referred to as ‘very easy’). The scores in the original measure were reverse coded so that a higher score indicates a greater perceived control of finances. However, the coding was changed in the present study to avoid the need for this, following confusion when testing the survey with colleagues.

### **Help seeking (follow-up survey only)**

Help seeking was measured using a binary variable distinguishing between students who have sought financial help (1) and those who have not (0). Those that had sought financial help were then asked what their sources of financial advice were from family, friends, my university, a debt charity, browsing the internet, professional support and other.

Participants were also asked ‘how confident are you that, should you need help with your finances, you would know where to go for help?’ on a scale from ‘very unconfident’ (1) to ‘very confident’ (5).

### **Information seeking (follow-up survey only)**

A measure of information seeking was taken from Pahlevan Sharif et al. (2020) which asked respondents to rate 5 statements on a seven-point likert scale from ‘strongly disagree’ (1) to ‘strongly agree’ (7) while ‘thinking about personal finance’. It included statements such as ‘When this topic comes up, I’m likely to tune it out’. Items were reverse coded when needed and overall lower scores indicated greater information seeking. The Cronbach’s alpha was .76.

### **Other questions**

As a manipulation check, participants were asked in the Wave 2 survey whether they recalled receiving the text message intervention: ‘no’ (1), ‘yes (2), ‘not sure’ (3). Of those in the control, 77% correctly said they did not see the messages and 14% were not sure. In the treatment, 68% recalled seeing the messages with 13% unsure. Those that did recall receiving the messages were asked to rate on a scale from ‘not at all useful’ (1) to ‘Extremely useful’ (5) how ‘helpful/useful’ they found the messages to be.

### **8.3.3 Messages**

In total, 10 text messages were sent to participants over a period of 10 weeks (1 message per week). The text messages were no more than 306 characters in length and included

useful websites and tips for students (see Appendix E). A message on fresh starts was included as well as mental accounting and links to just-in-time educational resources. The messages varied slightly by university in order to tailor them to the resources available in the particular higher education institution and its surrounding area.

## **8.4 Results**

The results are divided into three sections. First, the balance checks for demographics are presented which examine the spread of individual differences across the two conditions (treatment and control). Second, the main analysis exploring the effect of the text message intervention on the measures of financial wellbeing and overall wellbeing. Third, in the additional analysis section, we examine the influence of the intervention on information and help seeking.

### **8.4.1 Balance checks**

A test of balance across the conditions was conducted using regressions (see Table 8.4). The results suggested that participants randomly allocated to the treatment did not differ from those in control in the observed demographic differences, nor in aspects of university life (e.g living situation, year of study, consideration of coming to university). Students were randomised to treatment and control within university and so these also did not differ between conditions.

Null imputation was used for IMD quintile given a large volume of data were missing. This was because it required participants to input their home postcode, a question that was optional to complete. This method of imputation was chosen as it makes as few assumptions as possible about how ‘missingness’ and other variables are associated.

### **8.4.2 Main analysis**

A series of OLS regressions were used to examine how the treatment conditions differed on their scores of wellbeing and financial capability. In all of the regressions, Wave 2

Table 8.4: OLS regression balance checks for treatment and control group.

	Mature student	Gender	Living at home	Year of study	Part time or full	Considered not coming to uni
Treatment	-.0418 (.0561)	-1.1178 (.7679)	-.0990 (.0577)	.1141 (.1096)	-0.0130 (.0159)	.0660 (.0579)
Constant	.3966*** (.0367)	2.9162*** (0.7668)	.4860*** (.0375)	2.0391*** (.0684)	.9888*** (.0079)	1.5307*** (.0374)
<i>N</i>	303	303	303	303	303	303

Huber-White standard errors in parentheses.

Mature student: 1 = >21 years, 0 = <21; Gender: 1 = male, 2 = female, 3 = self-describe in another way;

Living at home: 1 = living at home, 0 = not living at home, Part time or full: 0 = part time study,

1 = full time study; Considered not coming to uni: 1 = no, 0 = yes.

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

Table 8.4: OLS regression balance checks for treatment and control group (continued)

	First generation	Care experienced	Disability	Ethnicity	Carer	IMD
Treatment	.8112 (1.6596)	1.0176 (1.2524)	-.7646 (2.9092)	1.5251 (1.1137)	-.1389 (1.4720)	.0011 (.0786)
Constant	2.2291*** (.9482)	.6034 (.5534)	7.4581*** (1.9214)	1.5475*** (.0550)	1.8324* (.9518)	3.0917*** (.1225)
<i>N</i>	303	303	303	303	303	303

Huber-White standard errors in parentheses.

First generation: 0 = no, 1 = yes; Care experienced: 1 = care experienced (pre-16),

2 = care leaver (post-16), 0 = no; Disability: 0 = no, 1 = yes;

Ethnicity: 1 = White/White British, 2 = Asian/Asian British,

3 = Black/African/Caribbean/Black British, 4 = Mixed/multiple ethnic groups, 5 = other; IMD: 1 to 5.

IMD has a smaller *N* as not all participants consented to providing a postcode.

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

Table 8.5: OLS regression for the financial wellbeing of participants (the multidimensional subjective survey for emerging adults) in Wave 2.

	Wave 2					
	Money management	Peer comparison	General	Handling money	Financial future	Complete scale
Treatment	-0.0566 (0.0882)	-0.0502* (0.0872)	0.0786 (0.0771)	0.0782 (0.101)	-0.0885 (0.0785)	.0160 (.0600)
Money management Wave 1	0.716*** (0.0494)					
Peer comparison Wave 1		-0.200*** (0.0976)				
General Wave 1			0.868*** (0.0424)			
Handling money Wave 1				0.769*** (.0426)		
Financial future Wave 1					0.634*** (0.0520)	
Complete scale Wave 1						0.879*** (0.0424)
Constant	0.709*** (0.709)	1.027*** (0.157)	0.259* (0.134)	0.550*** (0.129)	1.174*** (0.181)	0.268* (0.135)
<i>N</i>	266	266	266	266	266	266

Huber-White standard errors in parentheses.

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

scores were used as the dependent variable while controlling for an individual's Wave 1 score.

## Financial wellbeing

The intervention had little impact on the financial wellbeing of participants ( $p < .05$ )<sup>12</sup> nor the multidimensional subjective financial survey for emerging adults (Table 8.5).<sup>13</sup> The exception of was the peer comparison subscale which significantly varied between groups such that those in the treatment condition had lower levels of peer comparison wellbeing than the control, even when accounting for their Wave 1 score ( $p < .05$ ).

<sup>12</sup>  $N = 266$ , not all participants completed the measure.

<sup>13</sup>  $N = 266$ , not all participants completed the measure.

Table 8.6: OLS regression examining the effectiveness of the text message intervention on subjective wellbeing.

	Wave 2			
	Life satisfaction	Worthwhile	Happiness	Anxiety
Treatment	-0.343 (0.219)	-0.099 (0.221)	-0.110 (0.290)	-0.110 (0.298)
Life satisfaction Wave 1	0.689*** (0.0585)			
Worthwhile Wave 1		0.678*** (0.0492)		
Happiness Wave 1			0.437*** (0.0637)	
Anxiety Wave 1				0.429*** (0.0585)
Constant	1.637*** (0.403)	1.710*** (0.354)	2.917*** (0.433)	3.253*** (0.368)
<i>N</i>	266	266	265	266

Huber-White standard errors in parentheses.

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

Not all participants completed all outcomes.

## General wellbeing

Ordinary least squared regressions were used to examine whether the treatment was effective at improving general wellbeing: life satisfaction, feeling of life being worthwhile, happiness, and anxiety (Table 8.6). Overall, the intervention has no significant effect on these dimensions of wellbeing ( $ps > .05$ ).<sup>14</sup> This remains true when adding being in quintile 1 or 2 on the IMD and living at home to the model.<sup>15</sup>

Next, I ran Pearson's correlations to examine the relationship between personal wellbeing and subjective financial wellbeing. As expected, all correlations were significant at  $p < .001$  with the correlation between life satisfaction and having a worthwhile life ( $r = 0.8388$ ) and the two measures of financial wellbeing having the greatest strength ( $r = -0.7753$ ).<sup>16</sup> The correlations between personal wellbeing and financial wellbeing were of a moderate correlation.

<sup>14</sup>  $N = 266$ , not all participants completed the measure.

<sup>15</sup>  $N = 248$ , not all participants completed the measure.

<sup>16</sup> It is a negative correlation as the single measure of financial wellbeing is coded such that those living more comfortably have lower scores.



The objective measure of financial wellbeing, debt (as the natural log), also correlates with the measures of financial wellbeing such that greater debt is associated with poorer wellbeing ( $ps < .001$ ). It also correlated significantly (or approaching significantly) and positively with anxiety and negatively with life satisfaction and happiness ( $ps < .059$ ). The coefficients are however smaller than for the multidimensional and single measure of subjective financial wellbeing.

### **Financial capability**

Of the four components of financial capability measured, only financial attitudes were significantly different between the treatment and the control group. This was such that those who had received the text messages had more favourable attitudes to common financial behaviours than those that did not see the messages, even when controlling for their Wave 1 responses (Table 8.7). The results also do not shift across the significance threshold ( $p < .05$ ) when IMD quintile 1 or 2 and living at home were added to the model. This is such that financial attitude remains significantly different in the treatment and control group.

### **8.4.3 Additional analyses**

In the Wave 2 survey, participants were asked how likely they were to seek help if they needed to. There were no significant differences between the treatment and control for help seeking ( $p > .05$ ) and this remains true when accounting for individual levels of financial capability. Participants were also asked about their information seeking attitudes with greater scores on this measure indicating lower levels of information seeking. We find that those in the treatment group are more open to information seeking than the control ( $p = .05$ ) group. However, when controlling for financial attitudes and behavioural control this becomes insignificant suggesting these factors bias the estimate (Table 8.8).

Table 8.7: OLS regression examining the effectiveness of the text message intervention on financial capability.

	Wave 2			
	Financial confidence	Behavioural control	Financial attitude	Financial behaviour
Treatment	-0.0210 (0.301)	0.170 (0.148)	1.005* (0.434)	-0.463 (0.508)
Financial confidence Wave 1	0.716*** (0.0494)			
Behavioural control Wave 1		0.669*** (0.0505)		
Attitudes Wave 1			0.684*** (0.0510)	
Behaviour Wave 1				0.660*** (.0421)
Constant	2.897*** (0.629)	0.849*** (0.195)	5.166*** (0.959)	4.299*** (1.107)
<i>N</i>	265	266	266	260

Huber-White standard errors in parentheses.

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

Not all participants completed all outcomes.

Table 8.8: OLS regression of information seeking on the treatment group.

	1	2	3	4	5	6	7
Treatment	-1.364 (0.694)	-1.048 (0.680)	-1.520* (0.666)	-1.245 (0.682)	-1.380* (0.677)	-1.389* (0.687)	-1.445* (0.684)
Attitude		-0.319*** (0.0760)					
Behaviour			-0.268*** (0.0554)				
Behavioural control				-0.861*** (0.241)			
Financial confidence					-0.324*** (0.0970)		
Financial wellbeing						0.145 (0.285)	
Financial wellbeing (multidimensional)							-0.999* (0.457)
Constant	15.86*** (0.449)	21.42*** (1.435)	21.29*** (1.218)	18.68*** (0.925)	20.24*** (1.376)	15.44*** (0.960)	18.70*** (1.342)
<i>N</i>	265	265	261	265	264	265	265

Huber-White standard errors in parentheses.

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

Not all participants completed all outcomes.

Other factors which may affect financial wellbeing are working during the term, the hours worked and the frequency of missed lectures. When using the single measure of financial wellbeing, none of the regressions (controlling for financial wellbeing in Wave 1) resulted in a significant relationship ( $ps > .05$ ). However, the multidimensional scale did. This was such that those who work have greater financial wellbeing than those that do not, but that as the number of hours increased, financial wellbeing decreased. Equally, financial wellbeing decreased as the number of missed lectures increased.

## 8.5 Discussion

In this study, I examined the effect of a light-touch text message intervention at improving the financial wellbeing and capability of widening participation students in English higher education institutions. Students, in particular those from widening participation backgrounds, can struggle to manage their, often limited, financial resources and therefore exploring interventions that encourage students to seek out their own financial information, tools, support and education is likely to be beneficial.

Overall, the results suggest that the text messages have no impact on financial wellbeing but do have a small impact in reducing peer comparison, improving financial attitudes and, to a lesser extent, information seeking. These changes do not translate into an impact on financial wellbeing, possibly because an individual does not act on the change in self-report attitudes or information seeking, or that, even when an individual does act, the financial constraints are too great to result in the information supporting financial management in a way that can have a consequential impact on their wellbeing. It is not possible from the present study to know which explanation is more likely or whether low response rates post intervention make it difficult to determine the influence (see also Nguyen-Cousin et al. 2019).

While some have suggested that improvements in financial attitudes are necessary for the benefits of financial education to be achieved (e.g. Bhushan et al. 2014; Ibrahim et al. 2013). The impact of financial education on behaviour change, capability and wellbeing

has previously been criticised for being a reductionist perspective. This is because it is arguably not solely the education itself that influences behaviour and wellbeing but also personality, attitudes, financial knowledge and demographic factors, to name a few (e.g. Collins et al. 2014; Lyons et al. 2006). Understanding financial wellbeing and the factors which are influential on it is therefore challenging due to the complex web of associations between elements. In this study, we see that while improvements in financial attitude are likely to be beneficial for influencing financial behaviour, such behaviour is constrained either by capability, demographics and/or context which is perhaps why no impact on wellbeing was seen.

In order to exact the most sustainable impact on financial wellbeing and capability it is likely that interventions that change cognition need to integrate with interventions that change the context (environment or situation). That is, as well as improving financial information seeking and education the route to making good financial decisions also needs to be made easier. For example, maintenance loans and other bursaries and grants are typically paid termly making it more challenging to manage than monthly or weekly payments to manage (even though the monetary amount is the same). There is a preference among students for such financial support to be paid monthly, particularly among those from the lowest higher education participation neighbourhoods (NUS, 2012). This change in context combined with interventions to help individuals access additional support and education may therefore be more effective than either alone.

Many interventions examining the financial wellbeing and resilience of widening participation students have focused on the differential impact of scholarships, grants and bursaries on the likelihood to access and remain in higher education, and their influence on financial wellbeing. While interventions that provide money in the pocket cannot be downplayed in their importance, although, are often found to have limited value, they must be considered within a wider context of financial education and money management training. After all, money is not likely to be as effective as it could be if that money is not managed well. Interventions that provide cash support must be highly targeted due to its substantial cost meaning that not all students who could benefit would have access

to it. Therefore, more research into light-touch interventions that can encourage students to take a more active role in improving their financial knowledge and manage the money they do have well, are likely to be important in part because they can be applied widely. Many higher education providers offer financial programmes and support, for example, one-on-one guidance, hardship funds, webinars and classes; however, its effectiveness relies on those who need it being aware of, and accessing it. Interventions that build on the findings of the present study and encourage students to utilise such existing resources of their own volition may therefore be powerful, combining the change in cognition with contextual changes. Certainly, it is widely considered that active participation in financial behaviours can promote better understanding than teacher based education (Furnham et al. 1998), and therefore including ‘just in time’ nudges towards education as students start to venture out into financial independence at this crucial point in their lives is unlikely to be harmful and, as demonstrated in the present research, even very light-touch interventions may have some impact.

## 8.6 Conclusion

There is extensive research into how financial capability develops in young adults (Jorgensen et al. 2010; Kim et al. 2013b; Serido et al. 2010), and yet how the development of these skills relate to retirement saving is seldom mentioned. The common market-linked retirement accounts leave little opportunity for error with young people missing out on potentially thousands of pounds in investment returns, tax relief and matched contributions by delaying their decision to contribute, or contributing too little. While the effect of young people’s financial capability on retirement saving decisions is not explored directly in this study, the skills necessary to succeed - financial capability - are often enduring and it is not unreasonable to think that an intervention to improve financial capability could, first, improve financial decision making in the present (which could have implications in the future); and second, develop the skills necessary to apply to pension saving when one has left retirement. In future, studies looking at the long-term impact

of financial capability on retirement saving may be valuable.

The present chapter provides some evidence that light-touch interventions aimed at supporting widening participation students to seek out information that may be beneficial to their financial capability is effective. Future studies may look to explore the long term impact of such interventions as well as whether this has any impact on their *actual* money management behaviours.

In the final chapter (Chapter 9), I bring together the findings of this study, and the previous five chapters to conclude this thesis. I will present a summary of the findings and limitations and discuss the policy and research implications.

# Chapter 9

## Conclusion

### 9.1 Introduction

Interventions that ‘nudge’ desirable behaviour have become attractive and popular in the domain of public policy.<sup>1</sup> However, for retirement saving, many require personalisation to the individual (e.g. Hershfield et al. 2011) or expensive amends to either payroll or pension infrastructure (e.g. tax relief, automatic enrolment, and automatic escalation), making them challenging to scale if effective (e.g. Greenwood 2017). In this thesis, I primarily sought to explore the question: Can light-touch interventions be used to help increase retirement saving contributions in the UK? In the previous empirical chapters (Chapter 4 to 7) I have provided the results of a handful of studies looking at different interventions to contribute to answering this question. In the final empirical chapter (Chapter 8), this research question was broadened out to address the question: Can a light-touch intervention be used to increase the financial capability of widening participation students in English higher education institutions?

In this chapter, I draw together the key findings of each of the empirical chapters and discuss the contributions they make to the extant literature (Section 9.2). I also present

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<sup>1</sup>Although, not uncontroversially so due to the low efficacy of many interventions Castleman et al. 2021; Marteau et al. 2011; Mols et al. 2015; Weijers et al. 2021, as well as concern that they distract from more important interventions (Chater et al. 2022; Loewenstein et al. 2017; Porter 2016).



the overarching limitations of the research (Section 9.3) and makes some suggestions of the policy implications (Section 9.4) as well as the directions for the future research agenda (Section 9.5).

## **9.2 Summary of findings**

Overall, the findings within the present thesis suggest that light-touch interventions are unlikely to be sufficient enough to systematically and meaningfully change the long-term saving behaviours of people in the UK. Of course, each study was disparate in the specific questions asked and the approach taken to respond to the chapter-specific hypotheses, and therefore I summarise the findings below and detail the main contribution of each chapter to the literature. Greater detail on the findings of each chapter can be found in the results and discussion of the respective chapter.

### **9.2.1 Chapter 4**

The first empirical chapter, Chapter 4, was a replication in the UK context of a priming study originally conducted by Marques and colleagues (2018) in Portugal. The original study found that, alone, a website that primes ageing was insufficient to increase retirement saving in a money allocation task, but that when individuals completed a task to increase future self-relevance, the future ageing prime was effective at increasing hypothetical retirement saving. In contrast, in the replication presented in Chapter 4, I find no evidence that future self relevance moderates the effect such that priming future ageing had no effect on retirement saving, even when individuals have higher future self relevance. Given these findings, perhaps the greatest contribution of this study to the extant literature is in the emphasis of the importance of replication of research on financial decision making.

Psychological science is frequently rocked by the considerable number of effects that cannot be replicated despite using the same method, materials and procedure (Open Science Collaboration 2015; Shrout et al. 2018). There are typically three explanations

for this; first, it is possible that the original effect simply did not exist in the first place (i.e. it was a ‘false positive’ or Type I error) perhaps due to chance, bias or unscrupulous research practices such as ‘p-hacking’ (see Simmons et al. n.d.). Second, it is possible that the effect did exist in the original study but that the replication was under powered (Miller et al. 2016) or was a priori expected to have different criterion for success (Fiedler et al. 2018). The third possible explanation, which I focus on here, is that the effect exhibited in the original study did exist but that contextual differences between it and the replication mean the effect is absent in the latter; essentially, a low generaliability of findings (Fabrigar et al. 2016; Fabrigar et al. 2020; Stroebe et al. 2014). For instance, Van Bavel et al. (2016) analysed the replication attempt of 100 studies and found that the contextual sensitivity of a topic (considering time, culture or location) was associated with the replication success.

The study presented in Chapter 4 differed contextually from the original study in a number of ways.<sup>2</sup> First, conducted in the UK, the retirement saving context is different to Portugal, with greater levels of personal retirement saving (OECD 2022), and workplace pensions organised through employers being ubiquitous in the former. This is particularly notable given the priming stimuli used was a banking website advertising retirement saving which, to a UK audience does not commonly exist in reality. This, perhaps, increases the skepticism of the product or may be viewed as unnecessary given many already have a workplace pension and that building up multiple pots is generally discouraged (as small saving pots can be eroded by management fees).

Of course, to assume that it is context, particularly as a post hoc explanation, that explains the lack of replication is to fall into an epistemological trap. It has the possibility to render replication as useless if any ‘hidden’ moderator can be used as an explanation for the failure to replicate without further scrutiny. In an attempt to avoid this, the research method in Chapter 4 is transparent as to how it was conducted with a view to make the contextual differences clear and make obvious that such conclusions are based on more than limited information or total guess work.

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<sup>2</sup>To find out how the study differed in terms of outcome measure and procedure, see Chapter 4.

Despite it being well known that context can affect individual's decisions, frequently research is only ever conducted in one situation making it difficult to determine *why* something works, for *who* it works for, and also the boundaries of any effect. Research like that in Chapter 4 draws attention, once again, to the value of such research and the importance of considering how confounding factors may influence a result. This is arguably of particular value for policy makers looking to implement interventions tested abroad to the UK context.

### 9.2.2 Chapter 5

In Chapter 5, participants saw different vignettes attached to an occupational pension contribution. The vignettes were either self-relevant or not and were either positive, negative or neutral in affect. It was found that, compared to seeing no vignette, only those that saw the negative and future self-relevant vignettes contributed greater levels of retirement saving, an effect not mediated by future self-continuity. That is, positive and neutral vignettes, regardless of whether they were self-relevant or not did not result in a change in decision making compared to the control of seeing no vignette.

This finding provides some, albeit limited, evidence for the role of episodic future thinking at improving saving, suggesting that such mental representations do support an individual to “foresee, plan, and shape virtually any specific future event” (Suddendorf et al. 2007, p. 299). However, perhaps only when the imagined future is negative (and therefore perhaps in need of greater action in the present) and personally relevant (such that it feels like a possibility for one's own life) is this strong enough to influence behaviour. Indeed, evidence suggests that we often have an asymmetry in the way we process negative and positive information such that we attend to and learn from negative information to a greater extent than positive information (e.g. Peeters et al. 1990). While it is possible to imagine both hoped-for and feared possible versions of the future self (Markus et al. 1986), perhaps it is the latter that is more effective at motivating an individual to devise a plan in relation to these imagined events. This may be because of terror management theory which posits that people are threatened by their own mortality and future ill-

health which leads to anxiety and a desire to improve future outcomes (e.g. through saving) in order to combat the anxiety (Greenberg et al. 2012). Alternatively, applied psychology’s ‘if-then’ plans encourage individuals to create implementation intentions for achieving flexible goals (Bieleke et al. 2021), for example “if I save for retirement, then I will avoid the negative outcomes presented in the vignette” as opposed to simple goal intentions of “I will save for retirement”.

The effects of emotion on decision making is complex as the research into intertemporal decision making is somewhat mixed as to which emotions have the biggest impact on behaviour, if at all (e.g. Calluso et al. 2019; Lempert et al. 2015; Liu et al. 2013; Zhang et al. 2018). Indeed the present research adds to this complexity finding future self-relevance to work best with some emotions over others. Therefore, policy makers should be mindful in presenting information about what the future may be like (positive, negative or neutral) due to the different effects it may have on motivation.

### **9.2.3 Chapter 5b**

In Chapter 5b, the research contributes to the discussion on measuring internal psychological constructs. The debate around such measurement has existed for decades, with inferences made on the basis of hypothetical constructs questioned (Pervin 1999). When concepts are not observable (like future self-continuity) there is a question as to whether they exist, or whether they exist in the form or within the boundaries that we think they exist. In order to understand how people behave, understanding these concepts is important but they must be measured in a “convincing, valid way” (Smith 2005, p. 396). The majority of the time, self-report is relied upon to measure traits (Kagan 2007; Vazire 2006) because it is the only scalable time and cost effective option.<sup>3</sup> However, it relies on an individual’s ability to have insight into and accurately report their own behaviour, thoughts and attitudes which may be unreliable or inaccurate. Therefore, much research examines the validity of such measures to ensure the questionnaires are easily understood and accurately measure the concept of interest (for summary of concerns, see Flake et al.

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<sup>3</sup>Alternatives typically include interview and observations.

2020).

In the case of future self-continuity (the connectedness an individual has with their future self) one validated measure, the future self-continuity scale (Hershfield et al. 2009), has dominated research. However, the measure is a single-item scale measuring a multifaceted construct meaning internal consistency cannot be assessed and measurement error and precision are difficult to ascertain (Kamakura 2015). This means that when a researcher wants to look beyond similarity at vividness or positivity, they must use adhoc measures reducing validity and making it difficult to compare between studies. For instance, Van Gelder et al. (2013) used questions about personal recognition of virtual reality avatars, realism and connection in order to assess how much their intervention increased the vividness of the future self whereas others use measures of construal level and still others, pre-experiencing measures. With this in mind, Sokol et al. (2019a) developed a new measure of future self-continuity (the future self-continuity questionnaire) that supposedly tackled some of these issues and the authors argue it is a more accurate measure of future self-continuity.

Keen to compare the measures, I included both in Chapter 5; however, the two scales had a poor correlation despite supposedly measuring the same thing and so more data were collected in Chapter 5b. It was clear that the two measures of future self-continuity did not capture the same construct, even when only considering the concept of similarity. It is possible that neither measure accurately records future self-continuity or that one measure records it and the other does not, although it is difficult to determine which is correct (arguably the future self-continuity questionnaire is better grounded in recent theoretical conceptualisations of future self-continuity). Indeed, this study highlights the challenge of measuring internal processes and the importance of continually questioning the validity of measures. The implications of inaccurately measuring any outcome can be considerable when such information is used in the development of cognitive frameworks or interventions.<sup>4</sup>

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<sup>4</sup>In other domains the ramifications of a measure can be considerable. The interpretation (or misinterpretation) of life events and the effect on the future self are implicated in anxiety and depression where being able to accurately measure future self-continuity is therefore critical

## 9.2.4 Chapter 6

In Chapter 6, I examined whether inaction inertia was present where the missed opportunity of retirement saving is partial (due to the automatic enrolment context) rather than complete, as well as the impact of state-action orientation and regulatory mode on it. In this context, I found no evidence of inaction inertia, nor any differences between partial and complete missed opportunities. There are several reasons why this may be the case: first, it is possible that people do not appreciate the benefit of starting to save, or save more, for retirement as early as possible, and therefore may not see the past opportunities as a ‘miss’ (e.g. Eisenstein et al. 2007; McKenzie et al. 2011b; Stango et al. 2009).<sup>5</sup> Second, they may feel they have a lot of time to correct for past decisions in the future (even though it is likely to cost more). Third, other factors about the situation may mitigate the feeling of inaction inertia. In this case it may be an assumption that other people also missed the opportunity too (Kumar 2004), given the widespread media coverage on under saving.<sup>6</sup> The fourth possible explanation is that the level of inaction inertia was dynamically impacted by coping processes in place allowing for some individuals to continue pursuing their goal even when they may have forgone an opportunity (i.e. not exhibiting inaction inertia; Patrick et al. 2009). This occurs when the missed opportunity is goal-relevant and difficult to reverse.

Finding no impact of inaction inertia on retirement saving decisions in the UK context is arguably positive given it suggests that this does not contribute to the low levels of saving seen. This is not to say that policy makers and pension providers should not focus on how they present the missed opportunity to save, as how saving is communicated is still likely to be important, only that focusing on other explanations for low levels of retirement saving (e.g. present bias and inertia) may be more important than inaction

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<sup>5</sup>The ‘loss’ is not as easy to imagine as missing out on a better holiday or purchasing a white good. It may be the difference between £170,000 and £200,000 in retirement but in the present, both feel like large sums of money.

<sup>6</sup>Other factors can also influence although are likely to be relevant here. Evidence suggests that when a trivial attribute (i.e. an attribute that does not affect consumption utility) is added (Kumar 2019), the miss was actually materially inferior to what was believed (Tykocinski et al. 1995), the choice set changes (Tsiros 2009), or the discounting was steadily rather than abruptly decreased (Tsiros et al. 2010) then inaction inertia is mitigated.

inertia.

### **9.2.5 Chapter 7**

In Chapter 7, using a quasi-experimental design, it was found that the introduction of the Freedom and Choice (F&C) legislation in 2015 resulted in a very small decrease in opt-out behaviour amongst the over 55s. This is despite there being potentially hundreds of pounds worth of tax-relief and employer matches to be gained from a contribute and withdraw strategy. Much of the previous research on other arbitrage gains in the US suggests that the utilisation of such opportunities is similarly low (or does not exist at all), suggesting that the present findings do not represent a unique oversight of such benefits, but an oversight nonetheless.

Evaluating the impact of such policy is crucial for governments and organisations to design, implement, and improve on public policies that can in turn influence the prosperity of their country and the wellbeing of its citizens. It also creates a culture of evidence-based decision making and promotes accountability and learning. In the case of F&C, the study suggests the policy did result in some decrease in opt out behaviour, but that the move from illiquid to liquid savings did not have a substantial impact on most people's behaviour given an opt-out rate of near zero would be expected. Understanding the efficacy of policy is useful for the government given the utilisation of a contribute and withdraw strategy can lead to a recycling of tax benefits that has the potential to represent a non-trivial cost in tax relief if used excessively. Yet, interestingly this particular outcome of the policy has not been explored to date.

### **9.2.6 Chapter 8**

Finally, in Chapter 8, I found that a light-touch text message intervention that signposted towards resources was effective at changing the financial attitudes of widening participation students, the intention to seek help and reduced peer comparison. While remaining aware of the limitations the extant literature raises about the value of financial

education on improving financial capability and wellbeing, there is still clearly value in encouraging learning as an approach. Sign posting encourages an individual to actively engage in finding information that is of interest specifically to them. It of course relies on accurate and easy to understand materials being available, however often this is not the challenge in the university context where support and information are often abundantly available.

While previous studies on information seeking have tended to focus on the sources people use to seek information and the topics searched for (e.g. Vaaler et al. 2021), this study explored whether an intervention that aimed to encourage such behaviour could be beneficial for wellbeing and capability. Also, much of the previous literature on information seeking focuses on retirement, investments and consumer products rather than the unique position of students' financial decisions (Fan et al. 2017; Hsu 2016; Johansen 2013; O'Connor 2013), leaving a clear gap in the evidence. Xia (2010) found quick, easy to access information was crucial for influencing decisions, regardless of what the financial product or behaviour being studied was.

The findings of the present study suggest that signposting materials to make information easy to find was beneficial for improving some measures of financial capability like improved financial attitudes and reduced peer comparison. It is these skills which, over time, may support individuals to make better choices and become more financially confident and capable. The intervention presented occurred over one term and with one set of messages. Further exploring the impact of this intervention over a longer period and testing the efficacy of different messages would be valuable in making this intervention as effective as possible in the future.

### **9.3 Study limitations**

The findings of the studies included in this thesis are considered in the previous section (and in their respective chapters). I now provide some information on the overarching limitations of this research which should be considered when drawing conclusions from the



findings. Specific limitations of the study design, procedure and materials were discussed within the respective chapters and are not covered here. Instead, in this section, I provide an overview of several limitations which apply broadly when considering the application of the thesis as a whole to public policy.

### 9.3.1 Context

There are several aspects of the context of the research presented in this thesis that limit how the research can be generalised, and it is therefore an important factor in the interpretation of results. Context in relation to the country a research is conducted in and the linguistic, attitudinal and structural differences this can bring is touched on in the relevant chapters, and so instead I focus here on aspects of context that overarch several chapters.

The majority of the research highlights the ways in which hypothetical decision making in the financial domain is unlike real-world decision making and may elicit a considerably different behavioural response, with many suggesting that hypothetical decisions are not representative of the real decisions people make (e.g. Horn et al. 2022; Pronin et al. 2008). Yet, in the financial domain it is often not possible, or necessarily ethical (depending on the context), to use randomised controlled trials on people's *actual* finances. For example, in the case of Chapter 6, randomising an individual to miss a previous opportunity to save for retirement would not be ethical; nor would it be ethical to have individuals reminded of a past miss if the researcher believes this is likely to have a negative impact on their future saving behaviour. This makes the laboratory the only place to ethically study such phenomena (with randomisation). Consequently, if researchers want to explore certain concepts, the laboratory may be the only option available.

In the case of several of the other chapters in this thesis, the laboratory setting was chosen either because funding constraints meant it was a more cost-effective option or because the specific intervention or theoretical basis for the intervention had not been well established in relation to retirement saving before, and therefore, the laboratory

provides a ‘risk free’ context to examine behaviour in.

Where a laboratory is used it is important to attempt to minimise the difference between real-world and hypothetical decisions. Arguably, there are two ways this can be done: make the choice options as true to reality as possible and/or do the same for the decision making scenario. In the case of the former, choice options can be made to reflect the choice an individual has in reality. In Chapter 7 and 6 this was relatively straight forward: opt out (or don’t) and save (or don’t) respectively. Even in Chapter 8 this is achieved by the use of psychological measures as the outcome (there was no decision per se to measure). Nevertheless, this is more challenging where a study looks at how much an individual contributes to saving as the decision is more complex and the exact amount saved is dependent on a multitude of other components. In Chapter 4, for example, the outcome measure was a choice to divide money between five broad spending options, of which a retirement account was one. Clearly, there are an abundance of ways an individual may choose to spend a windfall (e.g., paying off debt, charitable giving, treat to self) and boiling it down to just five is likely to be an over-simplification of the decision. Yet, if the study was to ask participants to record only how much they would contribute to retirement saving, the comparison to other forms of spending, saving and investment is lost. This is accounted for in the real-world as, even if not explicitly measured, individuals are making financial decisions within a broader contexts. Yet, while they may be true to life, insights into this broader context is often lacking; for example, pension saving decisions tell us the outcome of a thought process, but provides no evidence as to whether that is a substitution, reduction in consumption or borrowing. In this instance, gaining insight into behaviour in the laboratory may provide a basis with which to understand behaviour and how individuals manage money before piloting where the implication of decisions have real consequences.

Relatedly, the mechanism by which an individual makes a decision in the laboratory should be reflective of the process in real life in order to get a true estimate of the effect. In Chapter 4, 5, and 6 the stimuli are presented without friction at the point that the decision is made and actioned. This is in spite of the fact that, in the real-

world there will likely be a process between the point in which an individual makes their decision and when the decision is executed. Like a lot of interventions that aim to improve contributions, in the present study there is an assumption that coming to make the contribution change is simple or indeed, non-existent. In reality, an individual must find their account details and log in, often needing to set up an account or reset their password in the process. By this point, many individuals continuing with the process are likely to be highly motivated to change their contribution and probably have some idea of what their contribution change will be (possibly making interventions less effective). Indeed, evidence from encouraging saving of tax rebates in the US suggests that changing the default to a higher anchor increases saving, but this is driven by only a few people actually changing their contribution away from what they might have saved without the anchor (i.e. people probably already had a figure in mind; de la Rosa 2020). There is of course also value in understanding the value of an effect in its ‘purest’ form so that if structural factors are influential, it can be pinpointed to this, rather than the intervention itself.

Exploring how interventions work in reality is an important part of the research journey. In the case of retirement saving, any changes to contributions as a result of an intervention are, by design, illiquid. This therefore adds another dimension to considering implementing research in the real-world as decisions are not easily undone. It is also plausible that a nudge in the retirement context may move money away from other, more urgent, needs such as paying down debt or building an emergency fund and yet any decision cannot be rectified after it is made (as it could be if saving into a short-term account was encouraged). In the current context of financial hardship, such interventions should be carefully considered. Consequently, while testing interventions in the laboratory setting initially may not be ideal, it is perhaps the best first step, with a consideration of implementation hurdles and a wider reflection on an individual’s broader financial situation coming when contemplating the move from evaluating the effectiveness in the laboratory to the real world.

### 9.3.2 Participants

Participants in the present research were largely self-selected (with the exception of Chapter 7). There are a number of reasons why this can be problematic for research but it generally comes down to the fact that the sample may not well represent the entire target population. In the case of the present research, this possibility does not affect the research integrity itself as the studies were randomised controlled trials (or in the case of the quasi experiment, had a very large sample size) and therefore any bias should be equally likely in both treatment and control groups. However, self-selection could have affected the *generalisability* of the research as could non-representative samples (for example, see Belot et al. 2015).

As information about each study was presented prior to a participant beginning the task, it is plausible that only those with a degree of financial confidence<sup>7</sup> volunteer to participate in such studies. For example, where collected, most people had pension schemes set up by their employer and therefore it is likely that those who are under pensioned - perhaps because they are self employed, on low incomes or unemployed - are not included in the present research despite their overall greater vulnerability to low saving rates. This means that it is not possible to be certain that the interventions wouldn't have had a greater (or even lesser) impact on groups of individuals who have less access to pension products or have differing levels of financial capability and engagement.

Structural and individual level barriers can also contribute to low levels of saving with factors such as the gig economy, motherhood, age, social class and ethnicity all affecting saving rates (Foster 2017; Gough et al. 2013; Gough et al. 2011; Robertson-Rose 2019). Few of these factors are measured in the present study meaning it is difficult to determine the role socioeconomic, situational, demographic and cultural factors have on decisions. Indeed, income, a variable intuitively thought to be one of the primary factors influencing retirement saving, may actually contribute relatively modestly to retirement saving decisions when considering other factors (Suh 2021). Including these

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<sup>7</sup>Or another trait or characteristic.

groups in the research, or at least measuring them as variables in order to determine the socioeconomic or demographic characteristics of the sample, may have been beneficial in explaining the boundaries of some effects and improving (or providing boundaries for) the generalisability.

### 9.3.3 Cost effectiveness

Throughout, I have spoken about the light-touch interventions used in this thesis being nudges that are generally inexpensive to implement due to there being no personalisation, nor the need to make amends to payroll and pension infrastructure. While it is probable that an intervention which does not require cumbersome administration or legislative amendments is likely to be cheaper than one that does, I provide little detail of the actual cost of these interventions. Indeed, even while classing them as ‘low cost’, the price still varies substantially between interventions and is difficult to compare due to some having greater up front costs (e.g. website changes) and other more long term costs (e.g. use of letters or texts).

Arguably, the most expensive intervention explored in this thesis is the F&C policy change presented in Chapter 7. This is partially because it is the only one that requires substantial legislative (and regulatory) changes, but also because it represents a cost to government in lost tax revenue which could total hundreds of pounds per annum per person. This is, of course, assumptive as the government has not released specific figures on the exact cost of this policy in terms of reduced tax revenue (nor a cost-benefit analysis).<sup>8</sup>

Even when somewhat unsure of the *actual* cost of the F&C contribute and withdraw strategy, other interventions presented here are likely to be lower cost. In Chapter 6, the inaction inertia letter, would arguably cost less than £0.80 per person for materials and postage (2022). For the 12-week text message intervention presented in Chapter 8, the price per student is under £1.00 per year.<sup>9</sup> The other interventions have a conceivably

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<sup>8</sup>At the time of writing.

<sup>9</sup>Neither cost estimates include the cost of time generating the materials.

lower cost per person (Chapter 4 and 5) as they involve amendments to websites which can be implemented to a large amount of people. It becomes challenging to estimate the cost per person given it could be seen by hundreds to hundreds of thousands of people.

Ultimately, all of these interventions are likely to be expensive relative to their benefit given they showed little or no effect in the present thesis. However, future research may consider testing multiple light-touch interventions on a large homogeneous population to compare the relative cost benefit of different approaches that have shown promise. A similar design has been used by by Patterson et al. (2020) who studied three nudge interventions on a US Army population to determine whether active choice, information or automatic enrolment affected pension enrolment behaviour the most (for a comparison of many studies in the pharmaceutical domain, see Milkman et al. (2022)). Conducting a similar study, only with light-touch interventions, and in the UK context of automatic enrolment, may be beneficial.

## **9.4 Implications of the findings for public policy**

As mentioned in Chapter 1, the purpose of this thesis was to explore the ways in which light-touch interventions may be used to encourage retirement saving. They provide a cheaper alternative to ‘hard’ legislation and retain the philosophy of free markets and small governments making them a popular choice. However, as the findings of this thesis demonstrate, their value may be limited as, at least in the scenarios tested in this thesis, they are not effective at changing behaviour. This section considers the implication of these findings for policy makers looking to improve levels of retirement saving.

A focus towards nudge interventions has become increasingly popular in recent years due in part to a lack of public funds. So called ‘nudge units’ have become synonymous with the application of behavioural insights into public policy and so the role of interventions, as used within this thesis, are widely acknowledged. The Behavioural Insights Team frequently utilise nudge interventions which, when evaluated collectively, have been found to have an overall small to medium effect, an average improvement to baseline/control

of 8.1 percent across domains (DellaVigna et al. 2022). Considering they are cheap, this small improvement is often very meaningful. Similarly, in a recent meta-analysis the value of nudges was found to be small but positive across domains, although a particularly small effect existed in the domain of finances (Cohen’s  $d = .24$ ) (Mertens et al. 2022). Arguably, in the complex world of retirement saving, the value of light-touch interventions will always be limited but given a choice architecture will always exist, optimising existing features (e.g. emails and letters that are sent, website presentation, contribution change process) seems worthwhile.

Perhaps then the biggest consideration for policy makers and pension providers alike is whether to utilise resources in optimising the current pension system using light-touch nudges or employ (likely) stronger nudges (e.g automatic escalation) to encourage saving, possibly with the need to make further large-scale reforms to a system that has already undergone substantial changes in the last decade. While light-touch nudges in the present thesis proved ineffective, implementing stronger nudges risks polarising the nation with concerns around overly paternalistic approaches, not needed by all. Equally, stronger nudges require the support of employers (and their payroll teams) who must administer any changes at their own expense<sup>10</sup>. However, over time, researching and implementing light-touch nudges is unlikely to result in the same step change in saving.

This presents a conundrum as to the level of involvement the government should have in ensuring saving adequacy. Assuming that government takes a welfare-orientated view of retirement and follows the Beveridgean principles then poverty prevention is the likely goal of any legislation, and so automatic enrolment arguably provide a baseline level at which, when combined with the state pension, sustains the majority of the population above the poverty line. This is already thought to be the case and so it is possible to see the benefit of light-touch nudges not in supporting ‘adequate’ saving per se but rather communicating what the system, at its default level, will allow them to achieve and encouraging discretionary saving beyond it (much like was attempted in the current thesis).

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<sup>10</sup>Adding columns to payroll can cost thousands of pounds.

As most people are looking for a retirement income that is more than sufficient to avoid poverty (Foster et al. 2017), nudge strategies should perhaps be focused at communicating the gap between what is provided for and what is not. If only small gains are made in saving levels then this may be perceived by the government as ‘acceptable’ as a baseline income is saved. Using this strategy, effort would be needed to ensure that it does not disproportionately benefit the more financially capable and confident in society (who will make active saving and investment decisions) and therefore widen inequalities. For instance, those who may be in difficult financial circumstances in the present, perhaps due to existing policy and social structures and inequalities, may ultimately see this disadvantage compounded into retirement by this simplistic approach (e.g. because automatic enrolment disadvantages those with multiple part time jobs).

If this approach were taken, arguably more attention should be directed to those who fall outside of automatic enrolment, many of whom are not saving at even default minimum levels (and who often don’t receive employer matches). For example, those on low incomes, with multiple jobs, self-employed, or those with caring responsibilities, are possibly more vulnerable to not even achieving an income to avoid poverty in retirement. Consideration of the legislative support that is needed for them (e.g. NI credits for caring responsibility, employer contributions regardless of employee contributions to cover career breaks etc, considerations of housing and generational wealth) is needed. Particularly for the self-employed and gig economy employees, income can be volatile make it difficult to regularly put aside saving and therefore focusing on products and solutions that support their specific challenges is likely to be valuable. In this instance, light-touch nudges are in all probability ineffective (e.g. see Nest Insight, 2022) with other solutions needed to support these individuals.

Despite some benefits, an approach that keeps the existing system, with the addition of incremental light-touch nudges does have the potential to reinforce a system that is fundamentally flawed. The low levels of saving and engagement in pension decision making in the current defined contribution pension system suggests it is clearly vulnerable to biases and use of heuristics; and, as this thesis has demonstrated, it is difficult to



shift this. Perhaps, it is in need of a radical overhaul to work effectively for more Brits. Loewenstein suggests that nudge interventions are a “flawed approach to retirement savings and [make] it a little bit more viable,” but that “the downside is that if we make it just sufficiently viable, people won’t recognize how bankrupt the concept is” (Porter 2016). Indeed, perhaps the role of those in public policy should be to take a more ambitious and radical approach to the pension system that simplifies the process for the saver and makes it easier for them to determine how much to save and whether they are on track. Clearly, if this is to be done, a degree of political will is needed and public opinion should be sought and to do this an empirical evidence base of the options should be tested to allow for a debate and discussion of the options. A normative debate and empirical evidence on the options available would therefore be valuable and arguably this thesis contributes to the discussion on light-touch interventions as part of this.

If a step change in saving behaviour is to be achieved through a legislative redesign, then this would almost certainly include a Save More Tomorrow (SMarT) automatic escalation (Thaler et al. 2004). The original SMarT trials saw average retirement saving rates increase from 3.5 to 13.6 percent over the course of just a few years compared to those who declined financial advice and SMarT who were saving an average of 6.2 percent in the same time frame (from a starting saving level of 6.6 percent). If applied across the United States, that would be a \$25 billion dollar increase in saving for every 1 percent increase in contribution (Mertens et al. 2022). However, it is also worth considering that despite its noteworthy impact, the appetite for UK employers to implement it is low due in large part because of administrative complexities (Greenwood 2017)). Therefore, such an intervention is unlikely to be taken up in the UK without legislative requirements<sup>11</sup> and therefore such an intervention also has a political component. For some it will be too paternalistic, it increases the risk of over saving in parts of the population, and may be unappealing to citizens or employers who would ultimately be left to implement and manage it.<sup>12</sup> However, it is possibly the only stronger nudge solution currently in the toolbox that could; one, go a meaningful way to improving savings; and two, be

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<sup>11</sup>A guide to implementation, and clarity on its legality, may be a good first step.

<sup>12</sup>And penalised by regulators if they get it wrong.

tied to increases in pay and consequently not compromise affordability or risk backfiring consequences like borrowing to save.<sup>13</sup>

Affordability is a key consideration when determining the pension infrastructure. George Loewenstein, a behavioural economist and notable critic of nudge interventions, has suggested that the reasons why nudges may not be effective, particularly at the margin with lower income households, is that they fail to overcome the primary obstacle faced by such groups: a lack of money (Loewenstein et al. 2017). In one experiment Loewenstein and colleagues used multiple behavioural techniques to encourage lower income individuals to take advantage of saving accounts that were topped up by the federal government at a rate of \$2 for every \$1 the individual saved. Yet despite it being a great deal, nothing worked, presumably because low incomes mean that the individuals who were targeted simply couldn't afford to save (Loibl et al. 2016).<sup>14</sup> In this thesis, many of the decisions were hypothetical with affordability not affecting the decisions made. Moreover, in Chapter 2 it is generally considered at the time the research was conducted the affordability of pensions was unlikely to be the primary reason for under saving for some.<sup>15</sup> For example, in 2022 the PLSA reported that a third of people (32%) could afford to contribute more to their retirement savings (Pensions and Lifetime Savings Association 2022).

While affordability may not be a direct concern in the present thesis I remain considerate of the role it plays in the applicability of research. Finding out an intervention could be effective in research but that no one can actually benefit in reality is arguably of limited value. This should remain a concern of policy makers too; particularly given the illiquid nature of retirement saving means that the cost of making a mistake and saving more than one can afford is likely to have ramifications for individuals' financial wellbeing and resilience. Evaluations of a sidecar approaches that consider short and long term savings in one account are underway (Nest Insight 2022a). This is where an

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<sup>13</sup>Of course, its benefit is reduced in a period of wage stagnation.

<sup>14</sup>For example, this is one critique of many incentive programmes. Things like prize draw saving accounts often result in more entries into the prize draw for those with more savings, ultimately benefiting those individuals who already have savings. Instead, encouraging the regularity of saving may be more important for this group, regardless of balance and number of withdrawals.

<sup>15</sup>Although, this is not to say that it is not a considerable and primary concern for a non-trivial number of people nor that this concern hasn't increased with the cost of living crisis.

individual is encouraged to build up an emergency saving buffer through payroll before contributions roll into additional pension contributions when a predetermined threshold is met (Beshears et al. 2020). Similarly, products with more flexibility like a lifetime ISA where contributions can be withdrawn for a house are also being offered. The product solutions, provide some balance between avoiding a ‘leaky’ pension system seen in other countries, whilst also providing reassurance that money ‘locked’ away in a pension could be accessed for emergencies or other purchases. Uptake of sidecar products is however low at around 1 percent (Nest Insight 2022a) and so even these approaches are unlikely to benefit the millions who need them.

Overall, there are many avenues that policy makers may wish to explore to encourage individuals to save more for retirement. While light-touch interventions may be part of the solution, ultimately stronger nudges like automatic escalation are likely to be needed along with more innovative development of the pension infrastructure (e.g. machine learning, combined pots, sidecar saving). Further building up the evidence base on ‘what works’ is therefore crucial for furthering the debate. In the meantime, the government’s discussions on decreasing the age thresholds for automatic enrolment from 21 to 18, raising pensionable pay to the first pound of income rather than £6,240, and increasing the default from 8 to 12 percent (Pensions and Lifetime Savings Association 2022) are valuable. They also suggest that the current infrastructure is here to stay, making consideration of the light-touch nudge all the more important.

## **9.5 The future direction of research**

With the light-touch interventions explored in this thesis largely ineffective, this section explores where future research may progress this field.

### **9.5.1 The future self**

The present research highlights that there is a need for further investigation of how temporal versions of the self are considered, and the extent to which this impacts the

behaviour of the present self. For instance, in the case of inaction inertia<sup>16</sup> it is decisions made by the past self that have an impact on the present self's decisions; and, in the case of present bias the perception of the future self can impact decisions in the present. Research frequently suggests that improved patience in decision making can come from closing the connection gap between the present and the future self. Therefore, the logic follows that making the future self more visceral through imagination compels us to care more about our older selves (Hershfield et al. 2011), swapping text for already vivid images of the future (Bryan et al. 2012; Chishima et al. 2021; Hershfield et al. 2011), boosting the emotional connection (Bartels et al. 2010; Hershfield et al. 2009), and reducing the uncertainty of the future (Maglio et al. 2016) can all also help people make better intertemporal decisions. Even though the present research found that using episodic future thinking and countering inaction inertia had little impact, there is clearly a wealth of research suggesting otherwise and posits a number of different ways to use episodic future thinking and directions to develop the research in this thesis.

In future, a greater exploration of how an individual thinks about older age, their goals, priorities, and fears in relation to it may be important, as well as better understanding the boundaries and limitations of effects (Tomar et al. 2021). For example, the cultural and societal expectations individuals have is likely to affect how we see our future selves and may provide information that allows for a better targeted intervention (e.g. Hershfield et al. 2020; Willows et al. 2021). Considering this, as well as how this may evolve over time could improve the efficacy of interventions.

Similarly, rather than looking to change the perception of time between now and a specific version of the future self (i.e. in retirement), it may be possible to change the general progression of time. There is clearly a tradeoff between objective time (e.g. £20 today vs. £25 in a week) but individuals tend to convert this from absolute time to a relative sense of distance (or closeness) when thinking about temporal horizons (Hu et al. 2018). Changing the perception of time would therefore have the potential to impact retirement saving decisions (e.g. Evans et al. 2014; Peetz et al. 2009). For instance, presenting

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<sup>16</sup>If it is present in retirement saving decisions in the UK.

the present as short-lived and the future as imminent can cause people to make more far-sighted choices (Hershfield et al. 2020). Changing the framing of retirement saving in this way may therefore be positive for encouraging saving.

Almost all interventions looking at intertemporal decisions, including but not limited to those referred to and tested in this thesis, take the form of *one-off* choices between the present and a delay. In reality, individuals can change their saving contributions many more times and intervening to allow a cumulative succession of present selves to take action on behalf of their future self may build a transformative habit that is more effective than a single one-off decision. Perhaps a 35 year old imagining the 40 year old self regretting not saving is more impactful than imagining the 65 year old with inadequate income. For example, Van Winssen et al. (2016) suggests anticipated future regret at having made no attempt at preparation was a key motivator for health insurance take up. This could be adjusted across the lifespan to provide more regular, rather than one-off, nudges to consider the future self. To date little consideration has been given to intertemporal decisions beyond the one-time decision and better understanding the cumulative impact of decisions may be valuable.

### 9.5.2 Consideration of a holistic financial picture

As with most research in the domain, the present research mostly focused on a narrow view of ones finances. Just as an individual's personal attributes and experiences of the world may impact their decision making, so may too their broader financial picture. In this research, the focus was primarily (with the exception of Chapter 8) on the narrow focus of retirement saving. While undoubtedly important, considering this aspect of saving in a silo minimises the considerations, challenges, desires and experiences of the population down to one behaviour: saving for retirement. Considerations of how retirement saving affects debt, saving for emergencies, housing and short-term goals is minimised with this reductionist view, as are the interactions with inter-generational wealth, labor market effects, and macro climates. Understanding how people prioritise demands on their money and the different factors that influence this is likely to be beneficial to

considering why individuals make the decisions they do (see Choi (2022)).

There may, for example, be a role for artificial intelligence (AI) or machine learning to help people manage their money more optimally. Opening banking is becoming more ubiquitous and covers a broader picture of an individual's finances and this could be used to determine an individual's income and expenses then suggestions of rates of saving into short-term, goal based and long-term saving accounts could be generated as well as debt management. This would take some of the uncertainty out of saving and may provide some increases in confidence when determining what to save, including for retirement. Such leveraging of technology is suggested as one of the three key principles from the World Bank for improved financial inclusion and retirement security (World Economic Forum 2018) and yet research has rarely focused on its role.

Previous research has looked at the interaction between different financial decisions, for example, debt and retirement saving (Beshears et al. 2019a) or student loans and retirement saving (Rutledge et al. 2016).<sup>17</sup> Nest Insight are collaborating with a number of other organisations to gain a deeper insight into how debt, financial behaviours and wellbeing was affected by the introduction of automatic enrolment (Nest Insight 2019). However, individuals hold complex financial pictures and truly understanding the interaction between the different aspects of people's financial lives is challenging. Economists often don't ask individuals about their financial decisions, how they weigh up the needs of their present and future self and why they make the decisions they do (Choi 2022). Understanding the complex financial situations people have may be invaluable research for designing future products that actually work for the individual.

Some research has looked at financial diaries to better understand how low to mid income households manage their money on a day-to-day basis.<sup>18</sup> Such research in the UK may be useful in building a picture of how different financial considerations interact. Additionally, such a study may provide greater detail on the motivation to save more than the default minimum. Robertson-Rose (2021) concluded, following qualitative interviews with a

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<sup>17</sup>Although this is arguably less pertinent in the UK.

<sup>18</sup><https://www.usfinancialdiaries.org/papers>

range of UK savers between 30 and 40 years old, that low pension contributions are not always the result of status quo bias or inertia. Some people were committed to retirement saving but made an active decision not to commit more resources to it. While from an income-smoothing perspective this may seem sub-optimal, it is not when considering other financial and non-financial priorities. The authors suggest that other factors like emotion (e.g. pride), anchoring, salience of ageing, uncertainty and loss aversion all have a role to play in the decision to change contributions and therefore should be considered in research to a greater degree when encouraging people to save more.

### **9.5.3 Nudge plus**

Nudge plus (John et al. 2013; Peter et al. 2019) is a modified behavioural change technique that combines ‘nudge’ with an element of self-reflection to boost its impact. It has been suggested that nudge-think type strategies can generate stronger and more persistent one-off effects (Banerjee et al. 2021) compared to nudge-only strategies (like the ones used in the present thesis).

While initially an apparent contradiction - after all, the low need for cognitive processing is one of the advantages of nudge - reflection is not considered to be in opposition with the principles of nudge (Thaler et al. 2009). Indeed, following a period of debate, it has been found that an awareness of nudges does not affect their efficacy (Loewenstein et al. 2015). Nudge is often critiqued for its ability to only deal with relatively minor public policy problems, and even then often have a small impact (e.g. Castleman et al. 2021; Marteau et al. 2011; Mols et al. 2015; Weijers et al. 2021), and therefore modifications to this structure that results in more profound effects is likely to be welcomed. It is clear from the nudges used in the present thesis that alone they are often not sufficient to meaningfully modify behaviour.

Several studies have demonstrated the efficacy of nudge plus interventions (e.g. Banerjee et al. 2021; Hume et al. 2021). For example, Mühlböck et al. (2020) found a reflective survey before an informational nudge was effective at improving both the uptake of in-

formation and also reducing unemployment amongst Austrian young people. In another study, Hallsworth et al. (2015) sent SMS messages to outpatients indicating the cost of missing an NHS appointment which ultimately led to fewer people missing their appointments. However, this is not likely to be a nudge that causes an automatic response but rather requires an individual to reflect on the fact that appointments cost money. It therefore follows that using nudges and including reflective processing to make more apparent to individuals the reason why saving is needed and a consideration of what retirement an individual would like, may be valuable.

## 9.6 Final conclusion

It is hard to avoid the abundance of research, articles in the public press, think tank reports and interest amongst policymakers on the so called ‘pensions crisis’ in the UK (Booth 2005) and around the world (Cumbo et al. 2019; Josephine Cumbo et al. 2020; OECD 2020). This generally refers to the idea that people are ‘sleepwalking’ (Aviva 2019) into retirement with insufficient savings leaving them vulnerable to poverty, reduced quality of life (relative to lifestyle when working) or removing the option of retirement entirely. The central motivation of this thesis was to investigate a number of light-touch interventions aimed at improving the long-term financial wellbeing and resilience of UK adults through changes in financial behaviours.

The findings suggest that there is limited value in the use of many of the light-touch ‘nudges’ tested, even when theoretically underpinned. This includes interventions aimed at improving the future self-continuity and reducing the inaction inertia felt around retirement saving decisions. We find some evidence that the policy introduction of the F&C to allow people to simultaneously access and contribute to their pension reduced the number of people opting out albeit not at a level that suggest it is a lever policy makers could use to encourage participation in occupational pension schemes in the over 55s. Finally, when thinking about broader financial decisions and experience, we found some evidence that a text message intervention that provides information on tools and



services for managing money resulted in a small improvement in financial attitudes, information seeking and a reduction in negative peer comparison for widening participation university students. Whilst all of these interventions had no or limited impact, there is still considerable learning to be gained from this thesis in better understanding the limitations of such interventions, the underlying mechanisms and the importance of context when applying research to different scenarios.

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# Appendix A

## Chapter 4: Appendices

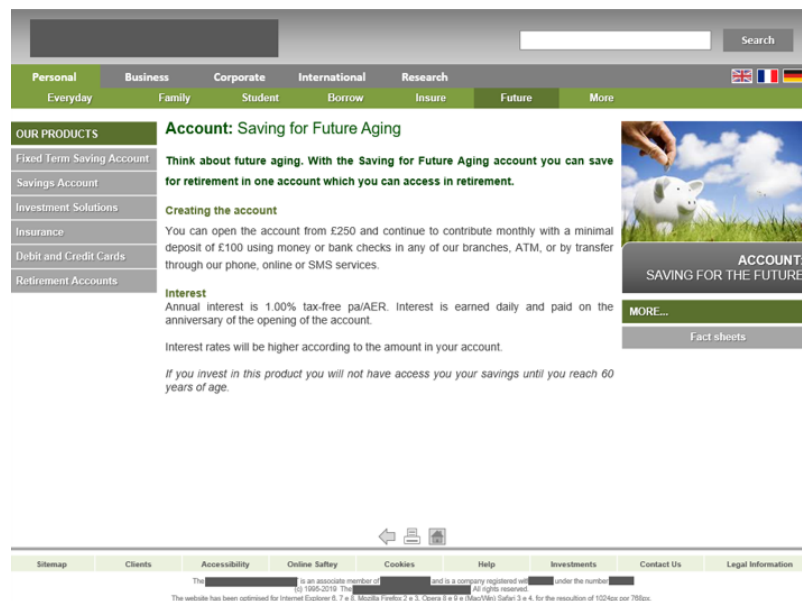


Figure A.1: Webpage shown to participants in the future ageing condition.

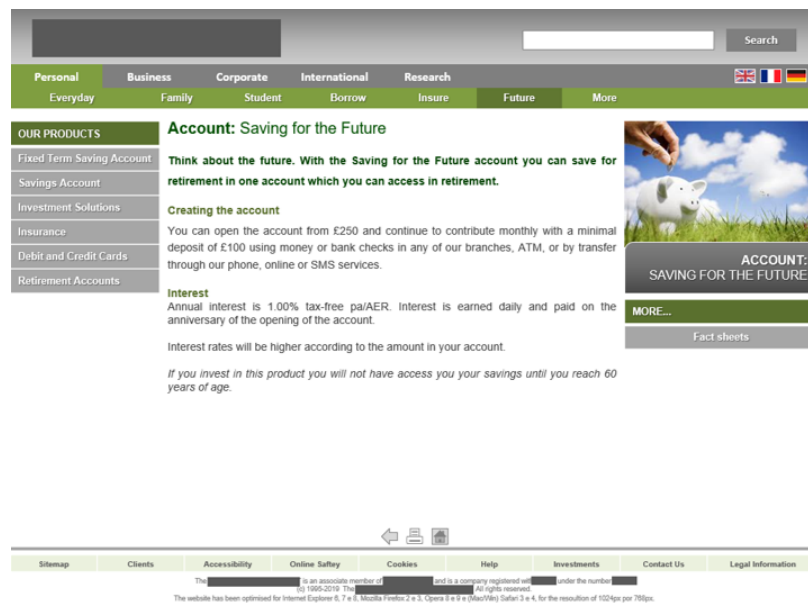


Figure A.2: Webpage shown to participants in the future condition.



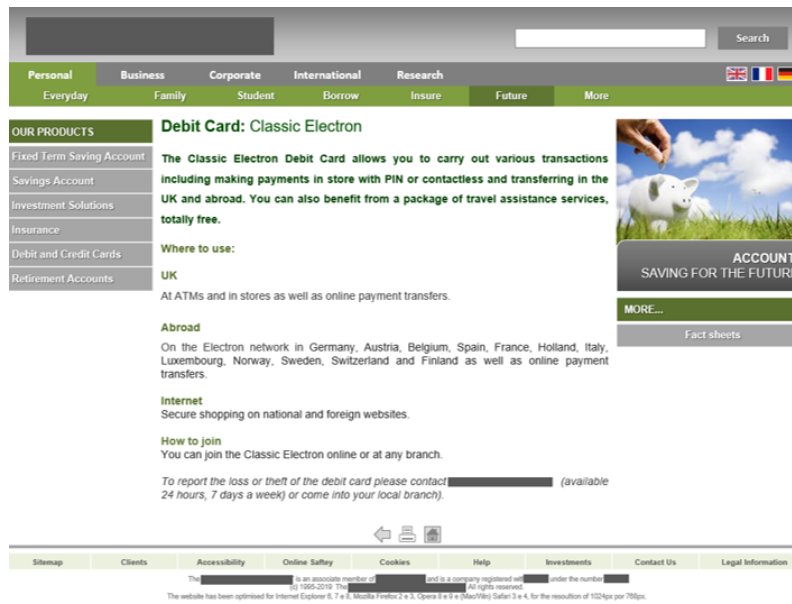


Figure A.3: Webpage shown to participants in the control condition.

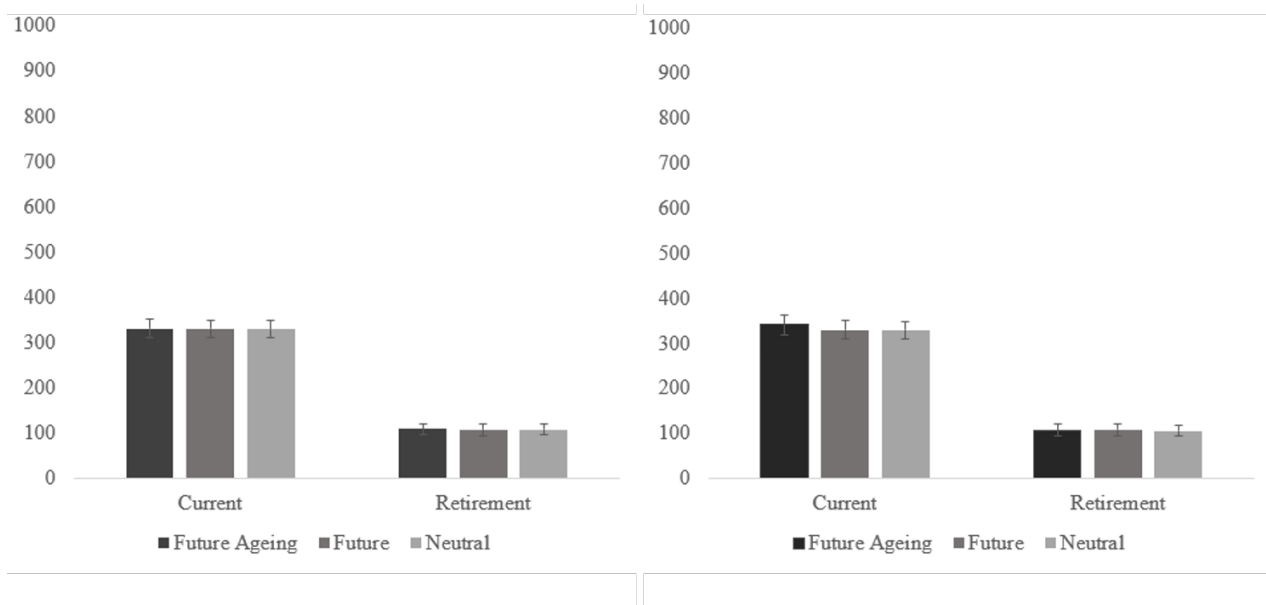


Figure A.4: The effect of priming condition on the money allocated (£) to current accounts and retirement saving under high future self-relevance (left) or low future self-relevance (right).

# Appendix B

## Chapter 5: Appendices

An example of the negative, positive and neutral not self-relevant vignettes used in Chapter 5. The self-relevant vignettes were identical except the ‘he’/‘she’ or name was replaced with an ‘I’.

Negative Vignette 1: Jane retired a few years ago. Jane spends much of her time at home but few people visit as it is cold and in need of repairs. She used to enjoy fixing motorcycles and baking but since retiring these activities are unaffordable and so Jane listens to the radio for entertainment. Jane frequently misses bills and is in so much debt it keeps her up at night. She now works shifts at the supermarket to supplement her savings.

Vignette 2: Sophie retired in the last couple of years. Sophie’s car broke down a year ago and it’s too expensive to fix or run it. There are few busses close enough for her to easily access. There is no money spare for hobbies so Sophie borrows books from the library. Sophie frequently misses bills and often has to borrow money if an unexpected bill arises. The budget is strict and there is no money spare after essentials.

Vignette 3: Raj has been retired for almost 2 years. Raj can’t afford to travel like he did when working but goes walking around the local area from time-to-time. Raj loves to dance but since retiring has had to stop attending classes as it’s too expensive. Instead he watches dancing on the TV. Raj makes a budget every month and then sticks to it.

There is no money left over each month but he doesn't have to borrow money.

Vignette 4: Sabah has just retired in the last year. Sabah mostly stays close to home and enjoys cooking and experimenting with food. Sabah used to eat out a lot when she was working and enjoyed trying new foods in the best restaurants but since retiring this has become a once a year treat. For Sabah, a tight budget is essential but by planning ahead and shopping around, she manages to make ends meet.

Positive Vignette 1: I retired a few years ago. I spend much of my time on holiday abroad and recently bought a motor home to tour Europe in. Since retiring, I have picked up many new hobbies including horse riding and golf and enjoy going on days out with my friends. I have enough savings to comfortably cover my retirement and think very little before spending. I have money spare for luxuries and gifts for friends and family.

Vignette 2: I retired in the last couple of years. I travel abroad a couple of times a year and often take day trips to historical sites with friends. When I'm at home, I enjoy painting and love that retirement gives me more time to enjoy the hobbies I did whilst working. I can pay all my bills without worry and as long as I keep to my budget there is often money spare at the end of the month.

Vignette 3: I have been retired for almost 2 years. I vacation in the UK, booking hotels and travel well in advance to get the best deal. I love to dance but since retiring I've had to reduce the number of classes I attend in order to reduce the cost. I make a budget every month and then stick to it. There is a small amount left over each month which I am saving to redecorate the bathroom.

Vignette 4: I retired when I was 68. I enjoy retirement and whilst many of the hobbies I did before retiring are now too expensive, I enjoy being involved in the community and keeping fit by volunteering as a local tour guide. I use the internet to research local free classes and events which I attend with friends. I enjoy fine cheeses but there is little money in the budget for such luxuries. I have to save for such items.

Neutral Vignette 1: I leave the house at about noon and go to my car. I travel to the park

and take a quick walk around before going back to the car. I then travel to a restaurant where I eat lunch. My food takes a while to arrive so I catch up on some emails before my food arrives. When I have finished eating I get back in the car. I get home at around two thirty in the afternoon.

Vignette 2: I spend Saturday afternoon mowing the lawn, raking leaves and planting brightly coloured flowers in the garden. Later in the day, I take a leisurely stroll to the local swimming pool and swims lengths until the sun outside begins to set. When I get home I begin to prepare dinner while listening to the radio. I always eat dinner in front of the television. After eating I take a shower and brush my teeth before heading to bed.

Vignette 3: I go to a local farm to pick fruits for my favourite summer fruit pie recipe. Whilst at the farm, I go and see the chickens and pigs which are in fields nearby. I walk around the area and pay for my fruit. After the visit to the farm I return home. I wash and chop the fruit and add it to the pre-prepared pie crust with some sugar. When the pie is finished, I eat a giant slice.

Vignette 4: I am living on the East Coast. I get on the bus in the afternoon and take a seat. I watch all the different types of people getting on the bus and wonder what they are all doing with their day and where they are going. I take the bus regularly as it is a good way to get around town and see different places. Sometimes I will get on the bus just to travel around, with no particular destination in mind.

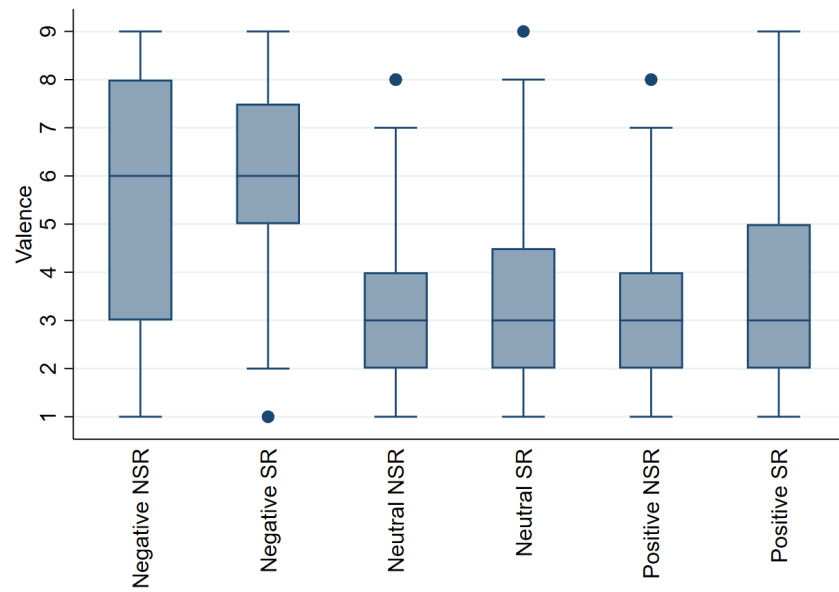


Figure B.1: Mean emotional valence scores by self-relevance group. Note: NSR = not self-relevant, SR = self-relevant. One is 'extremely positive' and nine is 'extremely negative'.

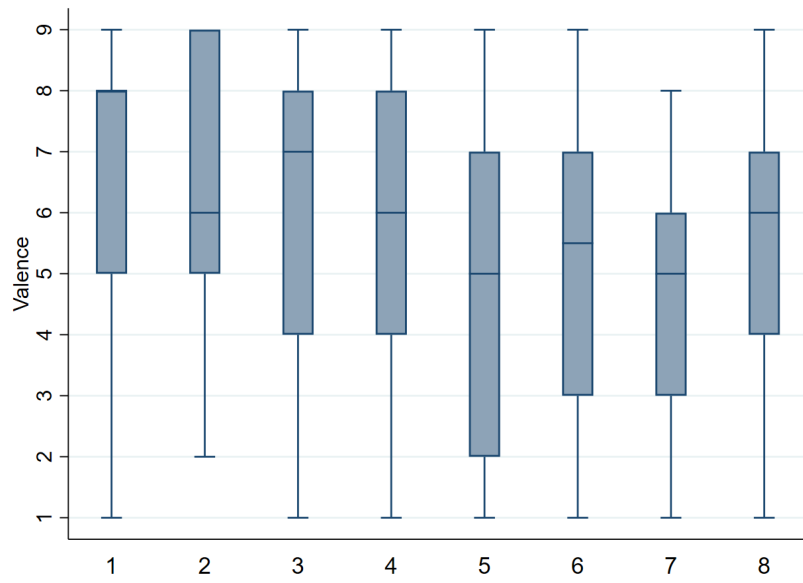


Figure B.2: Mean emotional valence scores for each negative vignette. One is ‘extremely positive’ and nine is ‘extremely negative’.

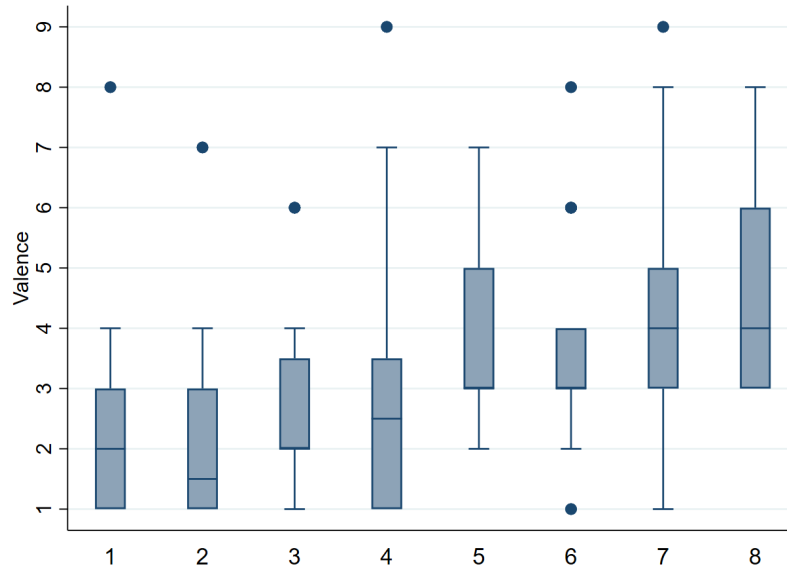


Figure B.3: Mean emotional valence scores for each positive vignette. One is ‘extremely positive’ and nine is ‘extremely negative’.



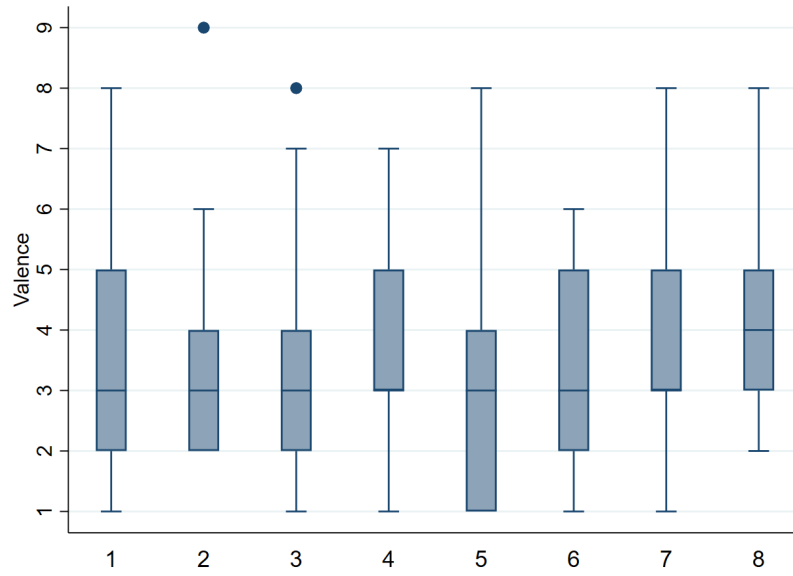


Figure B.4: Mean emotional valence scores for each neutral vignette. One is ‘extremely positive’ and nine is ‘extremely negative’.

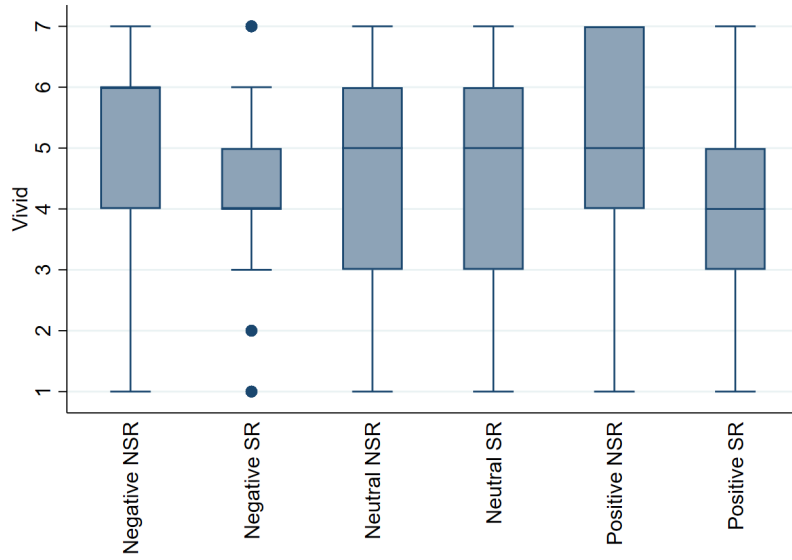


Figure B.5: Mean vividness scores by self-relevance group. Note: NSR = not self-relevant, SR = self-relevant. One is 'not at all vivid picture' and seven is 'very vivid picture'.

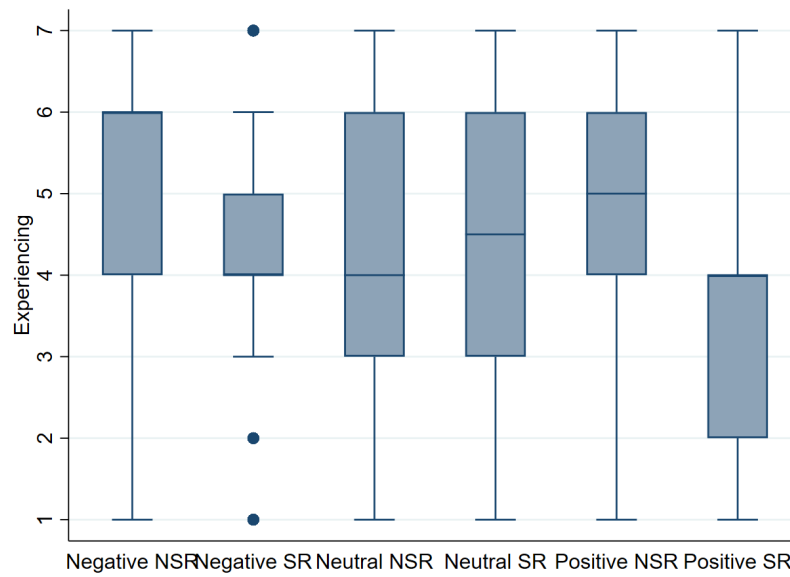


Figure B.6: Mean pre-experiencing scores by self-relevance group. Note: NSR = not self-relevant, SR = self-relevant. One is 'not at all' and seven is 'completely'.

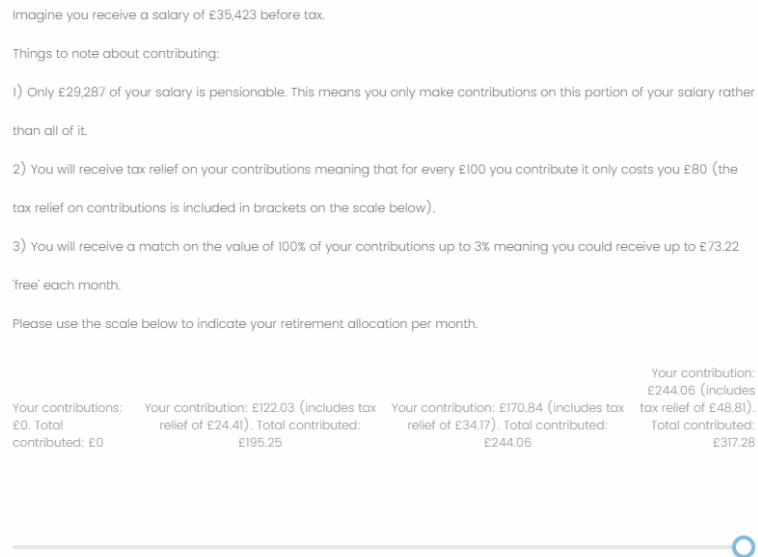


Figure B.7: Example scale and slider participants saw. Different emotional vignettes appeared below the scale when the slider was moved to different contribution levels.

# Appendix C

## Chapter 6: Appendices



Figure C.1: The scenario letter seen by all participants in Experiment 1.



## Retirement Master Trust

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May 28, 2020

Dear Sir or Madam,

You have been a member of the pension scheme for 10 years and are currently contributing to your pension at the minimum level of £200 per month.

If you choose to increase your contribution and pay an extra £215 per month on top of the minimum (£415 in total) you will be able to live comfortably in retirement\*.

Minimum contribution: £200

Optional additional contribution: £215 (total £415)

Sincerely,

Jane Bloggs  
Head of Contributions

\*This is based on 5 percent investment growth after charges (not accounting for inflation) targeting a retirement income which allows for a similar lifestyle in retirement as during work for an average earner (£27,000) with a full National Insurance record and therefore in receipt of the full state pension.  
(Financial Times Adviser - [www.ftadviser.com](http://www.ftadviser.com)).

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Figure C.2: The letter seen by participants in the control condition in Experiment 1.



## Retirement Master Trust

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May 28, 2020

Dear Sir or Madam,

You have been a member of the pension scheme for 10 years and are currently contributing to your pension at the minimum level of £200 per month.

If you choose to increase your contribution and pay an extra £215 per month on top of the minimum (£415 in total) you will be able to live comfortably in retirement\*.

If you delay this increase for another 10 years, you will need to pay an extra £510 on top of the minimum (£710 in total), to achieve the same retirement wealth and live comfortably in retirement\*.

Minimum contribution: £200

Optional additional contribution if made today: £215 (total £415)

Optional additional contribution if made in 10 years time: £510 (total £710)

Sincerely,

Jane Bloggs

Head of Contributions

\*This is based on 5 percent investment growth after charges (not accounting for inflation) targeting a retirement income which allows for a similar lifestyle in retirement as during work for an average earner (£27,000) with a full National Insurance record and therefore in receipt of the full state pension.

(Financial Times Adviser - [www.ftadviser.com](http://www.ftadviser.com)).

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Figure C.3: The letter seen by participants in the prospective condition in Experiment 1.



## Retirement Master Trust

---

May 28, 2020

Dear Sir or Madam,

You have been a member of the pension scheme for 10 years and are currently contributing to your pension at the minimum level of £200 per month.

If you had increased your contributions 10 years ago you would have needed to pay an extra £50 per month on top of the minimum to live comfortably in retirement (£250 in total)\*.

Now, if you choose to increase your contribution you will need to pay an extra £215 per month on top of the minimum (£415 in total) to be able to achieve the same wealth and live comfortably in retirement\*.

Minimum contribution: £200

Optional additional contribution if made 10 years ago: £50 (total £250)

Optional additional contribution if made today: £215 (total £415)

Sincerely,

**Jane Bloggs**

Head of Contributions

\*This is based on 5 percent investment growth after charges (not accounting for inflation) targeting a retirement income which allows for a similar lifestyle in retirement as during work for an average earner (£27,000) with a full National Insurance record and therefore in receipt of the full state pension.  
(Financial Times Adviser - [www.ftadviser.com](http://www.ftadviser.com)).

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Figure C.4: The letter seen by participants in the retrospective condition in Experiment 1.



Condition	Mean	Standard deviation
Control and Control	3.05	1.73
Control and Action	2.81	1.82
Control and State	3.29	1.96
Retrospective and Control	2.46	1.34
Retrospective and Action	3.25	1.89
Retrospective and State	2.81	1.71
Prospective and Control	3.42	1.91
Prospective and Action	3.44	1.93
Prospective and State	3.03	1.89

Table C.1: Means and standard deviation of likelihood to increase contributions (1 - Extremely unlikely, 7 - Extremely likely) in Experiment 1.

	Regret	Regret	Regret	Regret	Regret	Regret
Control and Ac- tion	-0.563			-0.625		
	(0.440)			(0.436)		
Control and State	0.00684			0.207		
	(0.437)			(0.435)		
Retrospective and Control	-0.394			-0.455		
	(0.438)			(0.430)		
Retrospective and Action	-0.0615			-0.125		

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**Table C.2 – continued from previous page**

	Regret	Regret	Regret	Regret	Regret	Regret
	(0.419)			(0.423)		
Retrospective and State	-0.260			-0.140		
	(0.403)			(0.389)		
Prospective and Control	0.0400			0.0721		
	(0.389)			(0.387)		
Prospective and Action	-0.302			-0.190		
	(0.496)			(0.484)		
Prospective and State	0.0981			0.143		
	(0.427)			(0.427)		
Retrospective		-0.0501			-0.0789	
		(0.263)			(0.260)	
Prospective		0.148			0.168	
		(0.271)			(0.267)	
Action			-0.217			-0.217
			(0.271)			(0.268)
State			0.0374			0.162
			(0.254)			(0.252)
Continued on next page						

**Table C.2 – continued from previous page**

	Regret	Regret	Regret	Regret	Regret	Regret
Age				0.0188 (0.0188)	0.0179 (0.0188)	0.0182 (0.0189)
Gender				0.566* (0.227)	0.533* (0.225)	0.564* (0.224)
Education				0.115 (0.124)	0.117 (0.124)	0.103 (0.124)
Pension				-0.740** (0.244)	-0.705** (0.243)	-0.724** (0.245)
Constant	8.079*** (0.265)	7.891*** (0.186)	7.978*** (0.171)	6.884*** (1.124)	6.772*** (1.130)	6.824*** (1.123)
Observations	548	548	548	547	547	547

Robust standard errors in parentheses

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

Table C.2: The effect of treatment condition on the level of regret at missing the initial offer (0 = no regret, 10 = very much regret) in Experiment 1.

	Attract	Attract	Attract	Attract	Attract	Attract
Control and Ac- tion	-0.0346 (0.486)			-0.0934 (0.480)		
Control and State	0.453 (0.507)			0.529 (0.505)		
Retrospective and Control	0.198 (0.519)			0.130 (0.516)		
Retrospective and Action	0.607 (0.482)			0.552 (0.487)		
Retrospective and State	0.323 (0.442)			0.363 (0.437)		
Prospective and Control	0.128 (0.507)			0.136 (0.511)		
Prospective and Action	-0.246 (0.548)			-0.196 (0.546)		
Prospective and State	0.175 (0.517)			0.179 (0.514)		

Continued on next page

Table C.3 – continued from previous page

	Attract	Attract	Attract	Attract	Attract	Attract
Control		0			0	
		(.)			(.)	
Retrospective		0.242			0.219	
		(0.272)			(0.276)	
Prospective		-0.0984			-0.0804	
		(0.299)			(0.304)	
Action			0.00316			-0.00462
			(0.295)			(0.295)
State			0.210			0.264
			(0.284)			(0.286)
Age				0.00770	0.00713	0.00930
				(0.0208)	(0.0208)	(0.0208)
Gender				0.426	0.403	0.430
				(0.243)	(0.239)	(0.238)
Education				0.188	0.195	0.195
				(0.120)	(0.119)	(0.120)
Pension				-0.299	-0.267	-0.295
				(0.252)	(0.251)	(0.248)
Constant	6.857***	6.989***	6.962***	5.550***	5.677***	5.533***
	(0.354)	(0.201)	(0.210)	(1.203)	(1.162)	(1.178)
Observations	548	548	548	547	547	547

Continued on next page

**Table C.3 – continued from previous page**

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<b>Attract</b>	<b>Attract</b>	<b>Attract</b>	<b>Attract</b>	<b>Attract</b>	<b>Attract</b>
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Robust standard errors in parentheses

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

Table C.3: The effect of treatment condition on the level of perceived attractiveness of the initial offer (0 = extremely unattractive, 10 = extremely attractive) in Experiment 1.

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# Appendix D

## Chapter 7: Appendices

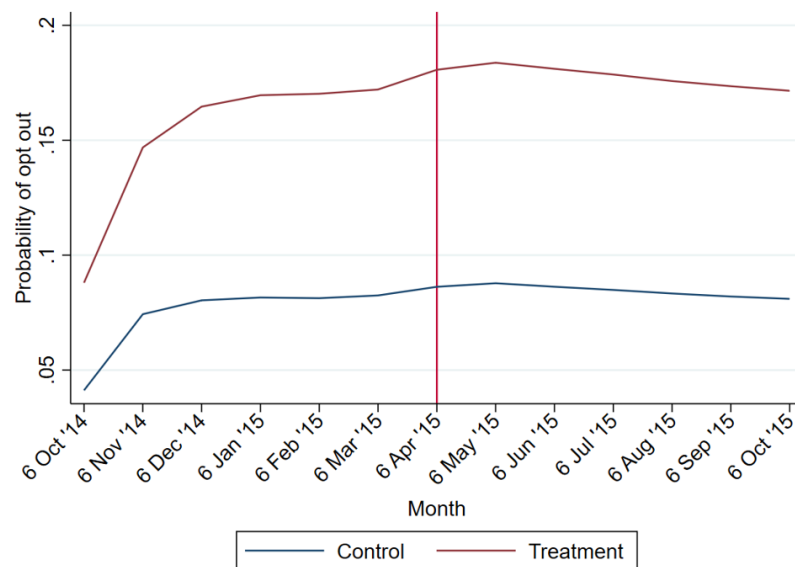


Figure D.1: Difference in Difference regression for opt outs (treatment group = 55 to 64 years old).

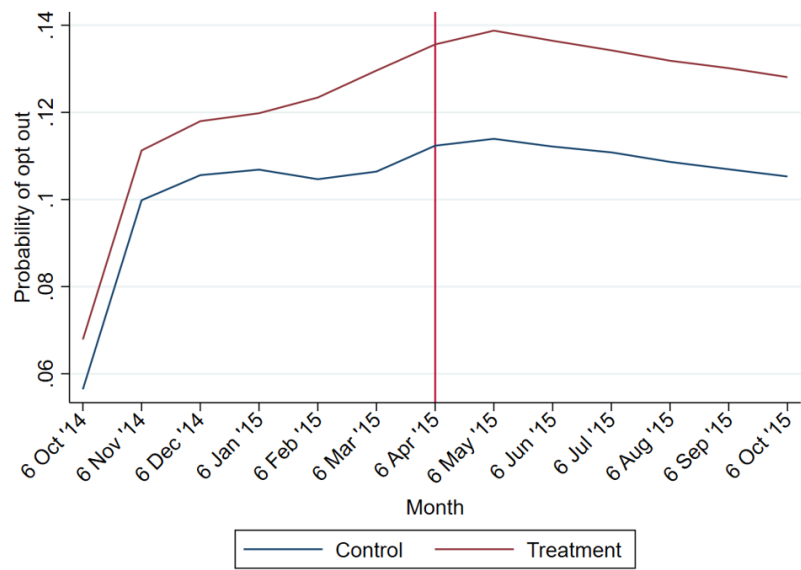


Figure D.2: Difference in Difference regression for opt outs (treatment group = 55 years old).



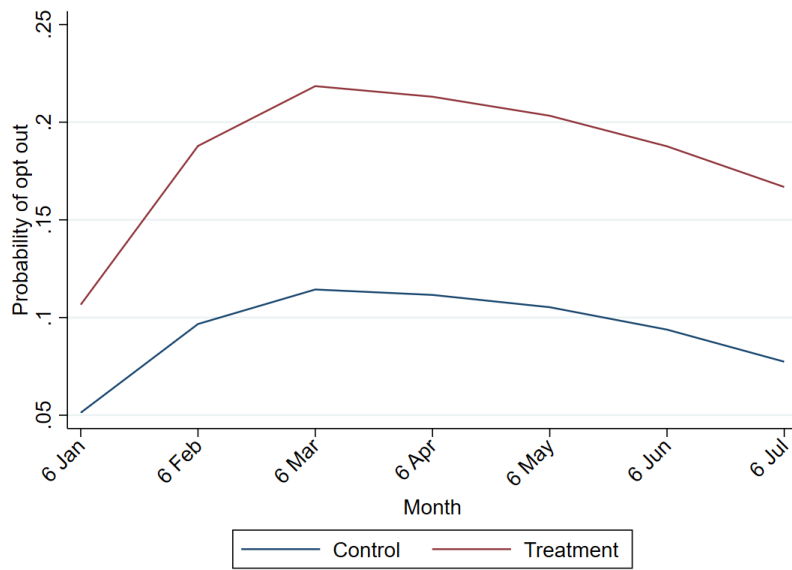


Figure D.3: Difference in Difference parallel trends for those that opt out (treatment group = 55 - 64 year olds).

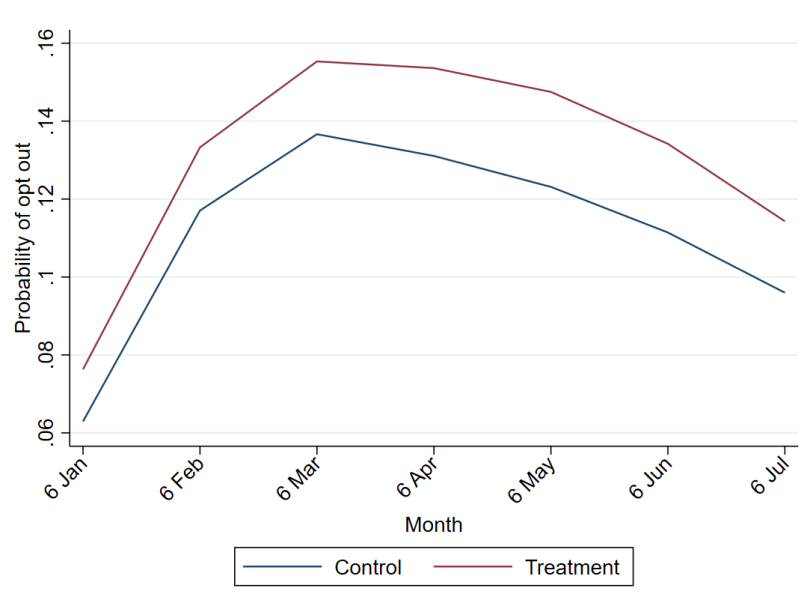


Figure D.4: Difference in Difference parallel trends for those that opt out (treatment group = 55 years old).

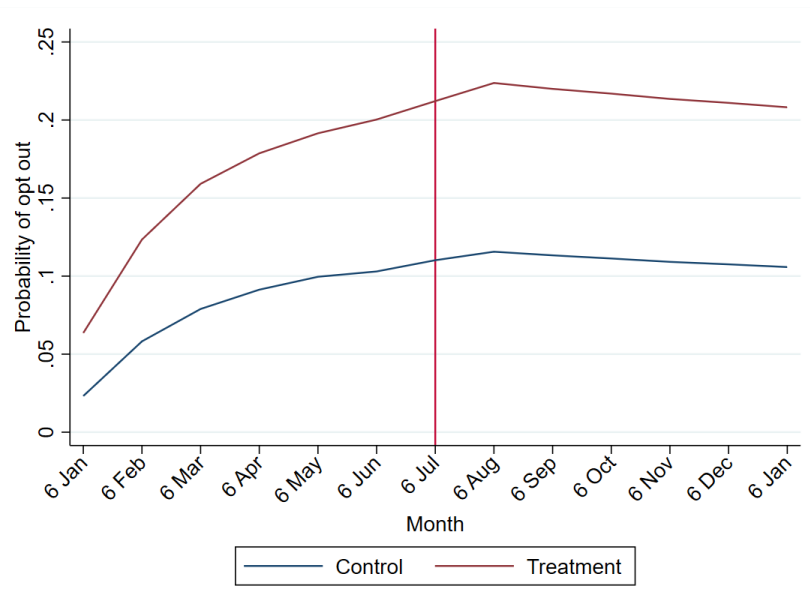


Figure D.5: Difference in Difference robustness test for those that opt out (treatment group = 55 - 64 year olds).

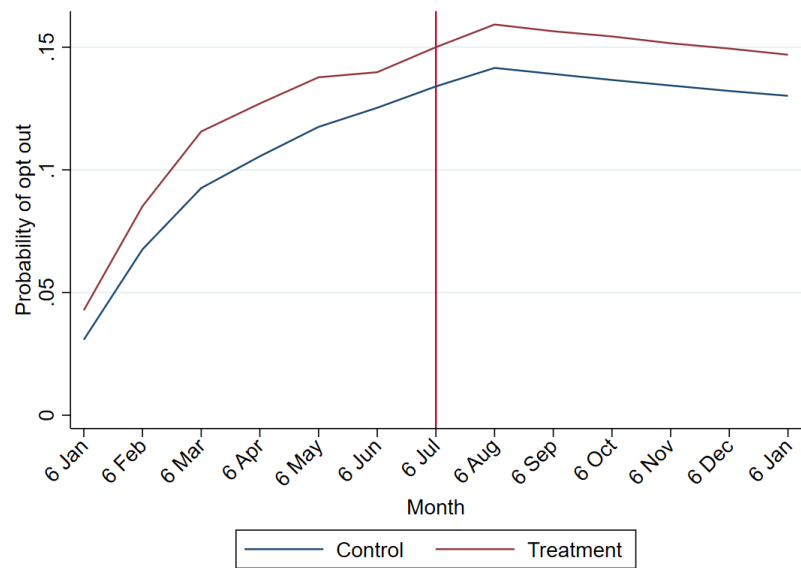


Figure D.6: Difference in Difference robustness test for those that opt out (treatment group = 55 years old).

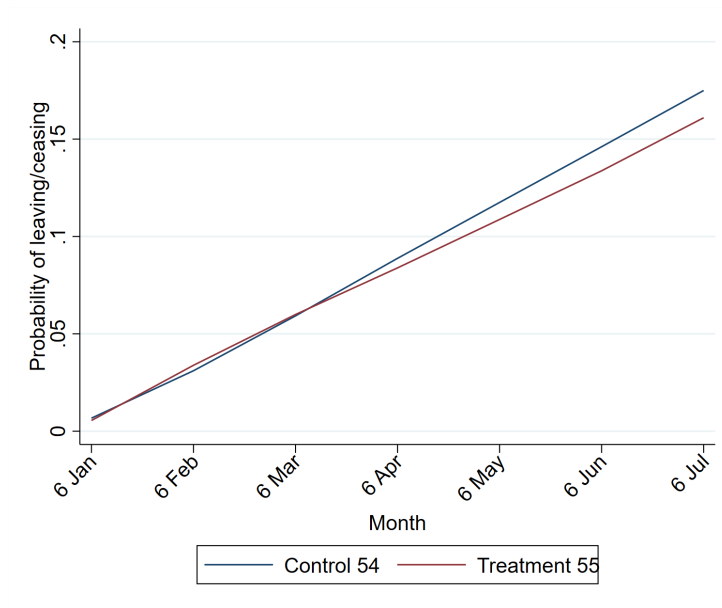


Figure D.7: Parallel trends for probability of leaving or ceasing pre 6 July 2016. Control = 54 years old, Treatment = 55 years old ( $\beta = -.0036$ ,  $p < .001$ , 95% CI  $[-.0068, -.0004]$ ).

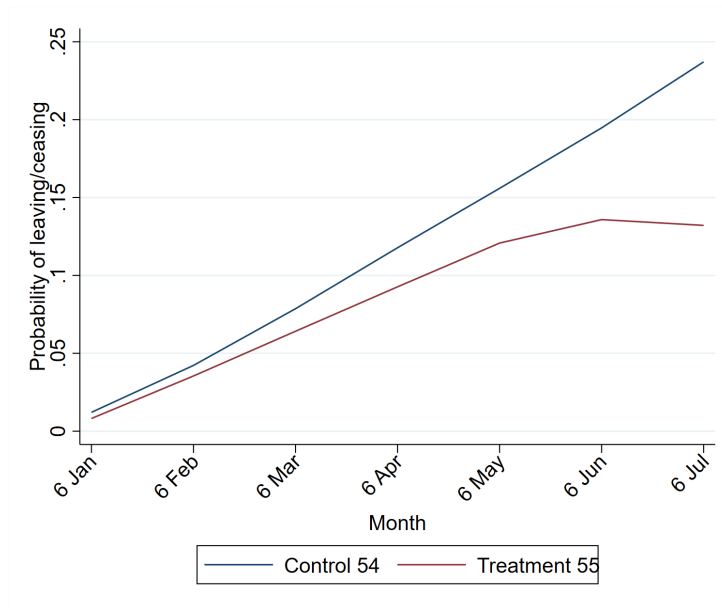


Figure D.8: Parallel trends for probability of leaving or ceasing pre 6 July 2016. Control = 45-54 years old, Treatment = 55-64 years old ( $\beta = -.0191$ ,  $p < .001$ , 95% CI  $[-.0202, -.0181]$ ).

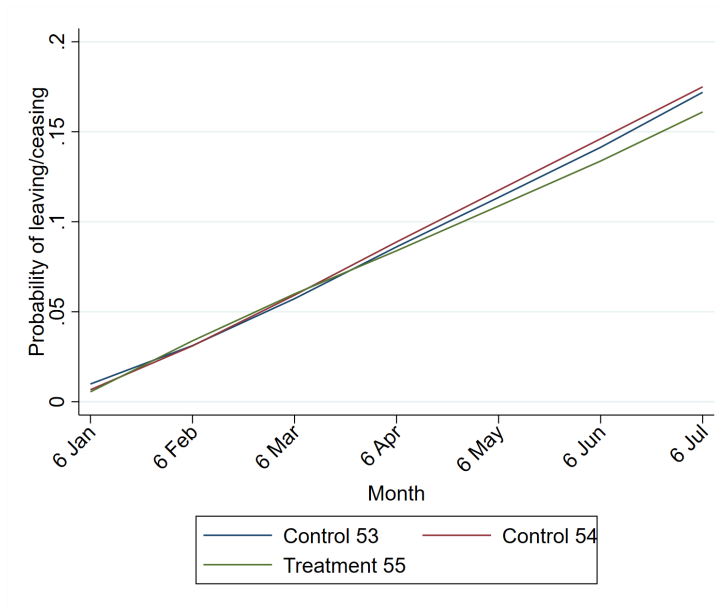


Figure D.9: Parallel trends for probability of leaving or ceasing pre 6 July 2016. Control 53 = 53 year olds, Control 54 = 54 year olds, Treatment = 55 year old ( $\beta = .0008$ ,  $p = .600$ , 95% CI  $[-.0023, -.0040]$ ).

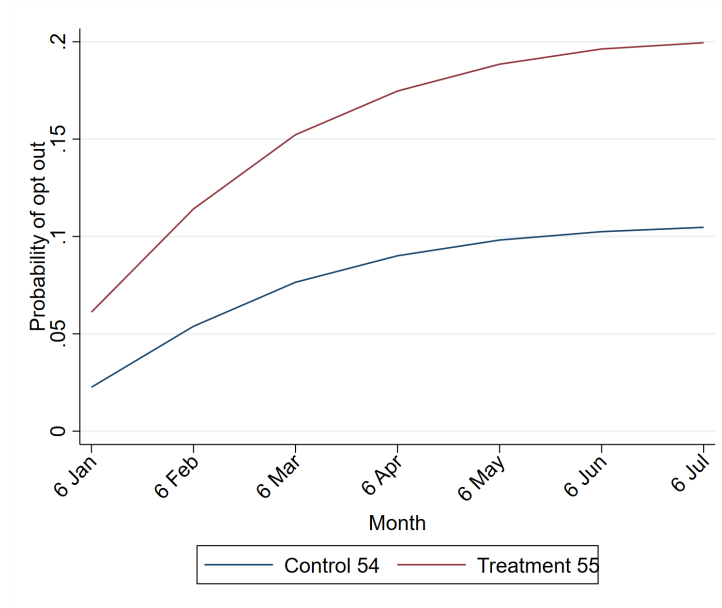


Figure D.10: Parallel trends for probability of opt out pre 6 July 2016. Control = 45-54 year olds, Treatment = 55-64 year olds.



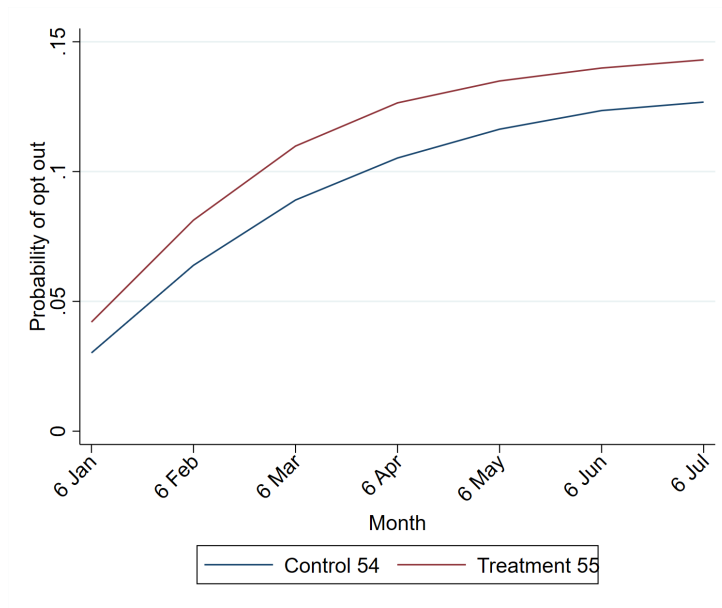


Figure D.11: Parallel trends for probability of opt out pre 6 July 2016. Control = 54 years old, Treatment = 55 years old.

Grouping (Years)	Sample size (n)		Gender % female		Employer size (Modal group)	
	Opt out	Leavers	Opt out	Leavers	Opt out	Leavers
45-54	175,276	84,567	49	47	5-49 (33%)	5-49(35%)
55-64	102,460	39,845	47	46	5-49 (34%)	5-49 (35%)
54	15,248	7,149	49	47	5-49 (34%)	5-49 (34%)
55	15,223	6,999	51	50	5-49 (33%)	5-49 (35%)

Table D.1: Sample size and demographics for the main analysis in July 2016.

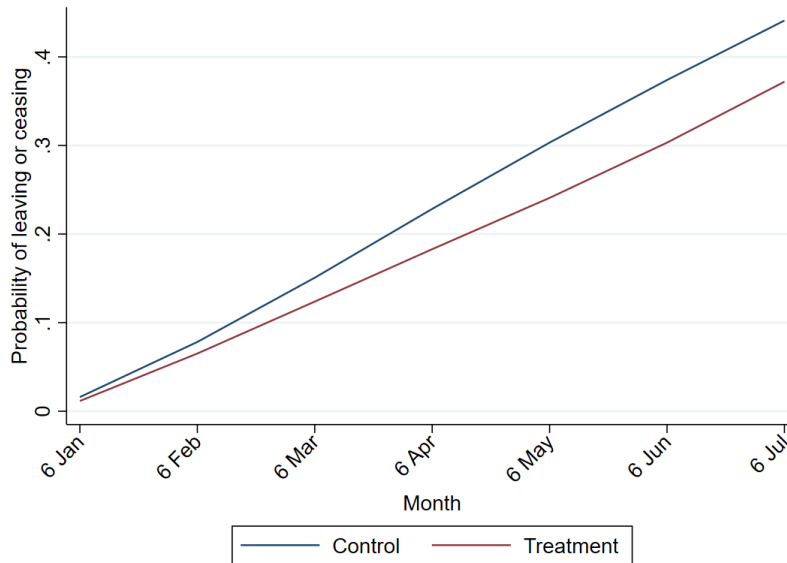


Figure D.12: Difference in Difference parallel trends for those that leave or cease contributing in July 2016 (treatment group = 55 - 64 year olds).

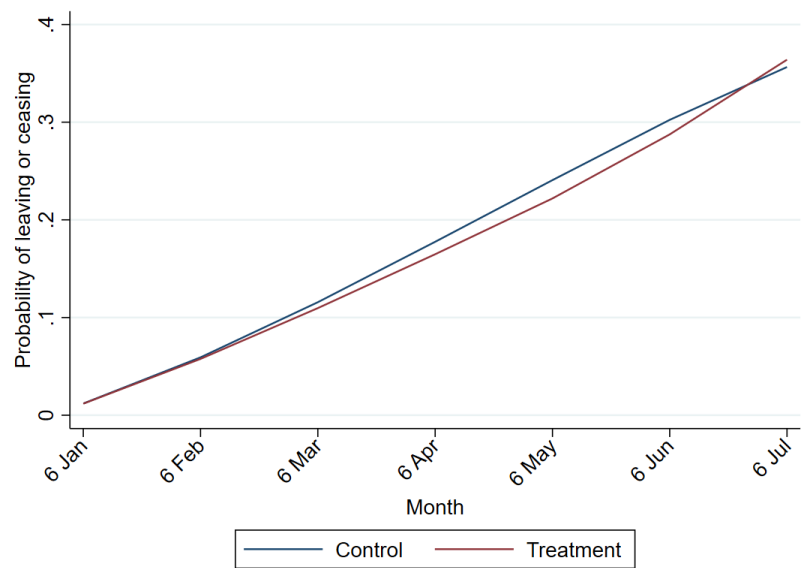


Figure D.13: Difference in Difference parallel trends for those that leave or cease contributing in July 2016 (treatment group = 55 years old).

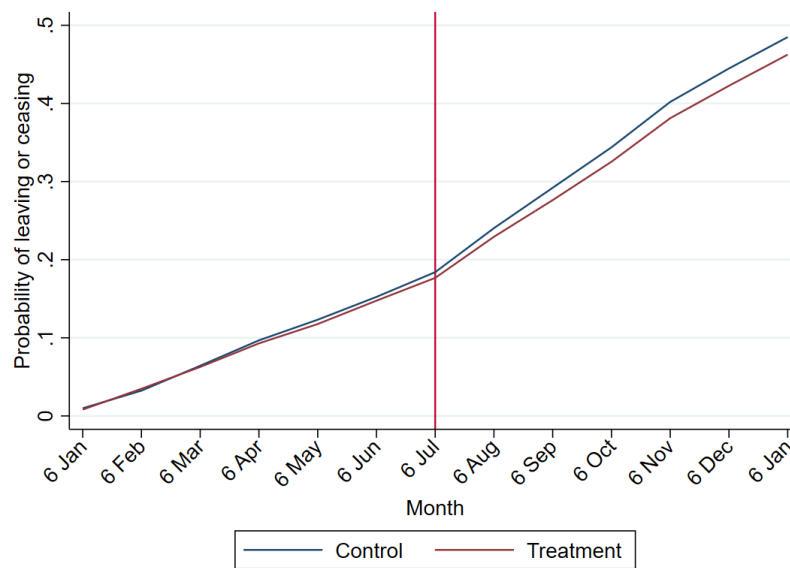


Figure D.14: Difference in Difference for those that leave or cease contributing in July 2016 (treatment group = 55 - 64 year olds).

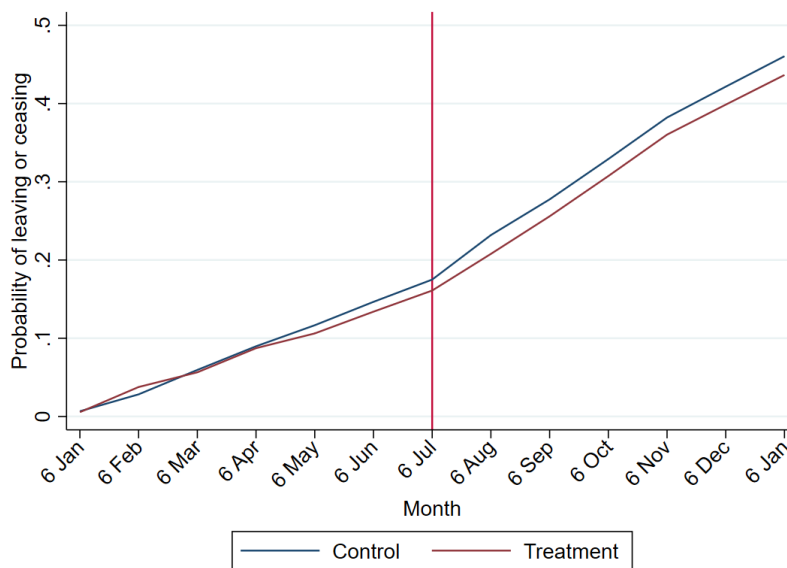


Figure D.15: Difference in Difference for those that leave or cease contributing in July 2016 (treatment group = 55 years old).

Table D.2: Difference in Difference regression probability of opt out in broad and restricted age bands.

	Model 1 (Broad age band)		Model 2 (Restricted age band)	
	DiD regression	Standard error	DiD regression	Standard error
Time				
6 Nov '14	.0420***	.0015	.0429***	.0045
6 Dec '14	.0518***	.0015	.0487***	.0047
6 Jan '15	.0539***	.0015	.0498***	.0047
6 Feb '15	.0535***	.0015	.0500***	.0048
6 Mar '15	.0545***	.0015	.0535***	.0048
6 Apr '15	.0595***	.0015	.0590***	.0049
6 May '15	.0611***	.0015	.0609***	.0050
6 Jun '15	.0588***	.0015	.0584***	.0050
6 Jul '15	.0566***	.0015	.0562***	.0051
6 Aug '15	.0542***	.0015	.0534***	.0052
6 Sep '15	.0521***	.0016	.0513***	.0053
6 Oct '15	.0503***	.0016	.0489***	.0054
Treated	.0803***	.0025	.0137*	.0068
Time*Treated (DiD)	.0012***	.0002	.0009*	.0005
Constant	.0287***	.0016	.0548***	.0057
<i>N</i>	1,587,643 (1)	1,587,643 (1)	175,463 (2)	175,463 (2)

Standard errors in parentheses.

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

(1) 155,817 clusters. Once people join and do not opt out they remain in the data set until they leave.

(2) 17,279 clusters. Once people join and do not opt out they remain in the data set until they leave.

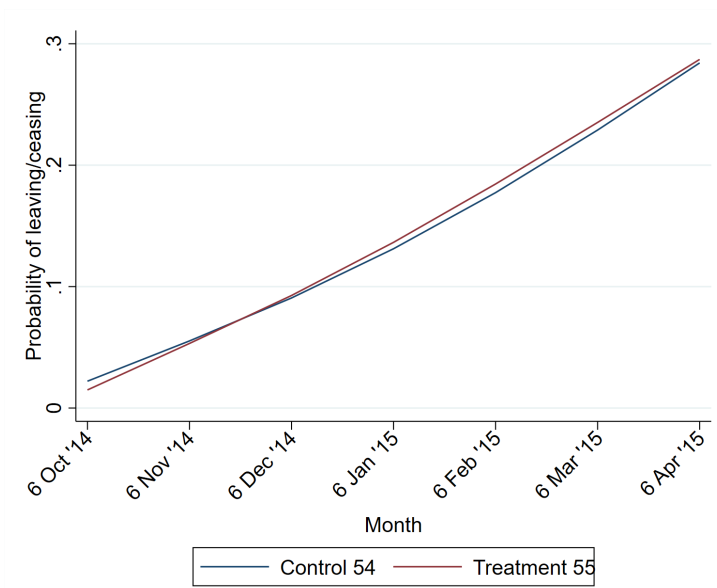


Figure D.16: Parallel trends for probability of leaving/ceasing pre-intervention. Control = 45-54 years old, Treatment = 55-64 years old.  $\beta = .0012$ ,  $p = .175$ , 95% CI  $[-.0005, .0028]$

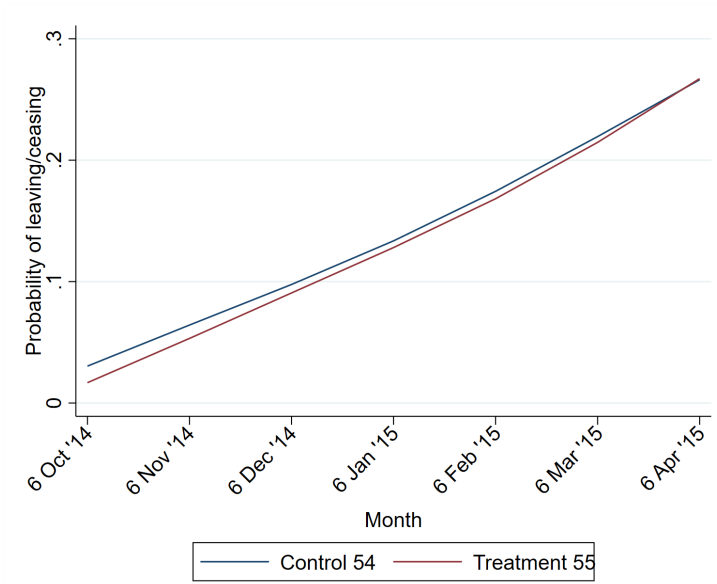


Figure D.17: Parallel trends for probability of leaving/ceasing pre-intervention. Control = 54 years old, Treatment = 55 years old.  $\beta = .0017$ ,  $p = .459$ , 95% CI  $[-.0028, .0063]$

# Appendix E

## Chapter 8: Appendices

Messages varied depending on the resources available at a particular university.

Each message ended with a link to stop the messages.

### **Week 1:**

*Welcome to the new term at [university]!*

*If you have any problems regarding your student finance, check your enrolment tasks at [website]*

*Still need help? Get in touch with the Student Financial Support by calling [telephone number].*

### **Week 2:**

*We're now getting into the term properly.*

*To make sure your loan lasts to the end of term, why not create a budget if you haven't already using a budget worksheet [link to budget tracker]*

### **Week 3:**

*When it comes to finances, knowledge is power. Why not give your money skills a boost with Blackbullion? <https://www.blackbullion.com/>*



*It's a free online learning platform providing engaging and easy-to-use digital resources and tools designed to improve your money management skills*

For universities that did not have Blackbullion, another source of financial education was provided.

#### **Week 4:**

*There are lots of exciting things to do at university, but you don't want to break the bank.*

*You can always make a money management/budgeting appointment with the [student support team] if you'd like more help*

*[Link to make an appointment]*

At universities without this resource, a link to cheaper activities, often provided by the students' union was linked to.

#### **Week 5:**

*[University] provides lots of resources on money management from student funding, budgeting, maximising your income as well as money saving tips, – take a look at the website.*

*[Website link]*

#### **Week 6:**

*Chances are that your friends need to save too - even if they don't admit it - so why not check out the free events and venues in your area and save money together.*

*Free museums: [link] Food deals: [link]*

#### **Week 7:**

*Sometimes we struggle to meet our spending goals - and that's fine. If you've fallen behind, take this week as a fresh start for the rest of term.*

#### **Week 8:**

*If it looks like you're running out of money, don't wait to seek help. Talk to the friendly*

*[relevant team] team at [university] to see what help might be available. You can contact them by emailing: [email address]*

### **Week 9:**

*Struggling to stick to your budget? Why not make a list of what expenses are a need and what is a want and cut back on some of those wants?*

*Check out how much those weekly takeaways or daily coffees are costing you over time:  
<https://www.moneysavingexpert.com/shopping/demotivator/>*

### **Week 10:**

*Term's almost over and it's time to celebrate! Remember, your next student loan payment won't arrive until the end of January so keep an eye on your budget.*