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4 Saving for the future: Dynamic Effects of Time Horizon

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24 Abstract

25 Why is the public so underprepared for retirement? We studied the saving behavior of a large
26 cross-section of adults to investigate age differences in motivations to save across adulthood. Our
27 investigation revealed that both a future oriented mindset as well as adequate financial knowledge may
28 be necessary for younger adults to engage in saving for their retirement. This finding is consistent with
29 a theoretical account in which younger adults who have long time horizons prioritize preparatory goals
30 and knowledge seeking. As time horizons shorten, motivations to realize goals replace motivations to
31 gather knowledge. Accordingly, future oriented attitudes were more directly associated with saving
32 with advancing age, such that future oriented adults who were approaching retirement saved regardless
33 of their level of financial knowledge. Our findings reveal a dynamic character of saving tendencies
34 across adulthood and imply age differences in the psychological factors that motivate saving behavior.

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37 Keywords: Saving, retirement, financial planning, time horizon, financial knowledge

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Saving for the future: Dynamic Effects of Time Horizon

We meet at a moment of great uncertainty for America. The economic crisis we face is the worst since the Great Depression. Markets across the globe have become increasingly unstable, and millions of Americans will open up their 401(k) statements this week and see that so much of their hard-earned savings have disappeared.

—Obama Oct. 13, 2008 economic crisis speech

55 **1. Introduction**

56 The global financial crisis of 2008 has shown with devastating consequences that the future is
57 highly uncertain. Rising life expectancies in past decades has lengthened retirement years (Lee, 2001)
58 and greater access to employment-based retirement plans has forced financial decisions about the
59 future into the hands of workers (Gough & Niza, 2011). Yet, the American public (Topoleski, 2013)
60 and people in other countries (Crossley, Emmerson, & Leicester, 2012) are seemingly underprepared
61 for retirement, and many retirees live below the poverty threshold (Lusardi & Mitchell, 2007a). Policy
62 initiatives can stimulate saving behavior (Thaler & Benartzi, 2004), but will be most effective if
63 informed by sound psychological principles.

64 In the U.S., the 401(k) plan is the principal employment-based retirement scheme. Workers
65 who opt into the plan can decide on the contribution they wish to make to their pension account. Some
66 companies in the U.S. offer 401(k) plans that enable workers to choose how to invest their
67 contributions in stocks, bonds, and the money market (Gough & Niza, 2011). The 401(k) plan and
68 other saving schemes offered by employers bestow in their workers a financial independence and
69 personal liability, but also raise the need to ensure that people possess the adequate knowledge and
70 future oriented mindset necessary to make advantageous decisions about their financial future (Chan &
71 Stevens, 2008; Choi, Laibson, Madrian, & Metrick, 2002).

72 People who are future oriented are more likely than others to save for retirement (Hershey et
73 al., 2007; Jacobs-Lawson & Hershey, 2005) and to enroll in employment-based retirement plans
74 (Howlett, Kees, & Kemp, 2008; Munnell, Sundén, & Taylor, 2001). Future oriented attitudes are
75 characterized by long planning horizons and a focus on future as opposed to present or past goals. In
76 the Munnell et al. (2001) study, workers who expressed planning horizons of five years or longer were
77 more likely than individuals with shorter planning horizons to enroll in the 401(k) plan and had made
78 greater savings contributions. Lynch Jr, Netemeyer, Spiller, and Zammit (2010) distinguish between
79 propensities to plan money and time in the short- and long-term, where only a propensity for long-term
80 planning of money is shown to predict individuals' personal credit scores.

81 Future oriented individuals typically report that they are more knowledgeable of financial
82 planning for retirement (Hershey, & Mowen, 2000; Hershey et al., 2007). Higher levels of financial
83 literacy are associated with greater engagement in retirement planning (Hilgert, Hogarth, & Beverly,
84 2003; Lusardi & Mitchell, 2007a; 2009) and a reduced likelihood of having debt (Lusardi & Tufano,
85 2009). Concerns regarding low levels of financial literacy in the U.S. population have prompted
86 researchers and institutions to develop education programs for improving financial literacy as a means
87 of fostering financial investment for retirement (e.g., Jacob, Hudson, & Bush, 2000; Lusardi &
88 Mitchell, 2011). However, relevant financial knowledge as well as a future oriented mindset may both
89 be necessary for engagement in retirement saving. Among a sample of graduate students, Howlett,
90 Kees, and Kemp (2008) found that only those who were both informed about how a retirement plan
91 worked and were future oriented expressed a willingness to enroll in the plan. This implies that
92 education programs that target financial literacy may be insufficient in engaging retirement saving
93 behavior unless also targeted at people's attitudes about the future.

94 Hershey and colleagues (Hershey et al., 2007) have proposed that a future oriented mindset
95 triggers the pursuit of financial knowledge necessary for making informed decisions about saving.
96 More generally, Carstensen and colleagues (Carstensen et al., 1999; Charles & Carstensen, 2009) have
97 proposed that for young adults who have a long time horizon (e.g., until retirement), time is perceived
98 as open-ended, and this prioritizes goals that are preparatory and which emphasize knowledge
99 acquisition for future possibilities. For example, young adults will often prefer the company of a social
100 partner that can offer novelty and new information (e.g., a book author) over the company of a close
101 friend or family member (Fung, Carstensen, & Lutz, 1999). Although this account was developed as a
102 theory of emotion regulation in social contexts (Charles & Carstensen, 2009), the notion that time
103 horizon is important for goal setting is highly relevant to financial planning. Information seeking
104 capitalizes on time available during early adulthood. A future oriented mindset may trigger the pursuit
105 of financial knowledge in young adulthood by motivating goals to prepare for the future.

106 As time horizons shorten (e.g., with the passage of time), time constraints are perceived.
107 Consequently, motivations to gather knowledge and seek new experiences are replaced with
108 motivations to realize goals (Carstensen et al., 1999). This implies that in the financial context, future
109 oriented attitudes may have a more direct influence on decisions about saving that are less dependent
110 on financial knowledge as one approaches retirement. This is because as time horizons shorten,
111 priorities shift away from preparatory goals (e.g., knowledge acquisition) and toward realizing goals
112 (e.g., making savings contributions). An implication is that some adults who are approaching
113 retirement may be motivated to make decisions about saving without seeking necessary financial
114 knowledge. Indeed, financial literacy is poor particularly among adults aged 50 years and older
115 (Lusardi & Mitchell, 2011).

116 As retirement looms large on the horizon for individuals approaching retirement, the financial
117 demands of retirement may become more salient. Construal level theory proposes that events that are
118 far in the future are mentally represented abstractly and in terms of their goal-relevant features (Trope
119 & Liberman, 2003). For young adults with a long time horizon, such goals are likely to be preparatory
120 and motivate knowledge seeking. Events that are in the near future are perceived in more concrete
121 detail and in a more contextualized form. For example, when asked to imagine reading a science
122 fiction book either tomorrow or in one year, participants imagining the longer horizon described the
123 activity in terms of higher-order goals (e.g., “broadening my horizons”), whereas those imagining the
124 shorter horizon focused more on details of actions involved (e.g., “flipping pages”; Liberman & Trope,
125 1998). Hence, people’s mental representations of future events change as they approach those events in
126 time. Similarly, individuals who are approaching retirement are likely to perceive retirement in more
127 concrete terms that reflect the actual financial requirements of retirement.

128 Here, we investigate the association between future oriented attitudes and financial knowledge
129 with retirement saving behaviors across the adult lifespan. We anticipate that a future oriented mindset
130 will influence retirement saving by motivating knowledge acquisition during young adulthood, but will
131 have a more direct influence on retirement saving as individuals approach retirement and their time
132 horizons shorten.

133 **2. Study 1**

134 In Study 1, we investigate differences with age in the influence of future oriented attitudes and
135 financial knowledge on retirement saving behavior. We reasoned that financial knowledge would
136 mediate effects of future oriented attitudes on retirement saving in young adulthood, such that only
137 young adults who are both future oriented and knowledgeable of finance would engage in saving. This
138 would suggest that a future oriented mindset motivates preparatory goals and knowledge seeking

139 behavior among individuals who have long time horizons. We expected that future oriented attitudes
140 would have a more direct and un-mediated association with retirement saving in later adulthood as
141 people approach retirement. This would suggest that shortening time horizons prioritize realizing goals
142 (i.e., making savings contributions) over preparatory and knowledge seeking goals. Consequently,
143 some older adults may be motivated to make decisions about retirement without seeking the necessary
144 financial knowledge. Specifically, we hypothesized that (a) future oriented attitudes would be a
145 stronger predictor of retirement saving as age advanced toward retirement as the effects of a future
146 oriented mindset would depend less on an individual's financial knowledge. As future oriented
147 attitudes are proposed to have a more direct effect on retirement saving with advancing age, we further
148 hypothesized that (b) future oriented attitudes would interact with financial knowledge and age when
149 predicting retirement saving.

150 As discussed earlier, long planning horizons as opposed to a focus on short term outcomes may
151 motivate a future oriented mindset. Lynch Jr et al., (2010) have distinguished between the short- and
152 long-term planning of money and time, in which tendencies toward long-term planning of money are
153 found to predict personal credit scores. On the basis that financial planning can be distinguished from
154 other types of planning (e.g., planning of time), we hypothesized that (c) a tendency toward the long-
155 and away from the short-term planning of money would predict greater retirement saving. We further
156 hypothesized that (d) if financial planning of the future motivates a future oriented mindset, then future
157 oriented attitudes should mediate any effects of financial planning tendencies on retirement saving.

158 In addition to assessing effects of future oriented attitudes, planning horizons, and financial
159 knowledge on retirement saving we also assessed individuals' financial risk tolerance, as this also is
160 associated with more active engagement in retirement saving (Jacobs-Lawson & Hershey, 2005) as
161 well as the accumulation of financial assets (e.g., Dulebohn, 2002). Risk taking in financial contexts,

162 however, reduces with age (Rolison, Hanoch, & Wood, 2012; Rolison, Hanoch, Wood, & Liu, 2014),
163 such that older adults are less willing than younger adults to engage with financial risks. Thus,
164 individual differences in financial risk tolerance may predict engagement in retirement saving only
165 among younger adults.

166 2.1. Method

167 2.1.1. Participants

168 The research materials and procedure were approved by the ethics committee at Scripps
169 College, Claremont (U.S.). Prior to the study, participants were told that the purpose of the study was
170 to assess their financial decision making, which would include assessments of their knowledge of
171 financial matters, their financial plans for the future, and their financial risk attitude. Participants
172 (N=448; 135 males, 313 females; age range=18–70, mean [M]=37.05, standard deviation [SD]=16.00)
173 were recruited from three sources. Advertisements online (N=201; 33 males, 168 females; age
174 range=18–69, M=34.13, SD=15.45) and Amazon Mechanical Turk (N=206; 84 males, 122 females;
175 age range=19–67, M=35.08, SD=12.91) were used to recruit participants from the younger to middle
176 age ranges. The former group was not compensated for their participation and the latter group received
177 a token payment of 0.25 US dollars. The reliability of the Amazon Mechanical Turk participant sample
178 has been validated elsewhere by comparisons with other samples and recruitment methods (Paolacci,
179 Chandler, & Ipeirotis, 2010). Older adults (N=41; 18 males, 23 females; age range=19–70, M=61.27,
180 SD=12.16) were recruited from a local community centre and were invited to Scripps College, CA to
181 complete the study. The older adults were compensated with 10 US dollars to cover their travel
182 expenses. All participants were US residents. The majority indicated high school (N=182; 40.63%) or
183 college (N=142; 31.70%) as their highest educational attainment, and over half (N=259; 57.81%)
184 indicated an annual household income greater than 40,000 US dollars.

185 2.1.2. Materials and Procedure

186 Future oriented attitudes were measured using the 6-item future time perspective scale (e.g., “I
187 enjoy thinking about how I will live years from now in the future”) developed by Hershey and Mowen
188 (2000), to which participants responded on a 7-point scale (“Never like me” [1] to “Always like me”
189 [7]). Scores were summed across items.

190 Propensities to plan time in the short- (e.g., “I set goals for the next few days for what I want to
191 achieve with my time”) and long-term (e.g., “I set goals...1–2 months...my time”) and money in the
192 short- (e.g., “I set financial goals...few days...my money”) and long-term (e.g., “I set financial
193 goals...1–2 months...my money”) were assessed using the 6-item short- and long-term time and
194 money planning scales developed by Lynch Jr, Netemeyer, Spiller, and Zammit (2010), to which
195 participants responded on a 7-point scale (“Strongly disagree” [1] to “Strongly agree” [7]). Scores
196 were summed across items.

197 Financial knowledge was assessed using four items taken from Van Rooij, Lusardi, & Alessie
198 (2011) that assessed financial numeracy (“Suppose you had \$100 in a savings account and the interest
199 rate was 2% per year. After 5 years, how much do you think you would have in the account if you left
200 the money to grow?” [1] More than \$102, [2] Exactly \$102, [3] Less than \$102), inflation (“Imagine
201 that the interest rate on your savings account was 1% per year and inflation was 2% per year. After 1
202 year, how much would you be able to buy with the money in this account?” [1] More than today, [2]
203 Exactly the same, [3] Less than today), investment return (“Buying a company stock usually provides
204 a safer return than a stock mutual fund. True or false?” [1] True, [2] False), and interest rates (“If the
205 interest rate falls, what should happen to bond prices?” [1] Rise, [2] Fall, [3] Stay the same, [4] None
206 of the above). Participants could further respond “Do not know” or “Refuse to answer” to each item.
207 Correct responses were summed across items.

208 Financial risk tolerance was assessed using a 5-item scale (e.g., “I am willing to risk financial
209 losses”) developed by Jacobs-Lawson and Hershey (2005), to which participants responded on a 7-
210 point scale (“Strongly disagree” [1] to “Strongly agree” [7]). Scores were summed across items.

211 Retirement saving tendencies were assessed using a 5-item (e.g., “I have made meaningful
212 contributions to a voluntary retirement savings plan”) self-report scale developed by Neukam &
213 Hershey (2002), to which participants responded on the same scale as the financial risk tolerance scale.
214 Scores were summed across items.

215 2.1.3. Analytic strategy

216 Age differences in future orientation, financial knowledge, risk tolerance, retirement saving,
217 and annual household income were examined in separate regression analyses that included age as a
218 continuous predictor in a first block to assess linear age trends. In a second block, a quadratic term for
219 age was included to test for quadratic age trends. Separate regression analyses were conducted to
220 assess effects of income on future orientation, financial knowledge, risk tolerance, and retirement
221 saving. Independent effects of age, future orientation, financial knowledge, and risk tolerance on
222 retirement saving were assessed in a multiple regression analysis that included all predictors in a first
223 block. All possible two-way interactions terms were included in a second block to test whether effects
224 of future orientation and financial knowledge on retirement saving differed with age. We hypothesized
225 that effects of future orientation would be less dependent on financial knowledge as age advanced into
226 later adulthood. Hence, we also tested for a three-way interaction involving age, future orientation, and
227 financial knowledge, including all possible three-way interaction terms in a third block. Propensity to
228 plan time and money in the short- and long-term were included as predictors of retirement savings and
229 future orientation in separate regression analyses. The Sobel z test was conducted to establish

230 mediating effects of future orientation on the association between propensity to plan and retirement
231 saving.

232 2.2. Results and discussion

233 We assessed age trends in retirement saving, future orientation, financial knowledge, financial
234 risk tolerance, and annual household income. Our regression analyses revealed quadratic age trends in
235 retirement saving ($\beta_{\text{linear}}=.385, p<.001; \beta_{\text{quadratic}}=-1.529, p<.001$), financial knowledge ($\beta_{\text{linear}}=.300,$
236 $p<.001; \beta_{\text{quadratic}}=-1.386, p<.001$), risk tolerance ($\beta_{\text{linear}}=.055, p=.245; \beta_{\text{quadratic}}=-.906, p=.004$), and
237 household income ($\beta_{\text{linear}}=.219, p<.001; \beta_{\text{quadratic}}=-1.115, p<.001$), but not in future orientation
238 ($\beta_{\text{linear}}=.048, p=.311; \beta_{\text{quadratic}}=-.335, p=.285$). Figure 1: Panel A provides the mean group values for 7-
239 year age periods from youngest to oldest adults. Inspecting it, retirement saving increased from age
240 18–24 years ($M=2.57$ of a possible 7) until age 46–52 ($M=4.85$) whereupon saving reduced with age.
241 Financial knowledge increased from age 18–24 years ($M=2.17$ of a possible 4) until a peak during late
242 middle-age ($M_{46-52 \text{ years}}=3.31$). Risk tolerance increased from age 18–24 years ($M=3.15$ of a possible 7)
243 to age 39–45 years ($M=3.69$) and there upon reduced with age. Annual household income was
244 positively associated with future orientation ($\beta=.248, p<.001$), financial knowledge ($\beta=.341, p<.001$),
245 and retirement saving ($\beta=.331, p<.001$), but was unrelated to risk tolerance ($\beta=-.018, p=.699$).

246 Next, we assessed effects of age, future orientation, financial knowledge, and financial risk
247 tolerance on retirement saving. To control for effects of annual household income, we included income
248 as a covariate in our regression model. This analysis revealed that age ($\beta=.286, p<.001$), future
249 orientation ($\beta=.409, p<.001$), financial knowledge ($\beta=.106, p=.010$), and risk tolerance ($\beta=.195,$
250 $p<.001$), all had positive effects on retirement saving. We hypothesized that (a) effects of future
251 orientation and financial knowledge on retirement saving would differ across adulthood. As expected,
252 age interacted positively with future orientation ($\beta=.422, p=.020$), and not with financial knowledge

253 ($\beta=.218, p=.140$). Figure 1: Panel B provides the results of our regression analysis conducted
254 separately for each 7-year period across adulthood from younger to older adults. The asterisks indicate
255 significant effects within each period. As age increased, the strength of the association between future
256 orientation and saving increased. We further hypothesized that (b) effects of future oriented attitudes
257 would depend on financial knowledge during young adulthood, but that future orientation would have
258 a more direct effect on retirement saving in later adulthood. As expected, our regression analysis
259 yielded a significant three-way interaction between age, future orientation, and financial knowledge
260 ($\beta=-1.461, p=.033$). Figure 1: Panel C shows retirement savings estimated at high and low levels of
261 future orientation and financial knowledge for each 7-year period. Observing it, the effects of future
262 orientation on retirement saving during young adulthood (~18–45 years) depended on financial
263 knowledge, such that saving was high typically only among individuals who were both future oriented
264 and financially literate. Effects of future orientation on retirement saving were less dependent on
265 financial knowledge with advancing age, and especially from age ~46+ years. Consequently, future
266 orientation predicted retirement saving even among individuals of low financial knowledge. Our
267 regression analysis also revealed that age interacted negatively with risk tolerance ($\beta=-.572, p<.001$),
268 which indicates that risk tolerance predicted retirement saving less as age increased. Inspecting Figure
269 1: Panel B, risk tolerance predicted retirement saving until age 32–38 years.

270 Finally, we hypothesized that (c) a tendency toward long-term planning of money and away
271 from short-term planning of money would predict greater retirement saving. Controlling for annual
272 household income, we found that a propensity toward long-term ($\beta=.264, p<.001$) and away from
273 short-term ($\beta=-.147, p=.011$) planning of money, but not short- ($\beta=-.073, p=.209$) or long-term ($\beta=-$
274 $.018, p=.763$) planning of time predicted greater retirement saving. We further hypothesized that (d)
275 future oriented attitudes would mediate any effects of planning tendencies on retirement saving.

276 Accordingly, a propensity to plan money in the long-term ($\beta=.411, p<.001$) and away from the short-
277 term ($\beta=-.187, p=.001$) and not long-term planning of time ($\beta=-.029, p=.604$), predicted stronger future
278 oriented attitudes. However, a propensity to plan time in the short-term also positively predicted future
279 orientation ($\beta=.194, p=.001$), even though this was not related to retirement saving. The effect of a
280 propensity to plan money in the long-term on retirement saving was mediated by individuals' future
281 orientation (Sobel z test=2.944, $p=.003$) and no longer predicted retirement saving after controlling for
282 future orientation ($\beta=-.013, p=.770$).

283 In sum, retirement saving, future orientation, financial knowledge, and financial risk tolerance
284 increased with age until around middle-age (Figure 1: Panel A). Financial risk tolerance positively
285 predicted saving, but only among younger adults (Figure 1: Panel B). Retirement saving was high
286 during young adulthood only among individuals who were both future oriented and knowledgeable of
287 finance (Figure 1: Panel C). Future orientation instead was more directly associated with saving with
288 advancing age, such that future oriented individuals in later adulthood saved more regardless of their
289 financial knowledge (Figure 1: Panel C). Finally, a tendency toward long- and away from short-term
290 planning of money positively predict retirement saving and future oriented attitudes mediated effects
291 of long-term planning of money on retirement saving.

292 **3. Study 2**

293 In Study 1, a future oriented mindset as well as relevant financial knowledge were both
294 necessary for young adults to engage in saving for retirement. Future oriented attitudes had a more
295 direct association with saving with advancing age, such that some adults who were approaching
296 retirement indicated that they had made savings contributions despite low levels of financial
297 knowledge. These findings imply dynamic differences in motivations to save across the adult lifespan
298 that depend on one's time horizon.

299 Events that are far in the future are mentally represented in terms of abstract goal-relevant
300 features (Liberman & Trope, 1998; Trope & Liberman, 2003). For young adults who have a long time
301 horizon, retirement may be perceived as distant and abstract, but nevertheless motivate preparatory
302 goals and knowledge seeking among those who are future oriented. Events that are in the near future
303 are perceived in more detail and in less abstract terms (Trope & Liberman, 2003). Consequently,
304 retirement may loom larger on the horizon for older adults, such that they perceive retirement in more
305 concrete terms that reflect the actual practicalities and financial requirements involved.

306 One method designed to increase saving behavior has been to target the connection between
307 people's present and future selves (Dulebohn & Hershfield, 2012; Hershfield, et al., 2011). This
308 approach draws on views in the psychology literature that people tend to perceive their future selves as
309 though they were someone else. Enhancing people's connection with their future selves may then
310 increase willingness to invest in the future. In the Hershfield et al. (2011) study, participants who
311 interacted with age-progressed computer renderings of their future selves in a virtual reality
312 environment indicated that they would make greater savings contributions.

313 One mechanism through which imagining one's future self might increase saving behavior is
314 by making future retirement less abstract. In Study 2, participants are asked to reflect on how they
315 might live in their retirement and to list some of the daily living requirements (e.g., food, medical care)
316 and activities (e.g., travel, hobbies, visit family) they anticipate during their retirement. They are then
317 asked to estimate how much money they think they would need to save for their retirement. Our
318 intervention is designed to focus people's thoughts about retirement in more concrete terms that reflect
319 the actual practicalities and financial expenses involved.

320 We hypothesized that participants who are provided the intervention would be more willing to
321 save for their retirement and to pay for a one-to-one meeting with a professional retirement planner,
322 but would also be less willing to make an immediate deduction from their Social Security fund.

323 3.1. Method

324 3.1.1. Participants

325 The research materials and procedure were approved by the ethics committee at Queen's
326 University Belfast, Northern Ireland (U.K.). Prior to the study, participants were told that the purpose
327 of the study was to investigate how people make financial decisions, such as decisions about how to
328 save money for retirement. They were told that they would be asked a number of questions, including
329 ones that would assess their knowledge of financial matters and financial planning. Participants
330 (N=405; 238 males, 167 females; age range=19–70, M=41.93, SD=14.53) were recruited from
331 Amazon Mechanical Turk and received a token payment of 0.50 US dollars. All participants were US
332 residents. The majority indicated high school (N=117; 28.9%) or college (N=234; 57.8%) as their
333 highest educational attainment, and over half (N=212; 52.35%) indicated an annual household income
334 greater than 40,000 US dollars.

335 3.1.2. Materials and Procedure

336 Participants were randomly assigned to either the intervention condition (N=202) or a control
337 condition (N=203). All participants were asked to make financial estimates about how much they
338 would save for retirement, pay for financial advice, and claim from their Social Security fund. Prior to
339 these questions, participants assigned to the intervention were first told:

340 *The U.S. Government is coordinating an initiative designed to motivate*
341 *individuals to prepare financially for their future. Financial experts and*
342 *policymakers agree that individuals need to plan how they will live their lives*
343 *years from now. At any age, it is crucial that everyone plans for their future to*
344 *ensure that they can financially support themselves in years to come.*

345 *Please take a couple of minutes to imagine yourself in your retirement. Try*
346 *to picture how you might live in your retirement. Think about how important*
347 *aspects of your life will be in retirement. For example, try to imagine where you*
348 *will live, your daily living requirements (e.g., food, medical care), and what kinds*
349 *of activities you would like to do during your retirement (e.g., travel, hobbies, visit*
350 *family).*

351
352 Participants in the intervention condition were then asked to list up to 12 daily requirements
353 that they will need in their retirement and activities that they would like to do in their retirement. They
354 were then told:

355 *Now, considering the activities that you wish to do in your retirement*
356 *(travel, hobbies, visit family) and the daily requirements that you expect in your*
357 *retirement (housing, food, medical care), think about how much money you will*
358 *need to save for your retirement.*

359
360 Participants in the intervention condition were then asked to provide a rough estimate of how
361 much money they thought they would need to save for retirement. Participants in the control condition
362 did not complete any prior task. All participants, including those in the control condition, were then
363 asked:

364 *Imagine that you have received an unexpected \$1,000 tax return from the*
365 *Internal Revenue Service (IRS). How much of this would you be willing to put*
366 *immediately into your retirement savings to be made available when you retire?*
367 *..... U.S Dollars*

368 *Imagine that you have received an unexpected \$1,000 tax return from the*
369 *Internal Revenue Service (IRS). How much of this would you be willing to pay for*
370 *a one-to-one meeting with a professional retirement planner who can help you*
371 *better design a personal savings plan for your retirement?*
372 *..... U.S Dollars*

373 *You have the option of a cash advance on your Social Security fund. You*
374 *can claim an advance of up to \$10,000, which you will receive immediately, but*
375 *this will reduce your entitlement to Social Security benefits in your retirement.*
376 *How much money would you like to claim as an immediate advance?*
377 *..... U.S Dollars*

378

379 The order in which the above items were presented to participants was randomly generated
380 for each participant.

381 Financial knowledge was assessed using the financial knowledge scale introduced in
382 Study 1.

383 3.1.3. Analytic strategy

384 We conducted logistic regression modeling on whether individuals were willing to save any of
385 the hypothetical \$1,000 tax return for their retirement, pay for a retirement planner, and claim from
386 their Social Security fund. This analysis included age, financial knowledge, and condition
387 (intervention vs. control) as predictors, and further included all possible two-way interaction terms and
388 a quadratic term for age in a second block. We included the same predictors in a linear regression
389 model to investigate predictors of the amounts identified by participants willing to make a saving,
390 payment, or claim.

391 Age differences in annual household income were examined in a regression analysis that
392 included age as a continuous predictor. Separate logistic regression analyses were conducted to assess
393 effects of income on participants' willingness to save for retirement, pay for a retirement planner, and
394 claim from their Social Security fund. Linear regressions analyses were used to assess effects of
395 income on the amount individuals indicated that they would save for retirement, pay for a retirement
396 planner, and claim from their Social Security fund.

397 3.2. Results and Discussion

398 Individuals in the intervention condition generated a mean of 8.40 (range=2-12, $SD=2.56$)
399 examples of daily requirements and activities that they envisioned for their retirement and anticipated
400 they would need to save a mean of \$772,915 (range=\$0-\$10 million; $SD=1.40$ million), after removing
401 one participant who estimated they would need to save \$500 million. As age increased, participants

402 generated more examples of daily requirements and activities ($r(206)=.159, p=.023$) and estimated
403 smaller personal saving requirements ($r(204)=-.170, p=.015$).

404 Across all participants, most (347/405; 86%) identified that they would save some of a
405 hypothetical \$1,000 tax return for their retirement and indicated that they would save a mean of \$584.
406 Fewer individuals (60%; 241/405) identified that they would spend any of a \$1,000 tax return on a
407 retirement planner, indicating that they would spend a mean of \$177, and just over half (52%;
408 212/405) opted to claim from their Social Security fund, indicating that they would claim a mean of
409 \$5,292 from a maximum \$10,000.

410 Annual household income did not differ significantly between intervention and control
411 conditions ($\beta=.027, p=.423$). Income increased linearly with age ($\beta=.121, p=.015$) and was positively
412 associated with financial knowledge ($\beta=.223, p<.001$). Although higher income individuals were not
413 significantly more likely to save some of the hypothetical \$1,000 tax return ($\beta=.085, p=.097$), higher
414 income was associated with greater contributions among those who saved ($\beta=.142, p=.004$). Higher
415 income individuals were also less likely to indicate that they would claim from their Social Security
416 fund ($\beta=-.157, p<.001$) and indicated that they would claim less overall ($\beta=-.189, p<.001$). Income was
417 not associated with likelihood of paying for financial advice ($\beta=.048, p=.168$), nor the amount
418 individuals were willing to pay ($\beta=.072, p=.148$). To adjust for effects of income in our following
419 analyses, we controlled for income in our assessment of amount saved and Social Security claims.

420 Financial knowledge did not differ significantly between the intervention condition ($M=2.77,$
421 $SD = 1.11$) and control condition ($M=2.69, SD = 1.11; \beta=-.037, p=.454$). Our intervention did not
422 significantly increase the number of individuals willing to save for retirement (Odds Ratio [OR]
423 $=1.235, p=.461$) and there was no effect of financial knowledge (OR=1.191, $p=.162$). Willingness to
424 save followed a quadratic trend with age (OR=1.002, $p=.049$). While most individuals were willing to

425 make a saving contribution, overall numbers reduced from age 19–25 years ($M=88\%$) to their lowest
426 among 47–53 year olds ($M=76\%$) and increased with advancing age (61–70 years; $M=92\%$). Among
427 those willing to save, when controlling for annual household income, our intervention increased the
428 amount individuals indicated that they would save ($M_{\text{(Intervention)}}=\622 ; $M_{\text{(Control)}}=\$551$; $\beta=.116$,
429 $p=.027$). Savings increased linearly with age ($\beta=.155$, $p=.003$) and a quadratic trend with age was not
430 significant. There was also a positive association with financial knowledge ($\beta=.136$, $p=.011$), such that
431 more knowledgeable individuals indicated that they would save more ($M_{\text{(High knowledge)}}=\631 ; $M_{\text{(Low$
432 $\text{knowledge)}}}=\$542$). There were no significant interactions.

433 The probability that participants would pay for a retirement planner was not increased by the
434 intervention ($OR=1.055$, $p=.791$), which followed a quadratic trend with age ($\beta=1.002$, $p=.009$).
435 Willingness to pay for a retirement planner reduced with age from age 19–25 years ($M=68\%$) to 40–46
436 years ($M_{\text{(40-46 years)}}=43\%$) before increasing with age ($M_{\text{(61-70 years)}}=67\%$). There was no effect of
437 financial knowledge ($OR=0.929$, $p=.427$). Among those who were willing to pay for a retirement
438 planner, those who were provided the intervention were willing to pay more ($M_{\text{(Intervention)}}=\200) than
439 those in the control group ($M_{\text{(Control)}}=\$135$; $\beta=.138$, $p=.032$). There were no significant trends with age
440 and no association with financial knowledge ($\beta=-.076$, $p=.236$).

441 When controlling for annual household income the probability that participants would claim
442 from their Social Security fund was reduced among those who were provided the intervention
443 ($M_{\text{(Intervention)}}=45\%$) compared to the control condition ($M_{\text{(Control)}}=58\%$; $OR=0.557$, $p=.006$). Individuals
444 of higher financial knowledge were also less likely to claim ($M_{\text{(High knowledge)}}=39\%$; $M_{\text{(Low knowledge)}}=64\%$;
445 $OR=0.630$, $p<.001$). There were no significant trends with age. Among those who wished to claim
446 from their social security fund, when controlling for annual household income there was no significant
447 effect of the intervention on the amount that individuals wished to claim ($\beta=.067$, $p=.329$). However,

448 individuals with high financial knowledge actually claimed more than those of lower financial
449 knowledge ($M_{(\text{High knowledge})}=\$6,168$; $M_{(\text{Low knowledge})}=\$5,146$; $\beta=.203$, $p=.004$). Claim amounts followed
450 a quadratic trend with age ($\beta=-1.199$, $p=.023$), increasing from age 19–25 years ($M=\$4,023$) until age
451 30–39 years ($M=\$6,533$).

452 In sum, most participants were willing to save for retirement at least some of an unexpected
453 \$1,000 tax return and saving contributions generally increased with age. Our intervention, which was
454 designed to make retirement less abstract, increased the amount individuals were willing to save and
455 the amount they were willing to pay for a retirement planner as well as reduce their willingness to
456 claim from Social Security. Financial knowledge was also relevant to individuals' savings decisions.
457 More knowledgeable participants indicated that they would save more for retirement and were less
458 willing to make a Social Security claim.

459 **4. General Discussion**

460 American workers are seemingly underprepared for retirement (Topoleski, 2013) as some
461 financial experts warn that as much as one million dollars may be inadequate for retirement (Sommer,
462 2013). Nearly half of current American workers are expected to be unable to maintain their standard of
463 living in retirement (Munnell, Webb, & Golub-Sass, 2009). After reflecting on how they might live in
464 their retirement and some of the daily living requirements (e.g., food medical care) and activities (e.g.,
465 travel, hobbies, visit family) they anticipate during their retirement, participants here estimated that
466 they would need to save around \$772,915. Hence, people's estimates of how much they need to save
467 for their retirement are not so unrealistic when they unpack the financial requirements of retirement.
468 Why then are American workers so underprepared for retirement?

469 Our findings, in support of other investigations (e.g., Hershey et al., 2007; Jacobs-Lawson &
470 Hershey, 2005), suggest that future oriented attitudes are central to retirement saving. In Study 1,

471 individuals who were future oriented indicated that they had made greater retirement saving
472 contributions than those who were less future oriented. Future orientation mediated the effects of a
473 propensity toward long-term planning for future expenses on retirement saving. Accordingly, we asked
474 participants in Study 2 to reflect on the future expenses that they anticipated in their retirement, which
475 increased the amount they were willing to save and the amount they would pay for a one-to-one
476 meeting with a professional retirement planner, as well as reduce their willingness to make an
477 immediate claim from their Social Security fund.

478 While future oriented attitudes may be central to saving behavior, a future oriented mindset as
479 well as relevant financial knowledge may both be necessary for young adults to engage in saving for
480 retirement. Carstensen and colleagues (e.g, Charles & Carstensen, 2009) have proposed that in social
481 contexts young adults who have a long time horizon perceive time as open-ended, which prioritizes
482 preparatory goals and knowledge seeking. Events that are far in the future tend to be perceived
483 abstractly in terms of goal-relevant features (Trope & Liberman, 2003). Our findings extend this line
484 of reasoning to the financial domain and suggest that knowledge seeking behavior among young adults
485 may be motivated by future oriented attitudes. Other researchers have highlighted a need for
486 improving financial literacy among the public (e.g., Lusardi & Mitchell, 2011). Our findings imply
487 that education programs designed to increase saving by targeting financial literacy may be inefficient
488 unless also aimed at focusing young people’s thoughts on the future.

489 Future oriented attitudes had a more direct association with saving with advancing age, such
490 that future oriented individuals who were approaching retirement were willing to save independent of
491 their financial knowledge. As proposed by Carstensen et al. (1999), as time horizons shorten (e.g.,
492 toward retirement), time constraints are perceived, which focusses attention on realizing goals (e.g.,
493 making savings contributions) and away from preparatory goals that might motivate knowledge

494 seeking. Additionally, as future events draw closer to the present (e.g., with the passage of time) they
495 are perceived in more concrete detail and in less abstract terms (Trope & Liberman, 2003). Our
496 intervention in Study 2 was designed to focus people's thoughts about retirement in more concrete
497 terms that reflect the actual practicalities and financial expenses involved, and this increased the
498 amount participants were willing to save for retirement. Our findings imply that some individuals who
499 are approaching retirement may be motivated to make decisions about saving without seeking
500 necessary financial knowledge. Consequently, policymakers and financial advisors should ensure that
501 older adults are adequately informed about retirement options when making decisions about their
502 savings.

503 Greater access to employment-based retirement plans has forced financial decisions about the
504 future into the hands of workers (Gough & Niza, 2011). In view of people's short-sighted saving
505 tendencies, some behavioral economists have recommended prescriptive savings plans. The Save
506 More Tomorrow™ plan uses automatic-payroll-deduction to commit workers to greater savings
507 contributions for future salary increases (Thaler & Benartzi, 2004). While effective for individuals
508 who enroll, only around a third of eligible workers reportedly participate in these plans (Helman,
509 Copeland, & VanDerhei, 2012). Here, we found that people's motivations to save for retirement
510 undergo changes across the adult lifespan. Participation in savings plans offered by employers might
511 be increased by tailoring plans in a manner that targets younger workers differently to those who are
512 closer to retirement.

513 The findings reported here imply dynamic differences in motivations to save across adulthood.
514 Such differences with age would be missed by methods that collapse across age. For example,
515 financial risk tolerance, which has been identified as an important predictor of retirement saving (e.g.,
516 Jacobs-Lawson & Hershey, 2005), was found to predict saving only among younger adults and was

517 less associated with saving with advancing age. This finding highlights a dynamic character of
518 retirement saving and reveals a need to assess age-by-age differences in people's motivations to save
519 for retirement across adulthood.

520 While our current research points to the importance of tracking dynamic differences in
521 motivations to save across adulthood, a limitation of our studies is that they were cross-sectional in
522 design. Generational changes in people's attitudes toward saving for the future, financial booms and
523 busts (e.g., the global financial crisis of 2008), and government policies and initiatives must also
524 impact on people's decisions to save. We cannot make claims about age changes in retirement saving
525 behavior. However, our findings do suggest that currently the psychological factors that motivate
526 young people to save are different to the factors that motivate saving behavior among adults who are
527 closer to retirement. For example, the results of Study 1 suggest that adults approaching retirement,
528 motivated by a future oriented mindset, may engage in decisions to save even if they lack adequate
529 financial knowledge. This finding raises concern about the saving decisions of individuals for whom
530 retirement looms on the horizon. A further limitation of our studies is that decisions about saving for
531 retirement are likely to be shared by an individual with their partner. In Study 1, we used a self-report
532 scale that questions individuals about their personal retirement saving tendencies (e.g., "I have made
533 meaningful contributions to a voluntary retirement saving plan"; Neukam & Hershey, 2002). In Study
534 2, participants were asked to make hypothetical decisions about whether to save an unexpected \$1,000
535 tax return. Although having better financial knowledge was associated with more saving in both
536 studies, we did not assess the financial knowledge or retirement saving tendencies of participants'
537 partners or cohabitants. As such, our studies do not identify which individuals in a household are
538 actually engaged in decision making about retirement. Our findings also neglect the potentially highly
539 important role of shared decision making in this process (Clark, Knox-Hayes, & Strauss, 2009).

540 Moreover, women may be less engaged than men in decisions about retirement saving. For instance,
541 Chen and Volpe (2002) found that, compared to men, women are less confident and enthusiastic about
542 their personal finance. Their study showed that women are also less eager than men to learn more
543 about financial matters.

544 In the current research we probed some of the psychological factors that potentially underlie
545 saving behavior. A standard economic view is that people save when their income is high and their
546 other expenses are low (Crossley, 2012). Our findings support that saving behavior increases with
547 income. In Study 1, higher annual household income was associated with greater retirement saving and
548 better knowledge of financial matters. In Study 2, individuals who had a higher annual household
549 income had better financial knowledge and indicated that they would save more of an unexpected
550 \$1,000 tax return for their retirement. They were also less likely to indicate that they would withdraw
551 from their Social Security fund, and if they were to make a withdrawal, that they would withdraw less.
552 In addition to psychological factors, such as one's future time perspective that can promote saving
553 behavior, income is an important determinant of saving for the future.

554 In conclusion, a future oriented mindset is central to retirement saving behavior. However,
555 motivations to save may differ dynamically across the adult lifespan, such that younger adults
556 prioritize knowledge seeking in preparation for future possibilities whereas people approaching
557 retirement prioritize realizing goals (e.g., making savings contributions). Future research that seeks to
558 understand people's motivations to save should take account of the dynamic character of retirement
559 saving.

560

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562 The data are available online and on request.

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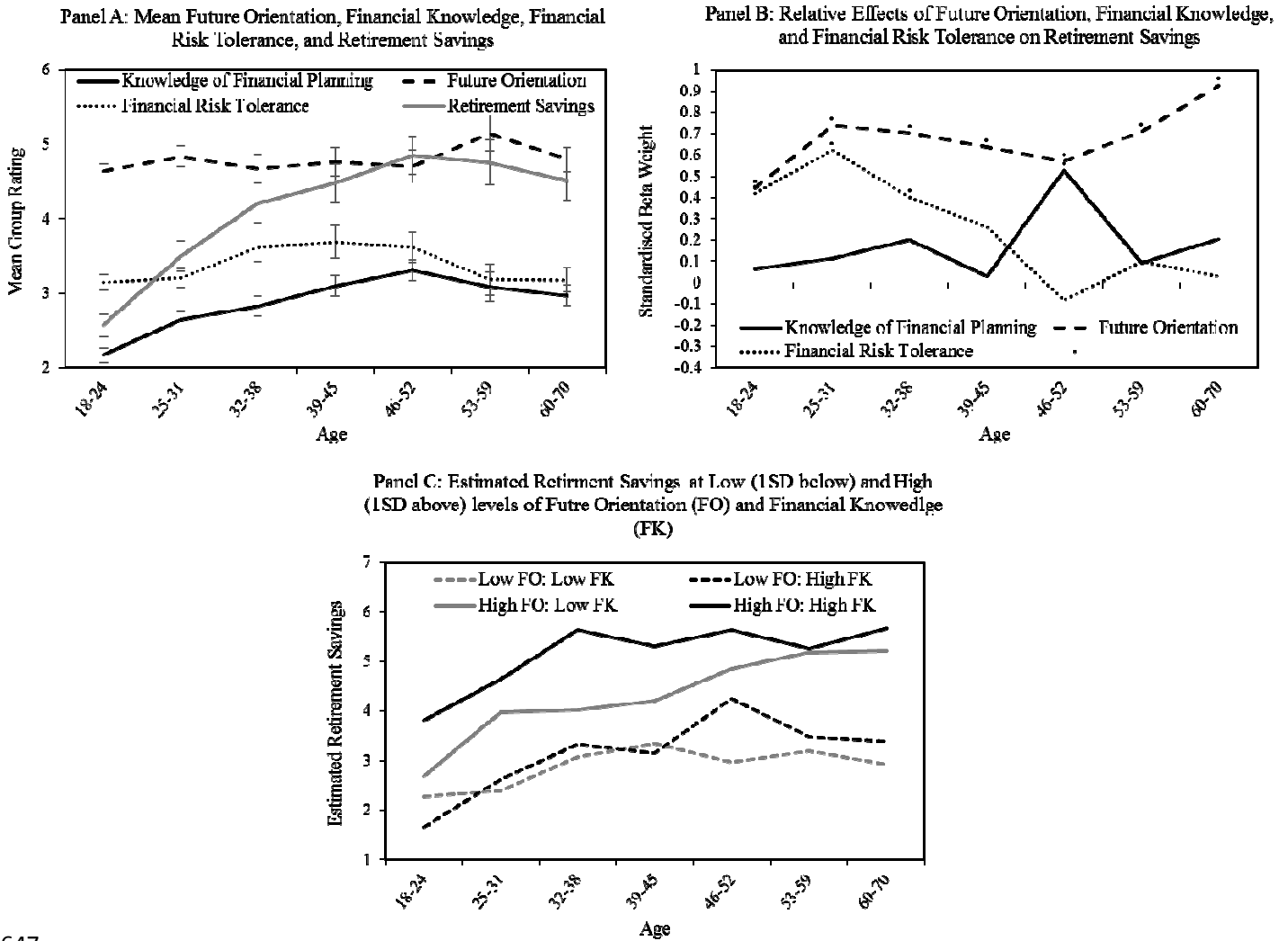
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647

648 *Figure 1.* (A) Mean future orientation, financial knowledge, financial risk tolerance, and
 649 retirement saving, (B) Relative effects of future orientation, financial knowledge, and
 650 financial risk tolerance on retirement saving, and (C) Retirement savings estimated at low (1
 651 SD below mean) and high (1 SD above mean) levels of future orientation and financial
 652 knowledge. *Note.* Asterisks in Panel B indicate effects that are significantly above chance
 653 ($p \leq .05$). Regression models used to conduct the analysis shown in Panels B and C controlled
 654 for annual household income.