Online Appendix for:

Behavioral Impediments to Valuing Annuities: Complexity and Choice Bracketing

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Discussion of Robustness

Online Appendix Table A7 examines the robustness of the two primary treatments to different measures of cognition, to different ways of selecting the sample, to different sets of controls, and to transformations of the outcome variable. The first row reproduces our baseline specification from Column 1 of Table 4. Subsequent rows provide estimates on the two main treatments in specifications identical to the baseline specification except for the change noted in the row heading.

In Panel A, we examine robustness of our results using different measures of cognition because cognition is a very strong predictor of the spread, and also because we saw in Online Appendix Table A2 that the cognition index is marginally significantly higher for those who received the complexity treatment than for those who did not. Rows (2) and (3) show that the point estimates and standard errors are not at all sensitive to the details of the construction of the cognition index: it does not matter whether we control for cognition by using the first principal component of the five available cognition measures, taking a simple average of these five measures, or entering all five measures separately. However, it is important for the significance of complexity treatment that we exploit information from all the cognition tests. If we control only for financial literacy, the point estimate on the complexity treatment declines moderately (by about a fifth) but loses statistical significance. If we control only for the two numeracy measures or the two verbal measures, the point estimate on the complexity treatment declines somewhat (by less than a fifth) but becomes only marginally statistically significant. In contrast, the point estimate on the consequence message is very stable, retaining statistical significance in all three specifications that use a subset of the cognition measures. In the final row of Panel A, we add nine additional controls for three types of cognitive mistakes, self-rated and objective knowledge about Social Security, confidence in Social Security, experience with certain financial assets, and ability and knowledge in retirement planning. The additional controls do not meaningfully change the estimates of the two key experimental treatment effects.

Panel B examines robustness to different sample definitions. Row (8) includes observations with missing demographic information, Row (9) includes observations with missing cognition data, Row (10) includes observations with any missing information (demographic or cognition), and Row (11) excludes the oversamples of Native Americans and Los Angeles county residents. We include observations with missing values in the regression by dummying out missing values.

While the coefficient estimate of the complexity treatment is reasonably stable, it becomes only marginally significant once observations with missing cognition data are included or the oversample is excluded. The estimate of the treatment effect of the consequence message remains significant in all specifications of Panel B. Next, Panel C investigates robustness to excluding various controls. Given the earlier finding that cognition is not quite balanced across complexity treatments, it is not surprising that the complexity treatment is sensitive to having cognition controls included. Excluding the controls for the secondary experimental manipulations makes the complexity treatment only marginally significant. The four remaining estimates of Panel C are not sensitive in magnitude or significance to the exclusion of controls.

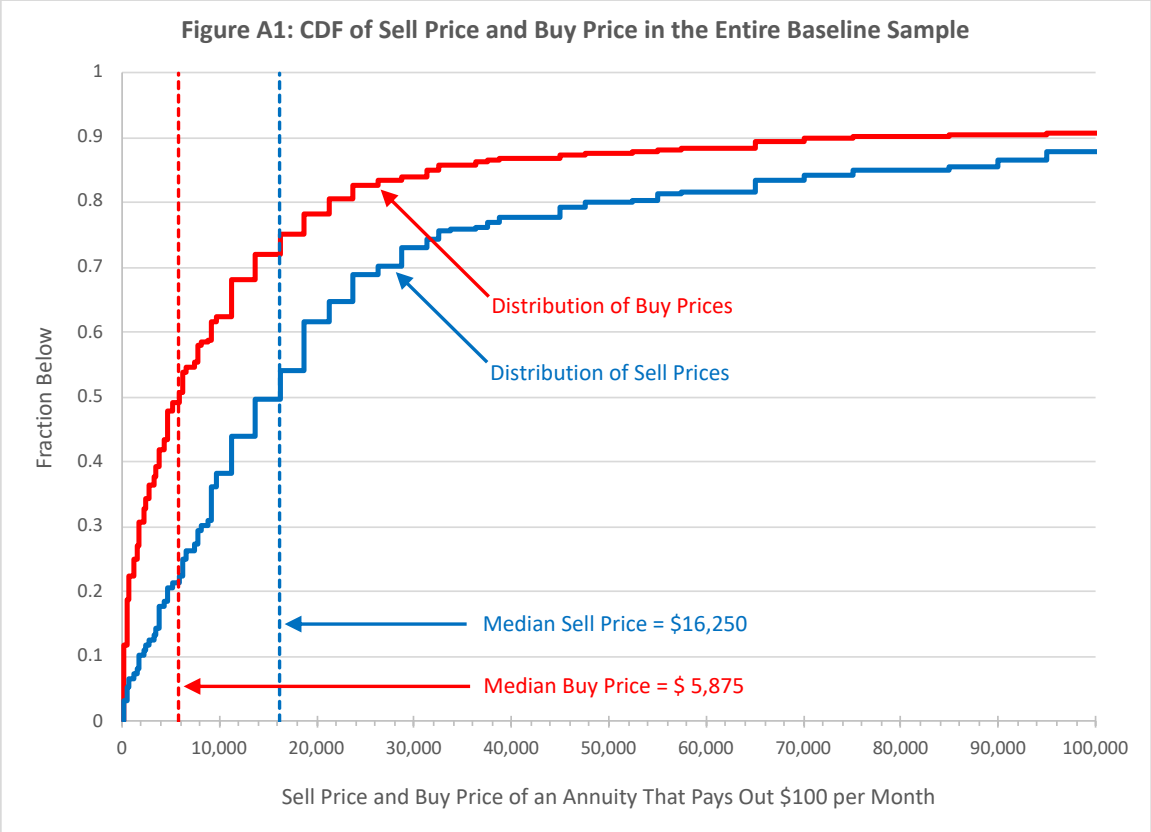
Our module tells the respondent that the vignette person will have saved $100,000 for retirement when making the annuity decision. Hence, unless there are other sources of savings, the vignette person cannot logically pay more than $100,000 for an annuity. This implies that there is an implicit topcode of $100,000 on the buy valuations, though respondents are permitted to give a buy recommendation at a price in excess of $100,000, and 9% of them do so. Nevertheless, we want to be sure that this implicit topcode does not drive key results. More generally, it is useful to know that the results do not hinge on a few respondents with very high buy or sell valuations. In the next specification check, therefore, we topcode all buy and all sell valuations at $100,000. Row (15) of Panel D shows that the main results are not sensitive in terms of economic magnitude or statistical significance to such topcoding. Similarly, Row (16) shows that the results are not sensitive to topcoding the spread itself at the 90th percentile, rather than topcoding the underlying sell or buy valuations. Row (17) shows that bottomcoding the buy and sell valuations at $1000 each results in somewhat smaller estimates that are significant at the 10% level. Apparently, the low valuations given by some respondents do contribute to the significance of our treatment effects.

Our finding in Table 5 that the treatment effects do not meaningfully vary by the level of Social Security benefits may have already alleviated the concern that our estimates might be due to the fact that a $100 change in monthly Social Security benefits is not literally a marginal change. Another way to address this concern is to not count small spreads as deviations from rational behavior, which could arise when a $100 change is insufficiently marginal. In Row 18, we do this by setting any spreads less than 0.50 log units equal to zero, and we find that the estimated treatment effects are essentially unaffected.

We defined the spread as strictly positive both when the sell price is larger than the buy price and vice versa. We do this because any difference is a deviation from rationality for a marginal change in Social Security benefits. However, if our treatment effects operate by reducing individuals' reluctance to trade when their understanding increases (due to the consequence message) or decreases (due to increased complexity), then they should operate predominantly on people who are reluctant to trade, i.e., whose sell price exceeds their buy price. We test this prediction in Row (19) by having a positive spread only for those who are reluctant to trade and setting the spread to zero for everyone else. Row (19) confirms that the treatment effects operate entirely on those who had sell prices exceeding buy prices, which is consistent with people's reluctance to trade being affected by the degree of their understanding. Reluctance to trade (so having a sell price exceeding the buy price) is a sensible heuristic in response to difficulty in valuing a product because it protects one from being taken advantage of by a better-informed party. In contrast, having a buy price exceeding the sell price could cause one to lose money in trading if the product is tradable (unlike the Social Security annuity). Thus, we would expect this latter group to be more disadvantaged and to score lower on measures of cognition or financial ability/experience. Online Appendix Table A8 indicates this is indeed the case.

Overall, Online Appendix Table A7 shows that the results on the complexity treatment are reasonably stable in magnitude but somewhat sensitive in terms of statistical significance, which falls to marginal in 7 of the 18 specification checks and disappears in 2 of them. This sensitivity can be traced largely to the fact that the cognition control, a very strong predictor of the spread, was not balanced across the complexity treatment and control conditions. Hence, having good controls for cognition is important for the results of the complexity treatment. By contrast, the consequence message treatment is extremely robust and remains significant at the 5% level everywhere, except for one specification where it is significant at the 10% level.

Online Appendix Figures and Tables



Note: This figure plots the cumulative distribution function (CDF) of the sell and the buy price for a real annuity that pays out $100 a month. The sell prices are plotted for all 4,060 observations in the baseline sample, unlike Figure 1, where it was plotted only for those observations where the sell question was asked first. Similarly, the buy prices are plotted all 4,060 observations in the baseline sample. Unlike Figure 1, some of the buy and sell prices may be influenced by anchoring on a previously asked sell or buy valuation.

Appendix Table A1: Text of the Vignettes and the Consequence Message

Panel A: Vignette Text

Complexity	Vignettes
No added complexity (Vignette 1)	"Mr. Jones is a single, 60-year old man with no children. He will retire and claim his Social Security benefits at 65. When he retires, he will have $100,000 saved for his retirement, and he will receive $[*SSB*] in monthly Social Security benefits. Based on his current health and family history, doctors have told Mr. Jones that he will almost certainly be alive at age 75 but almost certainly will not live beyond age 85."
Complexity: Wide age range (Vignette 2)	"Mr. Jones is a single, 60-year old man with no children. He will retire and claim his Social Security benefits at 65. When he retires, he expects to have $100,000 saved for his retirement, and expects to receive $[*SSB*] in monthly Social Security benefits. Based on his current health and family history, doctors have told Mr. Jones that he has an 80% chance of being alive at age 70, a 50% chance of being alive at age 80, a 20% chance of being alive at age 90, and a 10% chance of being alive at age 95."
Complexity: Added information (Vignette 3)	"Mr. Jones is a single, 60-year old man with no children. Social Security rules state that you need at least 40 credits, or 10 years of work, to qualify for Social Security – and Mr. Jones qualifies since he has worked for 30 years. Since Mr. Jones was born in 1956, his full retirement age is 66 years and 4 months, but he is eligible to start claiming starting at 62. He will retire and claim his Social Security benefits at 65. When he retires, he will have $100,000 saved for his retirement, and he will receive $[*SSB*] in monthly Social Security benefits. Based on his current health and family history, doctors have told Mr. Jones that he will almost certainly be alive at age 75 but almost certainly will not live beyond age 85."

Panel B: Text of the Consequence Message

Consequence Message Preceding Vignette
"First, we will show you a story about Mrs. Smith. Please pay close attention to the story, because at the end we will ask you two questions about the story. You will receive an additional $1 for each question you answer correctly. Mrs. Smith is a single, 65-year old woman with no children, and she is as healthy as the typical 65-year old woman. She just retired and receives her monthly Social Security check. She is talking with her financial adviser on how to spend her substantial savings in retirement. Her advisor explains that she could decide to spend down her savings relatively quickly. In this case, she will be more likely to be able to enjoy her money during her lifetime. But she also runs a risk of running out of money while alive and having to cut back on her spending as a result. Her advisor explains that she could also decide to spend down her savings relatively slowly. In this case, she will be less likely to run out of money. But now she runs a risk of not getting to enjoy all her money during her lifetime." *This story is followed by two 4-option multiple-choice questions to induce the respondent to pay attention to the story. One question asks about the benefits and drawbacks of spending down wealth quickly while the other asks about the benefits and drawbacks of spending down wealth slowly. See the Survey Instrument in the Online Appendix for the exact wording of these questions.* *The screen with the two test questions is followed by an advice question where the respondent is asked to advise the vignette person how quickly to spend down her wealth. This question is asked to induce the respondent to think about the problem of how to spend down wealth during retirement. See the Survey Instrument in the Online Appendix for the exact wording of this question.*

Note: Panel A provides the text of each of the 3 vignettes, with underlining added to emphasize the differences between the vignettes. Panel B provides the text of the consequence message. Additionally, we include experimental variation in the name and gender of the vignette person: Mr./Mrs., Smith/Jones, and the order of the last two paragraphs of the consequence message (spending quickly first versus spending slowly first) are independently randomized across respondents. A different name and gender was used in the consequence message from that in the vignette. Finally, there is experimental variation in the monthly Social Security benefit value (*SSB* = $800, $1,200, $1,600, or $2,000).

Table A2: Balance Tests

Variable	No Complexity	Complexity	p-value on test of equal means	No Consequence Message	Consequence Message	p-value on test of equal means
Panel A: Excluded from Baseline Sample due to:						
Missing annuity valuation data	0.008	0.011	0.322	0.011	0.009	0.491
Missing demographic data	0.003	0.007	0.099	0.006	0.005	0.507
Missing cognition data	0.090	0.115	0.008	0.109	0.104	0.627
Panel B: Balance on Control Variables in the Baseline Sample						
Age	48.43	48.51	0.876	48.50	48.46	0.925
Age^2	25.96	25.85	0.831	25.88	25.90	0.965
Female	0.58	0.57	0.592	0.58	0.57	0.663
Married	0.57	0.61	0.028	0.59	0.60	0.636
Nonhispanic white	0.76	0.75	0.507	0.76	0.75	0.626
Nonhispanic black	0.07	0.09	0.132	0.08	0.08	0.722
Nonhispanic other	0.08	0.08	0.627	0.07	0.08	0.349
Hispanic	0.09	0.09	0.960	0.08	0.09	0.843
High School Dropout	0.05	0.05	0.805	0.05	0.05	0.697
High School Education	0.19	0.20	0.381	0.20	0.19	0.651
Some College	0.41	0.38	0.087	0.38	0.40	0.219
Bachelor's Degree	0.21	0.22	0.151	0.22	0.22	0.998
Graduate Degree	0.15	0.15	0.917	0.16	0.14	0.151
Household Income: Less than 25k	0.17	0.17	0.944	0.16	0.17	0.114
Household Income: 25k-50k	0.18	0.18	0.945	0.18	0.17	0.428
Household Income: 50k-75k	0.15	0.17	0.060	0.17	0.16	0.915
Household Income: 75k-100k	0.14	0.12	0.145	0.13	0.13	0.383
Household Income: Above 100k	0.37	0.36	0.695	0.37	0.36	0.263
Household size of one	0.22	0.19	0.114	0.20	0.20	0.818
Household size of two	0.38	0.40	0.249	0.38	0.39	0.498
Household size of three	0.18	0.17	0.730	0.18	0.16	0.074
Household size of four or more	0.23	0.24	0.616	0.23	0.24	0.301
Any Kids	0.32	0.33	0.711	0.33	0.33	0.764
Cognition index	-0.04	0.02	0.072	-0.01	0.01	0.704
P-value of joint test of equality of control variables		0.107			0.788	

Notes: Each cell contains the mean of the variable listed in the row header for observations subject to the experimental condition listed in the column header. The baseline sample consists of observations with nonmissing annuity valuation data, nonmissing demographic data, and nonmissing cognition data. The first panel (N=4,596) examines balance on exclusion from the baseline sample. The second panel (N=4,060) examines balance of control variables included into the baseline regression specifications.

Table A3: Predictors of Heterogeneity in the Sell-Buy Spread in Control Sample

	(1)		(2)		(3)	
Explanatory variables:	Sell-Buy Spread		Sell-Buy Spread		Sell-Buy Spread	
Cognition index			-0.858***	(0.081)	-0.836***	(0.105)
Age	0.017	(0.027)			0.032	(0.026)
Age^2	-0.023	(0.025)			-0.035	(0.024)
Female	0.504***	(0.164)			0.085	(0.164)
Married	-0.073	(0.189)			0.044	(0.180)
Non-Hispanic black	0.847**	(0.375)			0.132	(0.372)
Non-Hispanic other	0.453	(0.301)			0.293	(0.276)
Hispanic	-0.089	(0.292)			-0.577**	(0.275)
Non-Hispanic white (omitted)						
High School Dropout	1.046**	(0.458)			0.748*	(0.425)
High School Education	0.582**	(0.238)			0.275	(0.235)
Some College (omitted)						
Bachelor's Degree	-0.463**	(0.199)			-0.060	(0.195)
Graduate Degree	-0.269	(0.221)			0.315	(0.216)
Household Income: Below 25k (omitted)						
Household Income: 25k-50k	0.157	(0.295)			0.260	(0.286)
Household Income: 50k-75k	0.166	(0.297)			0.486*	(0.287)
Household Income: 75k-100k	-0.369	(0.308)			-0.155	(0.300)
Household Income: Above 100k	-0.318	(0.260)			-0.003	(0.255)
Household size of one (omitted)						
Household size of two	-0.244	(0.242)			-0.151	(0.231)
Household size of three	0.008	(0.334)			0.141	(0.322)
Household size of four or more	-0.243	(0.379)			-0.133	(0.368)
Any Kids	-0.136*	(0.290)			-0.204	(0.277)
P-value on race/ethnicity dummies	0.0625				0.0952	
P-value on education dummies	0.0002				0.1485	
P-value on income dummies	0.1140				0.1297	
P-value on household size dummies	0.5516				0.5524	
R^2	0.1080		0.1570		0.1879	
N	708		708		708	

Notes: Each column reports a separate OLS regression of the Sell-Buy Spread on the controls listed in the row headings. The sample is limited to the 708 observations in the baseline sample that belong to the control group, i.e., those that did not receive the consequence message and that did not see one of the more complex vignettes. Reported p-values refer to p-values on the joint test that the coefficients on the listed variables are zero. Robust standard errors are in parentheses. * significant at 10%, ** significant at 5%, *** significant at 1%.

Table A4: Full Set of Coefficient Estimates from Table 4

	(1)		(2)		(3)	
Explanatory variables:	Sell-Buy Spread		Sell price (log)		Buy price (log)	
Complexity treatment	0.131**	(0.065)	0.050	(0.057)	-0.137**	(0.068)
Consequence message treatment	-0.141**	(0.062)	0.011	(0.055)	0.133**	(0.065)
Cognition index	-0.788***	(0.043)	-0.188***	(0.038)	0.098**	(0.046)
Sell question first	0.166***	(0.062)	-0.043	(0.055)	0.777***	(0.065)
Lump-sum medium: 20k	0.063	(0.076)	0.239***	(0.067)	0.236***	(0.079)
Lump-sum high: 30k	-0.002	(0.075)	0.484***	(0.068)	0.476***	(0.079)
Lump-sum shown first	0.029	(0.062)	-0.044	(0.055)	-0.065	(0.065)
Social security benefit 1200	0.113	(0.087)	0.010	(0.075)	-0.458***	(0.093)
Social security benefit 1600	0.057	(0.084)	-0.006	(0.074)	-0.393***	(0.091)
Social security benefit 2000	0.167*	(0.087)	-0.118	(0.080)	-0.353***	(0.093)
Vignette name: Mr. Jones	0.114	(0.086)	-0.028	(0.076)	-0.098	(0.089)
Vignette name: Mr. Smith	0.088	(0.088)	-0.097	(0.076)	0.114	(0.091)
Vignette name: Mrs. Smith	-0.011	(0.085)	-0.081	(0.076)	0.146	(0.089)
Age	0.025*	(0.013)	0.001	(0.011)	-0.035***	(0.013)
Age^2	-0.015	(0.013)	0.006	(0.010)	0.023*	(0.013)
Female	0.085	(0.066)	-0.075	(0.058)	-0.160**	(0.069)
Married	0.097	(0.076)	-0.007	(0.069)	-0.104	(0.081)
Non-Hispanic black	0.028	(0.142)	-0.087	(0.134)	-0.116	(0.148)
Non-Hispanic other	0.048	(0.122)	-0.056	(0.107)	-0.087	(0.128)
Hispanic	0.081	(0.125)	-0.094	(0.122)	-0.097	(0.133)
High School Dropout	-0.057	(0.178)	0.138	(0.161)	0.136	(0.182)
High School Education	0.033	(0.093)	0.104	(0.085)	0.048	(0.099)
Bachelor's Degree	0.008	(0.084)	0.019	(0.073)	0.100	(0.086)
Graduate Degree	0.076	(0.095)	0.224***	(0.077)	0.233**	(0.100)
Household Income: 25k-50k	0.102	(0.117)	0.046	(0.108)	-0.136	(0.123)
Household Income: 50k-75k	-0.166	(0.116)	-0.070	(0.107)	-0.037	(0.121)
Household Income: 75k-100k	-0.055	(0.130)	-0.104	(0.119)	-0.010	(0.132)
Household Income: Above 100k	-0.257**	(0.110)	-0.098	(0.100)	-0.041	(0.111)
Household size of two	-0.025	(0.095)	0.042	(0.084)	-0.007	(0.100)
Household size of three	0.147	(0.131)	0.252**	(0.113)	-0.025	(0.134)
Household size of four or more	0.182	(0.145)	0.178	(0.135)	-0.207	(0.151)
Any Kids	-0.177*	(0.106)	-0.239**	(0.101)	0.117	(0.114)
R^2	0.157		0.035		0.067	
N	4,060		4,060		4,060	

Notes: The regressions in Table A4 are identical to the regressions reported in Table 4, but here we also report the coefficients on all the secondary experimental manipulations as well as the coefficients on the demographic control variables. Robust standard errors are in parentheses. * significant at 10%, ** significant at 5%, *** significant at 1%.

Table A5: Complexity Treatment Split out by Type of Complexity Treatment

Dependent Variable: Sell-Buy Spread	(1)		(2)		(3)	
Explanatory variables:	Sell-Buy Spread		Sell price (log)		Buy price (log)	
Complexity treatment: Wide Age Range	0.149*	(0.076)	0.066	(0.068)	-0.117	(0.079)
Complexity treatment: Added Information	0.114	(0.075)	0.034	(0.066)	-0.156**	(0.079)
Consequence message treatment	-0.140**	(0.062)	0.011	(0.055)	0.134**	(0.065)
Cognition index	-0.788***	(0.043)	-0.188***	(0.038)	0.098**	(0.046)
Sell question first	0.165***	(0.062)	-0.043	(0.054)	0.777***	(0.065)
P-value on lump-sum starting values	0.624		0.000		0.000	
P-value on lump-sum shown first	0.623		0.434		0.323	
P-value on SS benefit amounts	0.248		0.368		0.000	
P-value on vignette names	0.374		0.566		0.032	
Demographic controls	Yes		Yes		Yes	
P-value that coefficients on both complexity treatments are equal	0.646		0.638		0.626	
R^2	0.157		0.035		0.067	
N	4,060		4,060		4,060	

Notes: This table is identical to Table 4, except that the two complexity treatments are estimated separately (rather than pooled). Robust standard errors are in parentheses. * significant at 10%, ** significant at 5%, *** significant at 1%.

Table A6: Other Predictors of the Sell-Buy Spread

Explanatory variables:	Coefficient	S.E.	R^2	N
Cognition index (standarized)	-0.804***	(0.032)	0.143	4,081
Decision-making competence, framing consistency (standarized)	-0.330***	(0.033)	0.024	4,540
Decision-making competence, time conjunction (standarized)	-0.074**	(0.033)	0.001	4,540
Decision-making competence, subset consistency (standarized)	-0.189***	(0.034)	0.008	4,540
Self-assessed knowledge about Social Security (standardized)	-0.121***	(0.033)	0.003	4,248
Social Security literacy score (standardized)	-0.294***	(0.033)	0.019	4,257
Confidence that Social Security will pay benefits (standardized)	-0.116***	(0.038)	0.003	3,115
Receives annuity income (dummy)	-0.111	(0.235)	0.000	4,420
Owns an IRA or Keogh (dummy)	-0.663***	(0.064)	0.022	4,422
Ability and comfort with retirement planning (standardized)	-0.289***	(0.037)	0.018	3,474

Notes: The Sell-Buy Spread is defined as the absolute difference between the log sell price and the log buy price for a real annuity stream of $100 per month. Each row displays the results from a single bivariate OLS regression of the Sell-Buy Spread on the explanatory variable listed in the column heading. Robust standard errors are in parentheses. * significant at 10%, ** significant at 5%, *** significant at 1%.

Variable definitions:

Decision-making competence (3 variables, one for each subscore)
UAS1 and UAS121 each contain 22 questions (admc1-admc22) that test for three types of mistakes in dealing with probabilities. We used responses in UAS1 unless they are missing, in which case we used UAS121. In answering these questions, respondents can make upto 4 "frame inconsistency" mistakes, meaning that the sum of their subjective probabilities for two complementary events is not equal to 100%. They can make up to 8 "time conjunction" mistakes, meaning that the subjective probability of some event happening in the next five years is less than the subjective probability of that event happening in the next year. They can make up to 2 "subset fallacy" mistakes, meaning that the subjective probability assigned to a subset of an event is higher than the probability assigned to the event itself. We created a score for each type of mistake, by taking the number of times the mistake is not made and dividing it by the maximum possible number of times the mistake could have been made. We standardize each of the three scores.

Self-assessed knowledge about Social Security
UAS 16 contains one question (q2c) that asks about knowledge about "How the Social Security system works" which is answered on a 4-point scale from "Very knowledgeable" to "Not at all knowledgeable." We reverse coded the responses so that higher scores correspond to better self-assessed knowledge, and standardized the variable.

Social Security literacy score
We counted the number of correct answers to the 10 true/false questions (q10a-q10i) on UAS16 about facts about the Social Security system, and standardized the resulting variable.

Confidence that Social Security will pay benefits
UAS 16 contains one question (q6a) that asks "How confident are you that Social Security retirement benefits will be there for you when you retire?" which is answered on a 4-point scale from "Very confident" to "Not at all confident." We reverse coded the responses so that higher scores correspond to more confidence, and standardized the variable.

Financial assets (2 measures)
UAS99 and UAS24 contain questions on asset holdings and income from assets. We used responses in UAS99 unless they are missing, in which case we used UAS24. We created a dummy variable for the respondent or their spouse receiving annuity income (other than Social Security). However, only about 2% of respondents report receiving annuity income. We also created a dummy for owning an IRA or Keogh.

Ability and comfort with retirement planning
UAS26 has five subjective questions (ch009a, ch009c, ch009d, ch009e, ch009f) about respondents' information about retirement planning, their knowledge for the best source of information for retirement planning, their comfort with doing online transactions, their comfort with getting additional information online about retirement planning, and their comfort with getting online information about government services. All questions are answered on a 4-point scale from "Strongly agree" to "Strongly disagree." We added the scores of each question (reverse coding ch009a, ch009d, ch009e, ch009f), and standardized the resulting variable.

Table A7: Robustness of the Main Treatment Effects

Dependent Variable: Sell-Buy Spread Specification:	(1) Coefficient on Complexity Treatment	(2) Coefficient on Consequence Message Treatment	(3) R^2	(4) N
(1) Baseline	0.131**	-0.141**	0.1568	4,060
	(0.065)	(0.062)		
Panel A: Changing Cognition Measures				
(2) Cognition index is the simple average of the 5 cognition measures	0.131**	-0.141**	0.1554	4,060
	(0.065)	(0.062)		
(3) All five components of cognitions score entered separately	0.131**	-0.137**	0.1614	4,060
	(0.065)	(0.062)		
(4) Financial literacy is the only cognition measure	0.107	-0.128**	0.1146	4,060
	(0.066)	(0.063)		
(5) Numeracy measures are the only cognition measures	0.121*	-0.153**	0.1495	4,060
	(0.065)	(0.062)		
(6) Verbal measures are the only cognition measures	0.111*	-0.152**	0.1174	4,060
	(0.066)	(0.063)		
(7) Additional controls for cognition, knowledge, and financial experience	0.135**	-0.136**	0.1601	4,060
	(0.065)	(0.062)		
Panel B: Sample Selection				
(8) Include observations with missing demographics (dummied out)	0.130**	-0.139**	0.1585	4,081
	(0.065)	(0.062)		
(9) Include observations with missing cognition index (dummied out)	0.118*	-0.120**	0.1422	4,528
	(0.062)	(0.059)		
(10) Include observations with any missing values (dummied out)	0.117*	-0.118**	0.1441	4,552
	(0.062)	(0.059)		
(11) Exclude Native American and LA county oversamples	0.113*	-0.169***	0.1632	3,704
	(0.068)	(0.064)		
Panel C: Different Controls				
(12) No cognition controls	0.087	-0.159**	0.0825	4,060
	(0.068)	(0.064)		
(13) No demographic controls	0.137**	-0.140**	0.1465	4,060
	(0.065)	(0.062)		
(14) No secondary experimental controls	0.125*	-0.138**	0.1534	4,060
	(0.065)	(0.062)		
Panel D: Adjustments to Outcome Variable				
(15) Buy and sell valuations topcoded at $100,000	0.111**	-0.108**	0.1427	4,060
	(0.054)	(0.051)		
(16) Topcoding spread at the 90th percentile	0.119**	-0.106**	0.1641	4,060
	(0.055)	(0.053)		
(17) Bottomcoding buy and sell valuations at $1000	0.104*	-0.098*	0.1501	4,060
	(0.057)	(0.054)		
(18) Spread set to zero if spread ≤ 0.50	0.131**	-0.142**	0.1592	4,060
	(0.066)	(0.063)		
(19) Spread set to zero if buy valuation > sell valuation	0.159**	-0.132**	0.0930	4,060
	(0.067)	(0.064)		

Notes: Each row displays the results of a single OLS regression that is identical to the baseline regression shown in Column 1 of Table 4 except for the difference described in the row header. In the baseline regression, the cognition index is the first principal component of five standardized cognition measures: financial literacy, a numeracy score, a number series score, a verbal analogies score, and a picture vocabulary score. The nine additional controls in row 7 are described in Online Appendix Table A6. Missing values for any of these control variables are dummied out. Robust standard errors are in parentheses. * significant at 10%, ** significant at 5%, *** significant at 1%.

Table A8: Characteristics of People with Buy Values Exceeding Sell Values

Variable	Buy Value > Sell Value	Buy Value < Sell Value	p-value on test of equal means
Age	45.94	49.53	0.000
Age^2	23.53	26.90	0.000
Female	0.60	0.57	0.212
Married	0.55	0.60	0.002
Non-Hispanic white	0.72	0.76	0.001
Non-Hispanic black	0.09	0.08	0.301
Non-Hispanic other	0.08	0.08	0.261
Hispanic	0.11	0.08	0.006
High School Dropout	0.06	0.05	0.342
High School Education	0.20	0.20	0.843
Some College	0.40	0.39	0.953
Bachelor's Degree	0.21	0.21	0.885
Graduate Degree	0.13	0.14	0.528
Household Income: Less than 25k	0.20	0.16	0.007
Household Income: 25k-50k	0.17	0.18	0.522
Household Income: 50k-75k	0.17	0.17	0.685
Household Income: 75k-100k	0.14	0.12	0.297
Household Income: Above 100k	0.33	0.37	0.032
Household size of one	0.22	0.20	0.139
Household size of two	0.35	0.40	0.013
Household size of three	0.20	0.17	0.475
Household size of four or more	0.23	0.23	0.454
Any Kids	0.36	0.31	0.025
Cognition index (standarized)	-0.17	-0.00	0.000
Decision-making competence, framing consistency (standarized)	-0.08	-0.01	0.073
Decision-making competence, time conjunction (standarized)	-0.02	-0.00	0.670
Decision-making competence, subset consistency (standarized)	-0.04	-0.00	0.571
Self-assessed knowledge about Social Security (standardized)	-0.10	0.05	0.000
Social Security literacy score (standardized)	-0.10	0.05	0.000
Confidence that Social Security will pay benefits (standardized)	-0.02	0.00	0.170
Receives annuity income (dummy)	0.02	0.02	0.297
Owns an IRA or Keogh (dummy)	0.31	0.37	0.002
Ability and comfort with retirement planning (standardized)	-0.03	0.01	0.169
P-value of joint test of equality of control variables		0.000	

Notes: Each cell contains the mean of the variable listed in the row header for observations belonging to the group listed in the column header. Observations for whom the sell value is exactly equal to the buy value are excluded. Only observations that are included in our baseline regression (Table 4) are included in this table. For the demographic characteristics, there are 1,110 observations in the group with buy value > sell value and 2,542 observations in the group with sell value > buy value. For the cognition and financial literacy measures, the number of observations is sometimes lower due to missing values, but for each of the measures, the number of observations is at least 769 for the first group and 1,760 for the second group. The joint test is performed by running an OLS regression of an dummy variable for belonging to the group with buy values > sell values on all the variables listed above, with any missing values of the explanatory variables dummied out. The p-value is from the F-test that all explanatory variables are jointly zero. The cognition and financial literacy measures are defined in the note to Table A6.

Survey Instrument

Notes on the Survey Instrument

- Everyone sees both EV-Sell and EV-Buy questions in the same survey
- Randomizations are all orthogonal and across subjects. All options within each randomization are selected with equal probability.
    - The main manipulations consist of a 3x2 design: three vignettes that vary the complexity, and whether or not the consequence message (see Table 2) is shown.
    - The secondary manipulations consist of a 4x3x4x2x2 design that is orthogonal to the main manipulations.
        - There are four different versions for name and gender of the vignette person to be advised on annuity decisions. This name and gender is randomized to one of the following: Mr. Jones, Mrs. Jones, Mr. Smith, or Mrs. Smith. The person featured in the consequence message has the opposite name and gender from the vignette person in the annuity valuation questions.
        - The starting value for lump-sum amounts is randomized at \$10,000, \$20,000, or \$30,000. For any given respondent, the same starting value is used for the EV-Sell and EV-Buy questions.
        - The baseline monthly Social Security Benefit, \$*SSB*, is randomized to \$800, \$1200, \$1600, or \$2000.
        - Whether the choice option with the lump-sum amount (\$*LS*) is shown first or second is randomized. For each respondent, this is randomized once and the same order is used for EV-Buy and EV-Sell.
        - Whether EV-Buy is asked before or after EV-Sell is randomized.
        - For the consequence message, it is randomized whether the paragraph on the benefits and drawbacks of spending down retirement wealth quickly is shown before or after the paragraph on the benefits and drawbacks of spending down retirement slowly.
- Text in Arial are instructions to the programmers while text in Times New Roman is shown to respondents. Text in *italicized Arial* denote variables and the respondents see the value contained by that variable.
- Text between square brackets is replaced based on the randomization.
- Page breaks are shown by horizontal lines.

Survey Instrument Text and Instructions for Understanding America Study #49

Invitation to the survey. When panelists logged on to their UAS account, they saw the following message. If they clicked on the link in this message, they entered into UAS49.

This survey asks you to make decisions as if you were giving someone financial advice. You will then play an insurance game. You will earn $10 for completion, and have a chance to win more.

In the following survey we want you to play the role of financial advisor. We will show you some examples of persons who have to make a decision about money and we will ask you to help them make the decision.

Consequence message treatment: Advisor explanations. Only people in the consequence message treatment get this screen and the following two screens. Respondents are randomized to see one of four vignette person names: Mr. Jones, Mrs. Jones, Mr. Smith, or Mrs. Smith. The pronouns [he/she] and [his/her] should match the gender of the consequence-message vignette person. Similarly, the word [man/women] should match the gender of the vignette person.

First, we will show you a story about [Mr. Jones/Mrs. Jones/Mr. Smith/Mrs. Smith]. Please pay close attention to the story, because at the end we will ask you two questions about the story. You will receive an additional $1 for each question you answer correctly.

[Mr. Jones/Mrs. Jones/Mr. Smith/Mrs. Smith] is a single, 65-year old [man/woman] with no children, and [he/she] is as healthy as the typical 65-year old [man/woman]. [He/She] just retired and receives [his/her] monthly Social Security check. [He/She] is talking with [his/her] financial adviser on how to spend [his/her] substantial savings in retirement.

Randomize whether either block 1 or block 2 is shown.

Block 1:

[His/Her] advisor explains that [he/she] could decide to spend down [his/her] savings relatively quickly. In this case, [he/she] will be more likely to be able to enjoy [his/her] money during [his/her] lifetime. But [he/she] also runs a risk of running out of money while alive and having to cut back on [his/her] spending as a result.

[His/Her] advisor explains that [he/she] could also decide to spend down [his/her] savings relatively slowly. In this case, [he/she] will be less likely to run out of money. But now [he/she] runs a risk of not getting to enjoy all [his/her] money during [his/her] lifetime.

Block 2:

[His/Her] advisor explains that [he/she] could decide to spend down [his/her] savings relatively slowly. In this case, [he/she] will be less likely to run out of money. But now [he/she] runs a risk of not getting to enjoy all [his/her] money during [his/her] lifetime.

[His/Her] advisor explains that [he/she] could also decide to spend down [his/her] savings relatively quickly. In this case, [he/she] will be more likely to be able to enjoy [his/her] money during [his/her] lifetime. But [he/she] also runs a risk of running out of money while alive and having to cut back on [his/her] spending as a result.

Consequence message treatment: Test questions 1 and 2.

Remember, you will earn an extra $1 for each question you answer correctly on this page.

The financial advisor tells [Mr. Jones/Mrs. Jones/Mr. Smith/Mrs. Smith] that spending down [his/her] savings more quickly:

- Increases the risk that [he/she] does not get to enjoy all of [his/her] money during [his/her] lifetime.
- Decreases the risk that [he/she] runs out of money during [his/her] lifetime.
- Increases the risk that [he/she] runs out of money during [his/her] lifetime.
- None of the above.

The financial advisor tells [Mr. Jones/Mrs. Jones/Mr. Smith/Mrs. Smith] that spending down [his/her] savings more slowly:

- Increases the risk that [he/she] runs out of money during [his/her] lifetime.
- Decreases the risk that [he/she] does not get to enjoy all of [his/her] money during [his/her] lifetime.
- Increases the risk that [he/she] does not get to enjoy all of [his/her] money during [his/her] lifetime.
- None of the above.

If a question is not answered, prompt once to answer the question, but move to next screen if respondent still leaves the question blank.

Consequence message treatment: Question to induce respondent to think about how to draw down savings during retirement

Now we are going to switch to a different type of question. Instead of asking you about facts, we are going to ask your advice about what decisions [Mr. Jones/Mrs. Jones/Mr. Smith/Mrs. Smith] should make. Unlike the previous questions, there is no right or wrong answer; we just want to know what you think.

Recall [Mr. Jones/Mrs. Jones/Mr. Smith/Mrs. Smith], the retired, single, 65-year old [man/woman] with no children. [He/She] is as healthy as the typical 65-year old [man/woman].

How quickly should [he/she] spend [his/her] savings?

- Spend [his/her] savings by age 70. [he/she] can spend a large amount each year, but [he/she] will have to cut back if [he/she] lives beyond 70. If [he/she] dies before 70, [he/she] will not have enjoyed all of [his/her] savings.
- Spend [his/her] savings by age 80. [he/she] can spend a moderate amount each year, but [he/she] will have to cut back if [he/she] lives beyond 80. If [he/she] dies before 80, [he/she] will not have enjoyed all of [his/her] savings.
- Spend [his/her] savings by age 90. [he/she] can spend a modest amount each year, but [he/she] will have to cut back if [he/she] lives beyond 90. If [he/she] dies before 90, [he/she] will not have enjoyed all of [his/her] savings.
- Spend [his/her] savings by age 100. [he/she] can spend a small amount each year, and [he/she] will have to cut back if [he/she] lives beyond 100. If [he/she] dies before 100, [he/she] will not have enjoyed all of [his/her] savings.

This is the end of the screens shown for the consequence message.

Complexity Treatment. Respondents are randomized to one of the three vignettes shown below: Vignette 1 (corresponding to treatment "No added complexity"), Vignette 2 (corresponding to treatment "Complexity: Wide age range") or Vignette 3 (corresponding to treatment "Complexity: Added information"). The name in the complexity vignette below is different than the name shown in the consequence-message vignette above. Similarly, the gender of the person in the complexity vignette is different from the gender of the person in the consequence-message vignette. The scalar variable *SSB* is randomized to 800, 1200, 1600, or 2000.

In the next few questions, we are going to ask you to give some advice to [Mrs. Smith/Mr. Smith/Mrs. Jones/Ms. Jones] for when [she/he] retires. You will be happy to know that whatever advice you give [Mrs. Smith/Mr. Smith/Mrs. Jones/Ms. Jones], [she/he] will not owe any taxes on the amounts shown and [her/his] benefits will keep up with inflation. There is no right or wrong answer; we just want to know what you think.

Vignette 1 ("No added complexity"):
[Mrs. Smith/Mr. Smith/Mrs. Jones/Ms. Jones] is a single, 60-year old [woman/man] with no children. [She/He] will retire and claim [her/his] Social Security benefits at 65. When [she/he] retires, [she/he] will have $100,000 saved for [her/his] retirement, and [she/he] will receive $[*SSB*] in monthly Social Security benefits. Based on [her/his] current health and family history, doctors have told Mr. Smith that [she/he] will almost certainly be alive at age 75 but almost certainly will not live beyond age 85.

Vignette 2 ("Complexity: Wide age range"):
[Mrs. Smith/Mr. Smith/Mrs. Jones/Ms. Jones] is a single, 60-year old [woman/man] with no children. [She/He] will retire and claim [her/his] Social Security benefits at 65. When [she/he] retires, [she/he] expects to have $100,000 saved for [her/his] retirement, and expects to receive $[*SSB*] in monthly Social Security benefits. Based on [her/his] current health and family history, doctors have told Mrs. Jones that [she/he] has an 80% chance of being alive at age 70, a 50% chance of being alive at age 80, a 20% chance of being alive at age 90, and a 10% chance of being alive at age 95.

Vignette 3 ("Complexity: Added information"):
[Mrs. Smith/Mr. Smith/Mrs. Jones/Ms. Jones] is a single, 60-year old [woman/man] with no children. Social Security rules state that you need at least 40 credits, or 10 years of work, to qualify for Social Security – and [Mrs. Smith/Mr. Smith/Mrs. Jones/Ms. Jones] qualifies since [she/he] has worked for 30 years. Since [Mrs. Smith/Mr. Smith/Mrs. Jones/Ms. Jones] was born in 1956, [her/his] full retirement age is 66 years and 4 months, but [she/he] is eligible to start claiming starting at 62. [She/He] will retire and claim [her/his] Social Security benefits at 65. When [she/he] retires, [she/he] will have $100,000 saved for [her/his] retirement, and [she/he] will receive $[*SSB*] in monthly Social Security benefits. Based on [her/his] current health and family history, doctors have told [Mrs. Smith/Mr. Smith/ Mrs. Jones/Ms. Jones] that [she/he] will almost certainly be alive at age 75 but almost certainly will not live beyond age 85.

Initializations for EV-Sell and EV-Buy. Whether the EV-Buy questions or the EV-Sell questions are shown first is randomized.
The scalar variable *LS_STARTVALUE* is randomized to 1, 2, or 3.
The values in the matrices *LS_LOW*, *LS_MED*, and *LS_HIGH* are listed at the very end of this document.

Initialization of the matrix *LS_AMT*:

If *LS_STARTVALUE* ==1
Set the 16x5 matrix *LS_AMT=LS_LOW*
Elseif *LS_STARTVALUE* ==3
Set the 16x5 matrix *LS_AMT=LS_HIGH*
Else
Set the 16x5 matrix *LS_AMT=LS_MED*
Endif

EV-Sell Questions

Set the scalar *j*=1
Set the scalar *ROW*=1
For *j*=1 to 5

This is the start of the loop for EV-Sell questions.
The text for each iteration of the loop is shown on a new screen.

If *j* = 1, Display:

If EV-Sell is asked before EV-Buy:

Suppose that the Social Security Administration is considering a new policy that gives people more choice in how they want to receive their benefits. As part of this policy, [Mrs. Smith/Mr. Smith/Mrs. Jones/Ms. Jones] is asked to make a choice between two money amounts.

What should [Mrs. Smith/Mr. Smith/Mrs. Jones/Ms. Jones] do?

Else

Now consider a different way of giving people more choice in how they want to receive their benefits. As part of this policy, [Mrs. Smith/Mr. Smith/Mrs. Jones/Ms. Jones] is asked to make a choice between two money amounts.

Endif

Else, Display:

Now we ask you the same question but with a different amount for the one-time payment.

What should [Mrs. Smith/Mr. Smith/Mrs. Jones/Ms. Jones] do?

Endif

The order of the two options shown is randomized once for each respondent. The order remains the same for the EV-Sell and EV-Buy questions shown to a given respondent. The third appearance of the word "receive" (i.e., when it appears after the underlined word "and") in the text below is shown in bold if and only if EV-Sell is asked after EV-Buy.

- Receive a Social Security benefit of $[*SSB*+100] per month starting at age 65.
- Receive [her/his] expected Social Security benefit of $[*SSB*] per month and receive a one-time payment of $[*LS_AMT*[*ROW,j*]] from Social Security at age 65.

If the respondent does not select any option, the respondent is prompted once to answer this question. If the respondent still doesn't give an answer, the variable *j* is set to 5, so that we get skipped out of this loop.

If Respondent selects the option that does **not** contain the one-time payment:
Set *ROW*=*ROW*+2^(4-*j*)]
Note: this will increase the size of one-time payment in the next iteration, so it makes the option that does not contain the one-time payment less attractive.
Endif
Set *j*=*j*+1
This is the end of the loop for the EV-Buy questions.

Vignette reminder. The complexity vignette is shown again, but now preceded by the word "Remember, ".

Vignette 1 ("No added complexity"):
Remember, [Mrs. Smith/Mr. Smith/Mrs. Jones/Ms. Jones] is a single, 60-year old [woman/man] with no children. [She/He] will retire and claim [her/his] Social Security benefits at 65. When [she/he] retires, [she/he] will have $100,000 saved for [her/his] retirement, and [she/he] will receive $[*SSB*] in monthly Social Security benefits. Based on [her/his] current health and family history, doctors have told Mr. Smith that [she/he] will almost certainly be alive at age 75 but almost certainly will not live beyond age 85.

Vignette 2 ("Complexity: Wide age range"):
Remember, [Mrs. Smith/Mr. Smith/Mrs. Jones/Ms. Jones] is a single, 60-year old [woman/man] with no children. [She/He] will retire and claim [her/his] Social Security benefits at 65. When [she/he] retires, [she/he] expects to have $100,000 saved for [her/his] retirement, and expects to receive $[*SSB*] in monthly Social Security benefits. Based on [her/his] current health and family history, doctors have told Mrs. Jones that [she/he] has an 80% chance of being alive at age 70, a 50% chance of being alive at age 80, a 20% chance of being alive at age 90, and a 10% chance of being alive at age 95.

Vignette 3 ("Complexity: Added information"):
Remember, [Mrs. Smith/Mr. Smith/Mrs. Jones/Ms. Jones] is a single, 60-year old [woman/man] with no children. Social Security rules state that you need at least 40 credits, or 10 years of work, to qualify for Social Security – and [Mrs. Smith/Mr. Smith/Mrs. Jones/Ms. Jones] qualifies since [she/he] has worked for 30 years. Since [Mrs. Smith/Mr. Smith/Mrs. Jones/Ms. Jones] was born in 1956, [her/his] full retirement age is 66 years and 4 months, but [she/he] is eligible to start claiming starting at 62. [She/He] will retire and claim [her/his] Social Security benefits at 65. When [she/he] retires, [she/he] will have $100,000 saved for [her/his] retirement, and [she/he] will receive $[*SSB*] in monthly Social Security benefits. Based on [her/his] current health and family history, doctors have told [Mrs. Smith/Mr. Smith/ Mrs. Jones/Ms. Jones] that [she/he] will almost certainly be alive at age 75 but almost certainly will not live beyond age 85.

EV-Buy Questions
Set the scalar *j*=1
Set the scalar *ROW*=1
For *j*=1 to 5
This is the start of the loop for EV-Buy questions.
The text for each iteration of the loop is shown on a new screen.

If *j* = 1, Display:

If EV-Buy is asked before EV-Sell:

Suppose that the Social Security Administration is considering a new policy that gives people more choice in how they want to receive their benefits. As part of this policy, [Mrs. Smith/Mr. Smith/ Mrs. Jones/Ms. Jones] is asked to make a choice between two money amounts.

What should [Mrs. Smith/Mr. Smith/ Mrs. Jones/Ms. Jones] do?

Else

Now consider a different way of giving people more choice in how they want to receive their benefits. As part of this policy, [Mrs. Smith/Mr. Smith/ Mrs. Jones/Ms. Jones] is asked to make a choice between two money amounts.

Endif

Else, Display:

Now we ask you the same question but with a different amount for the one-time payment.

What should [Mrs. Smith/Mr. Smith/ Mrs. Jones/Ms. Jones] do?

Endif

The order of the two options shown is randomized once for each respondent. The order remains the same for the EV-Sell and EV-Buy questions shown to a given respondent. The word "payment" in the text below is shown bold if and only if EV-Buy is asked after EV-Sell.

- Receive a Social Security benefit of $[*SSB*-100] per month starting at age 65.
- Receive [her/his] expected Social Security benefit of $[*SSB*] per month and make a one-time payment of $$[*LS_AMT[ROW,j]*] to Social Security at age 65.

If the respondent does not select any option, the respondent is prompted once to answer this question. If the respondent still doesn't give an answer, the variable *j* is set to 5 so that we get skipped out of this loop.

If Respondent selects the option that **does** contain the one-time payment:

Set *ROW*=*ROW*+2^(4-*j*)]

Note: this will increase the size of one-time payment in the next iteration, so it makes this option with the payment less attractive.

Endif

Set *j*=*j*+1

This is the end of the loop for the EV-Buy questions

End of survey instrument for experiment on annuity valuations. The remainder of UAS49 consisted of approximately 24 screens with information and questions about insurance decisions that were collected for a different project.

The Values of the Matrices for the Lump-Sum Amounts

The following tables show lump-sum amounts for three different starting values: low, medium and high, which are randomized as mentioned above.

10,000	**4,000**	**2,000**	**1,000**	**500**	**Row 1**
				1,500	**Row 2**
			3,000	**2,500**	**Row 3**
				3,500	**Row 4**
		7,000	**5,500**	**4,750**	**Row 5**
				6,250	**Row 6**
			8,500	**7,750**	**Row 7**
				9,250	**Row 8**
	30,000	**20,000**	**15,000**	**12,500**	**Row 9**
				17,500	**Row 10**
			25,000	**22,500**	**Row 11**
				27,500	**Row 12**
		60,000	**40,000**	**35,000**	**Row 13**
				50,000	**Row 14**
			100,000	**80,000**	**Row 15**
				200,000	**Row 16**
Col. 1	**Col. 2**	**Col. 3**	**Col. 4**	**Col. 5**	

We put the values of this in the 16x5 matrix *LS_LOW*. The i^{th} row and j^{th} column of this matrix is denoted by *LS_LOW*[*i,j*]

20,000	4,000	2,000	1,000	500	Row 1
				1,500	Row 2
			3,000	2,500	Row 3
				3,500	Row 4
		10,000	7,000	5,500	Row 5
				8,500	Row 6
			15,000	12,500	Row 7
				17,500	Row 8
	60,000	30,000	25,000	22,500	Row 9
				27,500	Row 10
			40,000	35,000	Row 11
				50,000	Row 12
		100,000	80,000	70,000	Row 13
				90,000	Row 14
			200,000	150,000	Row 15
				500,000	Row 16
Col. 1	Col. 2	Col. 3	Col. 4	Col. 5	

We put the values of this in the 16x5 matrix *LS_MED*. The i^{th} row and j^{th} column of this matrix is denoted by *LS_MED*[*i,j*]

30,000	10,000	4,000	2,000	1,000	Row 1
				3,000	Row 2
			7,000	5,500	Row 3
				8,500	Row 4
		20,000	15,000	12,500	Row 5
				17,500	Row 6
			25,000	22,500	Row 7
				27,500	Row 8
	60,000	40,000	35,000	32,500	Row 9
				37,500	Row 10
			50,000	45,000	Row 11
				55,000	Row 12
		100,000	80,000	70,000	Row 13
				90,000	Row 14
			200,000	150,000	Row 15
				500,000	Row 16
Col. 1	Col. 2	Col. 3	Col. 4	Col. 5	

We put the values of this in the 16x5 matrix *LS_HIGH*. The i^{th} row and j^{th} column of this matrix is denoted by *LS_HIGH*[*i,j*]

Construction of the Cognition Index

The cognition index is the first principal component of the 5 scores of different tests administered at different times in the UAS: one score for financial literacy and four scores for four standard cognition tests.

Financial Literacy

The financial literacy score is calculated by standardizing the number of correct answers to the 14 financial literacy questions in UAS1. These questions are derived from Lusardi and Mitchell (2014). The 14 questions are:

1. Suppose you had $100 in a savings account and the interest rate was 2% per year. After 5 years, how much do you think you would have in the account if you left the money to grow: more than $102, exactly $102, less than $102?
    a. More than $102
    b. Exactly $102
    c. Less than $102
    d. I don't know

2. Suppose you had $100 in a savings account and the interest rate was 20% per year and you never withdraw money or interest payments. After 5 years, how much would you have on this account in total?
    a. More than $200
    b. Exactly $200
    c. Less than $200
    d. I don't know

3. Imagine that the interest rate on your savings account was 1% per year and inflation was 2% per year. After 1 year, would you be able to buy more than, exactly the same as, or less than today with the money in this account?
    a. More than today
    b. Exactly the same as today
    c. Less than today
    d. I don't know

4. Assume a friend inherits $10,000 today and his sibling inherits $10,000 but 3 years from now. Who is richer today because of the inheritance?
    a. My friend
    b. His sibling
    c. They are equally rich
    d. I don't know

5. Suppose that in the year 2020, your income has doubled and prices of all goods have doubled too. In 2020, will you be able to buy more, the same or less than today with your income?

a. Buy more than today
b. Buy the same as today
c. Buy less than today
d. I don't know

6. Which of the following statements describes the main function of the stock market?
    a. The stock market helps to predict stock earnings
    b. The stock market results in an increase in the price of stocks
    c. The stock market brings people who want to buy stocks together with those who want to sell stocks
    d. None of the above
    e. I don't know

7. Which of the following statements is correct?
    a. Once one invests in a mutual fund, one cannot withdraw money in the first year
    b. Mutual funds can invest in several assets, for example invest in both stocks and bonds
    c. Mutual funds pay a guaranteed rate of return which depends on their past performance
    d. None of the above
    e. I don't know

8. If the interest rates (rise/fall), what should happen to bond prices? **Respondents are randomly selected to be asked about rise or fall.*
    a. They should rise
    b. They should fall
    c. They should stay the same
    d. I don't know

9. Do you think the following statement is true? Buying a (single company stock/stock mutual fund) usually provides a safer return than a (single company/stock mutual fund). **Respondents are randomly selected to be asked about single company or stock market mutual fund.*
    a. True
    b. False
    c. Don't know

10. Do you think that the following statement is true or false? (Stocks/bonds) are normally riskier than (stocks/bonds). **Respondents are randomly selected to be asked about stocks or bonds.*
    a. True
    b. False
    c. Don't know

11. Considering a long period (for example 10 or 20 years), what normally gives the highest return?

a. Savings accounts
b. Bonds
c. Stocks
d. I don't know

12. Normally, which asset described below displays the highest fluctuations over time: savings accounts, bonds or stocks?
    a. Savings accounts
    b. Bonds
    c. Stocks
    d. I don't know

13. When an investor spreads his or her money among different assets, does the risk of losing a lot of money increase, decrease, or stay the same?
    a. Increase
    b. Decrease
    c. Stay the same
    d. I don't know

14. Is the following statement true? Housing prices in the US can never go down.
    a. True
    b. False
    c. I don't know

Numeracy

Numeracy consists of 8 items taken from Weller et al. (2013). The test scores for this sub-test were derived within the UAS using a two-parameter logistic Item Response Theory (IRT) model. The test was administered in UAS1. The resulting score is standardized.

1. Imagine that we roll a fair, six-sided die 1,000 times. Out of 1,000 rolls, how many times do you think the die would come up as an even number?

   [Slider from 0 to 1,000]

2. In the BIG BUCKS LOTTERY, the chances of winning a $10.00 prize are 1%. What is your best guess about how many people would win a $10.00 prize if 1,000 people each buy a single ticket from BIG BUCKS?

   [Slider from 0 to 1,000]

3. In the ACME PUBLISHING SWEEPSTAKES, the chance of winning a car is 1 in 1,000. What percent of tickets of ACME PUBLISHING SWEEPSTAKES win a car?

   [Slider from 0 to 100]

4. If the chance of getting a disease is 10%, how many people would be expected to get the disease out of 1,000?

   [Slider from 0 to 1,000]

5. If the chance of getting a disease if 20 out of 100, this would be the same as having how much of a percent chance of getting the disease?

   [Slider from 0 to 100]

6. Suppose you have a close friend who has a lump in her breast and must have a mammogram. Of 100 women like her, 10 of them actually have a malignant tumor and 90 of them do not. Of the 10 women who actually have a tumor, the mammogram indicates correctly that 9 of them have a tumor and indicates incorrectly that 1 of them does not have a tumor. OF the 90 women who do not have a tumor, the mammogram indicates correctly that 80 of them do not have a tumor and indicates incorrectly that 10 of them do have a tumor. The table below summarizes all of this information.

	Tested positive	Tested negative	Totals
Actually has a tumor	9	1	10
Does not have a tumor	10	80	90
Totals	19	81	100

   Imagine that your friend tests positive (as if she had a tumor), what is the likelihood that she actually has a tumor?

   [Randomized between: (i) Answer box accepting numerics with decimals and (ii) answer box accepting answers in the format "<number> out of < number>"]

7. A bat and a ball cost $1.10 in total. The bat costs $1.00 more than the ball. How much does the ball cost?

   [Answer box accepting numerics with decimals]

8. In a lake, there is a patch of lily pads. Every day, the patch doubles in size. If it takes 48 days for the patch to cover the entire lake, how long would it take for the patch to cover half of the lake?

   [Answer box accepting numerics with decimals]

Number Series, Picture Vocabulary and Verbal Analogies

Each of the three sub-tests – number series, picture vocabulary and verbal analogies – were taken from the Woodcock-Johnson Tests of Cognitive Abilities (Mather and Jaffe, 2016). Each measure consisted of 15 items, which were scored as either correct or incorrect. The number-series test was administered in UAS42, the picture-vocabulary test in UAS43, and the verbal-analogies test in UAS44.

The test scores for each of these three sub-tests were derived within the UAS using a two-parameter logistic Item Response Theory (IRT) model. The resulting scores are standardized.

Due to copyright, we are unable to reprint the specific questions here.

References

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