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The pivotal role of fairness: Which consumers like annuities?

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Decumulation of wealth in retirement is a difficult task, requiring tradeoffs between longevity risks and immediate consumption needs. Economists have long argued that life annuities can be a valuable part of decumulation and that most retirees should annuitize, and yet actual market demand is quite low–the so-called "annuity puzzle." We analyze data from two studies to understand how measurable individual differences predict interest in annuities. In our data, a relatively high percentage of respondents dislike all annuities; demographic measures are not predictive of which individuals never choose annuities, and individual factors (such as beneficiaries) favored by economic models have small or even opposite effects. We find that the strongest individual differences predictive of liking of annuities are the respondent's perception of product fairness. We discuss implications of our findings for financial planners hoping to help customers with their decumulation challenges.

KEYWORDS
decision-making, household finance, retirement

1 | THE DECUMULATION CHALLENGE

Since the rise of defined contribution (DC) plans in the late 1970s and early 1980s, financial advisors, policy makers, and academic researchers have dedicated substantial effort into helping Americans save more for their retirement. While these efforts have been successful at increasing savings rates in the productive "accumulation stage" of life, less effort has been put toward the problem of how individuals should optimally "decumulate" their assets during retirement.

The size of the decumulation challenge is large and growing. Approximately $9.2 trillion of retirement assets are held in DC plans or Individual Retirement Accounts (Benartzi, Previtero, & Thaler, 2011). Each day, around 10,000 individuals enter retirement and face the problem of how to draw down those assets optimally during their remaining lifetime. If the money is spent too quickly, the retiree may run out and be destitute, but if spent too slowly, he or she may underconsume and die with unused assets. The financial and psychological dimensions of this decumulation problem are complex involving multiple uncertainties and value tradeoffs. First, solving the decumulation decision problem requires an estimate of the individual's life expectancy, a judgment that is highly uncertain and subject to bias (Payne, Sagara, Shu, Appelt, & Johnson, 2013). Second, individual differences in family composition, outside income (such as social security), and uncertainties about future health status can all affect income requirements during retirement. Third, there is a clear trade-off to be made between more retirement income sooner vs. more income later. Finally, and most importantly for this paper, psychological differences in individual-level perceived fairness, feelings of ownership, loss aversion (not just risk aversion), as well as life expectations and patience, can strongly influence how the individual thinks about the tradeoffs within decumulation options (Shu & Payne 2013; Shu & Shu, 2018; Shu, 2018).

2 | ANNUITIES AS A DECUMULATION TOOL

A retiree with retirement savings has several options available for generating consumable income during retirement.[1]One decumulation option is to self-manage the money (whether done alone or with the advice of a financial planner). Here, economists' and financial planners' advice for optimal drawdown is to spend no more than 4% or 5% per year, to avoid

running out within 30 years (Bengen, 1994). Another option, and one highly recommended by economics experts, is to convert some portion of accumulated retirement assets into a life annuity.

The process of purchasing a life annuity allows a retiree to convert a set amount of saved assets into guaranteed monthly payments that will continue until death; thus, allowing a lump sum to be translated into an income stream similar to pension benefits. The primary advantages of a life annuity are the implied insurance against outliving one's assets as well as annual returns that are higher than are reasonably achievable with self-managed accounts (e.g., Brown, 2007 models various assumptions and shows that a self-managed "amoritization" strategy at market rates leads to 25% lower income in retirement than a life annuity purchased with equivalent wealth). Thus, people who expect to live longer should find life annuitization particularly attractive, as should individuals who are highly risk averse and want to avoid uncertainty in future income (Milevsky, 1998; Poterba, Venti, & Wise, 2011). The higher return associated with a life annuity is a result of survivorship benefits, based on pooling of assets from all contributors being used to support the ongoing payments to surviving annuity holders. Perceived disadvantages of life annuities are that the assets are transferred to the issuing company and therefore not available either for transfer to beneficiaries (i.e., bequests) or for use in case of emergencies (liquidity). Life annuity issuers have responded to these disadvantages by introducing attributes, such as period-certain guarantees, delayed start dates, annual increases to offset inflation, and joint annuities for married couples. Providing such attributes does come with financial tradeoffs, however; companies must weigh whether consumers are willing to accept a higher annuity price to fund these benefits.

3 | RESEARCH ON ANNUITY CHOICE

Within the academic economics literature, there is substantial agreement that annuities are a compelling and rational solution to the problem of wealth decumulation during retirement (for a review, see Benartzi et al., 2011). Yaari (1965) was one of the first economists to argue that rational retirees with no bequest motive should use all of their retirement assets to buy annuities. The pooled structure of life annuities allows them to offer a "mortality premium" on returns (benefits to survivors from annuitants who die early) while also eliminating longevity risk (the danger of outliving one's assets). Davidoff, Brown, and Diamond (2005) demonstrate the attractiveness of annuitization by comparing life annuities to CDs.[2] While economists like life annuities, the public does not. Purchase of life annuities by retirees is significantly below the theoretical potential, a so-called "annuity puzzle" (Brown, 2007; Davidoff et al., 2005). For example, a 2009 study by Hewitt Associates reports that just 1% of employees actually buy annuities as payout options (Lieber, 2010), and Inkmann, Lopes, and Michaelides (2010) report that only about 6% of U.K. households voluntarily participate in the life annuity market. Even when taking into account "rational" economic reasons for not buying life annuities, such as adverse selection or pricing issues, most economists argue that retirees are financially better off by at least partially annuitizing (Brown, 2007).

Possible reasons for limited market demand for annuities include rational heterogeneous preferences at the consumer level. Davidoff et al. (2005), Babbel and Merrill (2006), Brown (2007), and Benartzi et al. (2011) all provide comprehensive reviews of how individual preferences may affect annuity demand. For example, the guaranteed monthly income provided through social security could lead to less demand for additional annuitization among people with limited retirement savings, but this does not explain why wealthier individuals also do not buy. Similarly, bequest motives might account for less than full annuitization, so that some assets are reserved for beneficiaries, but bequest motives cannot explain why retirees without heirs still choose nearly no annuitization. Concerns about liquidity to cover expenditure shocks (such as medical expenses) may also be a factor for reduced demand for full annuitization, and yet bundled contracts of life annuities with long-term care coverage remain relatively unpopular. Finally, consumers may worry about default risk by the annuity issuer, but reasonable levels of perceived default risk still do not account for the low demand for partial annuitization.

Thus, although rational economic explanations of the lack of annuitization are important factors in the annuity puzzle, they do not fully explain the problem, and more psychological factors need to be considered (Brown, 2007). For instance, some studies have looked at whether the annuity decision is affected by how it is framed. Hu and Scott (2007) argue that the complexity of the task leads people to narrowly frame the decision as a simple breakeven gamble rather than as an insurance decision. Loss aversion from cumulative prospect theory (Tversky & Kahneman, 1992) is also widely invoked as a reason why annuities are generally less attractive than standard utility theory would predict, especially when considering the loss of the annuity purchase price due to early death. In addition to loss aversion, the tendency for individuals to overweight small probabilities (e.g., Tversky & Kahneman 1992) could contribute to the perceived risk of losing the value of annuity due to unexpected early death. To counteract consumer perceptions of life annuities as a "gamble," Brown, Kling, Mullainathan, and Wrobel (2008) examined whether framing an annuity purchase as an investment (using words such as invest and earnings) or for consumption (using words such as spend and payment) affects choice, and found that consumers are more likely to choose annuities when they are described in a consumption frame. Framing effects are also significant

(although mediated by gender) in Agnew, Anderson, Gerlach, and Szykman's (2008) simulated retirement game in which individuals choose between annuities and self-managed investments. Most recently, Brown, Kapteyn, Luttmer, and Mitchell (2017) find experimental evidence for narrow bracketing, demonstrating that survey respondents encouraged to think about spending during retirement are more likely to properly value annuities. In our prior work, we have found that information displays that help individuals "do the math" on the cumulative value of annuity payouts can affect both overall interest in annuities and demand for particular annuity attributes (Shu, Zeithammer, & Payne, 2016; see also Kunreuther, Pauly, & McMorrow, 2013). These behavioral explanations of the annuity puzzle provide important insights, but many more aspects of the decision remain to be investigated and tested.

In the present article, we go beyond testing for some of the general judgmental biases and framing effects described above, and conduct an analysis of how measurable individual differences among consumers may predict (or correlate with) their interest in annuities. In addition to the differences in loss aversion described above, we consider a variety of other individual psychological differences that could affect demand. Schreiber and Weber (2016) show that individual differences in discount factors affect annuity choice. Other aspects of intertemporal choice, such as myopia and hyperopia, differential discounting of gains and losses, procrastination, and predictions of resource slack, may also relate to consumers' preference for annuities (e.g., Shu, 2008; Soman, 1998; Zauberman & Lynch, 2005). Individuals feel significant uncertainty in their judgments of future health, economic outcomes (e.g., inflation), and life expectancy, so capturing individual variation in these judgments is a key input (McGarry, 2014). Building on research on how trust, branding, company ratings, and perceived fairness all affect consumer choices, we measure perceived fairness of annuities as a product (Kahneman, Knetsch, & Thaler, 1986; Roth, 2007; Seligman & Schwartz, 1997). Response to annuity offerings may also be affected by individuals' financial knowledge and literacy, numeracy, and overall cognitive ability (Brown et al., 2017), so we also include a measure of numeracy (Fernandes, Lynch Jr, & Netemeyer, 2014; Frederick, 2005; Peters et al., 2006). We measure all of these psychological differences, along with a variety of demographical and financial variables, and analyze how they correlate with individual-level demand for annuities in a hypothetical decumulation scenario among consumers nearing retirement.

4 | OUR STUDIES OF CONSUMER PREFERENCES FOR ANNUITIES

To explore how consumers think about the decumulation problem and especially how their value differences and belief differences may drive the annuity puzzle, the rest of this article analyzes data regarding survey results on consumers' preferences for annuities. The data reported here were collected as part of a larger study measuring how consumers value particular attributes of annuities relative to their actuarial value; those results suggested that individual differences were also important to annuity choice (Shu et al., 2016). While our previous work focused on the value of the individual annuity attributes among consumers who say they would purchase at least some of the annuities our survey offered, this article contrasts consumers who are willing to consider at least some types of annuities to those who avoid them entirely in our surveys.

4.1 | Study implementation: Subject recruitment and detailed survey procedure

We completed two separate studies, with different participants per study, to explore the question of who chooses annuities. Study 1 focuses only on how a wide variety of demographics and psychographics affects annuity choice; we also include measures to capture differences in bequest motives, family status, risk aversion, and understanding of annuities. In Study 2, we include a test of an intervention that provides respondents with calculations for the cumulative value of each annuity, in the hopes of increasing overall demand for annuities (as recommended in Kunreuther et al., 2013). Both studies were constructed as choice-based conjoint analyses (Lenk, DeSarbo, Green, & Young, 1996), in which study participants make a series of 20 choices, with each choice including three described annuities and an outside choice of self-management. Because the studies are similar in design, we report them side by side in the remainder of the article.

4.1.1 | Participants

We recruited participants through a commercial online panel from Qualtrics. Qualtrics does hundreds of academic research projects and also serves clients, such as the US Army and government agencies. Panel members opt-in to Qualtrics through various websites and are offered the opportunity to participate in surveys; Qualtrics does not actively solicit for its panel. For both studies, participation was limited to individuals between the ages of 40 and 65 because this target group is the most appropriate for annuity purchases. We placed no limit on household income or current retirement savings, but we collected data on these characteristics so that we could perform an analysis of how financial status affects preferences. We also included several demographic questions including age, gender, race, and marital status. As a proxy for financial literacy (Fernandes et al., 2014), we included eight numeracy and cognitive reflection (CRT) questions. Finally, we also collected key individual difference measures suggested in the literature to affect liking for annuities, including bequest motives, life expectations, loss aversion, risk aversion, and annuity perceptions

such as attitude (e.g., good/bad, positive/negative), desire for control, and perceived fairness.

To reduce the number of respondents who either do not understand the instructions or do not pay attention to the task, we included an attention filter at the start of the survey and excluded participants who did not pass the filter. For Study 1, our final sample consists of 404 respondents. Of the 404, we have eliminated 41 who took less than 15 minutes to complete the questionnaire—a time we consider unreasonably fast. This elimination results in 363 useable respondents. Study 2 included two conditions: with and without an "enriched" information display of cumulative payouts per annuity. This sample consists of 334 respondents in the basic treatment (no display) and 323 in the enriched information treatment. Table 1 and 2 summarizes the respondent demographic and psychographic characteristics. Although ours is clearly a convenience sample of respondents, many of the demographic measures, such as household income, race, and gender align well with general population distributions, suggesting our sample is reasonably representative of American households.

4.1.2 | Procedure

In both studies, participants began by reading short descriptions of the annuity attributes being tested in the conjoint analysis as well as the full range of levels for each of these attributes. Attributes included monthly income, annual increases (in either % or dollar terms), period certain guarantees, and company rating (see Shu et al., 2016 for more detail on annuity attributes). They were told the annuities were otherwise identical and satisfactory on all omitted characteristics. They were also told all annuities were based on an initial purchase price of $100,000 at age 65 and that they should imagine having sufficient funds to afford one. We then asked each participant to complete 20 choice tasks. To control for order effects, we presented the choice tasks to the participants in a random order.

TABLE 1 Summary of individual characteristics for Study 1

	Mean	Median	SD
Age (years)	53.997	55	6.722
Male	0.537	1	0.500
Married	0.580	1	0.495
Has children	0.633	1	0.483
HH income 35 to 100 K	0.519	1	0.501
HH income over 100 K	0.141	0	0.349
Retirement savings 75 to 150 K	0.120	0	0.326
Retirement savings over 150 K	0.187	0	0.391
Period certain beneficiary would be family	0.898	1	0.304
Perceived fairness of annuities	0.552	0.667	0.219
Risk aversion	0.680	0.6	0.312
Loss aversion	0.572	0.6	0.302
Numeracy	0.428	0.375	0.247
Life expectancy (age at death, years)	82.92	83.39	9.27

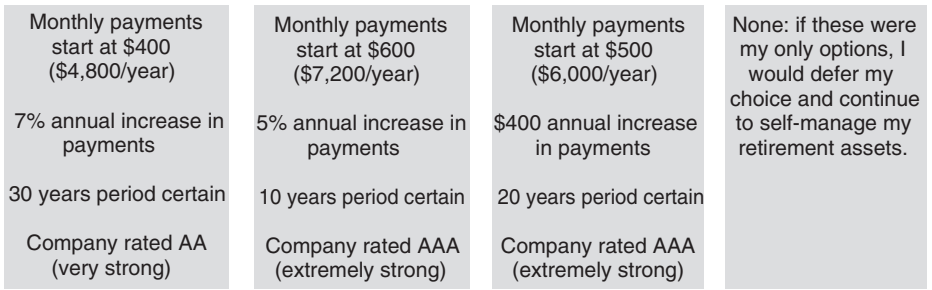
In each choice task, participants were asked, "If you were 65 and considering putting $100,000 of your retirement savings into an annuity, which of the following would you choose?" They then saw three annuity options and a fourth option that read, "None: If these were my only options, I would defer my choice and continue to self-manage my retirement assets." Figure 1 provides a sample choice task used in both studies, including the enriched information treatment from one of the conditions in Study 2.

After completing all 20 choice tasks in their assigned condition, participants filled out a number of additional demographic and psychographic measures. Participants were first asked how long they expected to rely on their retirement funds by having them indicate the probability that they would live to ages 65, 75, 85, and 95 (Payne et al., 2013).[3] We next collected demographic information including gender, race, marital status, number of children, household income, and retirement assets. As a proxy for financial literacy, we administered five numeracy questions and three CRT questions (Frederick, 2005; Weller et al., 2012). In Study 1, we administered an additional set of questions to measure individual differences thought to specifically affect preference for annuities. We collected bequest motives by asking individuals who they would identify as beneficiaries, whether they had formally or informally designated any portion of their savings as inheritance to others, and if so, what proportion of their savings was so designated. We also asked them to agree or disagree (7-point Likert scale) with statements about the importance of providing inheritance for family members versus financing their own retirement (see Appendix, Supporting Information for text of all questions).

Consumer perceptions of fairness are recognized as an important consideration for a variety of pricing and purchase decisions, and are starting to be recognized as an important input to financial decisions as well. These fairness judgments depend not only on distributional fairness (i.e., how outcomes are split between consumers and firms) but also on procedural fairness and transparency regarding the ways in which the outcomes are determined (Bies, Tripp, & Neale, 1993). Therefore, in both studies, we measured perceived fairness for annuities through both direct questions about fairness (Kahneman et al., 1986) and questions about the process underlying annuities; the inter-item covariance for these factors is high ($\alpha = .91$) and factor analysis suggests the factor driven by the single-item direct fairness question captures 78% of the overall variance. Thus, for the remainder of this analysis, we use the traditional (and more standard) single-item direct fairness measure as our measure of perceived fairness for annuities. Specifically, the direct fairness measure asks "Please rate how fair you think a life annuity product is?" on a 4-point scale (Very Unfair, Somewhat Unfair, Acceptable, and Completely Fair). We measured risk aversion in Study 1 through a series of choices for uncertain annuity income streams adapted from Barsky, Juster,

TABLE 2 Summary of individual characteristics for Study 2

	Baseline treatment (334 respondents)			Enriched info treatment (323 respondents)		
Demographic or psychographic characteristic	**Mean**	**Median**	**SD**	**Mean**	**Median**	**SD**
Age (years)	52.87	53	6.83	52.80	53	7.02
Male	0.41	0	0.49	0.40	0	0.49
Retirement savings 75 to 150K	0.13	0	0.34	0.17	0	0.38
Retirement savings over 150 K	0.18	0	0.38	0.21	0	0.41
Perceived fairness of annuities	0.59	0.67	0.22	0.57	0.67	0.22
Loss aversion	0.66	0.7	0.29	0.68	0.7	0.29
Numeracy	0.50	0.5	0.16	0.50	0.5	0.15
Life expectancy (age at death)	85.77	87	8.03	84.80	86	9.01



In the enriched information treatment, the following table was shown directly under the task:

Cumulative amount paid to you by different ages if you live to that age

Age	70	75	80	85	90	95
Option A	$27,600	$66,300	$120,600	$196,800	$303,600	$453,400
Option B	$39,800	$90,600	$155,400	$238,100	$343,600	$478,400
Option C	$34,000	$78,000	$132,000	$196,000	$270,000	$354,000

FIGURE 1 Sample study choice task

Kimball, and Shapiro (1997) as used in the 1992 HRS; responses to these choices allow us to categorize individuals into one of six levels of risk aversion (also see Kapteyn & Teppa, 2011). Finally, participants in both studies responded to a set of 10 questions that asked them to choose between mixed (gain and loss) gambles, thus providing us with individual-level loss-aversion measures (Brooks & Zank, 2005; Payne, Shu, Webb, & Sagara, 2015).

4.2 | Model estimation methodology: Two types of respondents

Although our conjoint task involved 20 single-stage choices between four options (three annuities and one outside [self-managed] option), we find that a substantial proportion of respondents do not like annuities at all. Specifically, of the 363 participants in Study 1, 22% (n = 80) did not choose any annuity at all among the 20 choice tasks they completed (in other words, they chose the outside "self-manage" option 20 times). We find consistent results in Study 2, where 20% of the 334 participants in the basic-information condition and 16% of the 323 participants in the enriched-information condition choose no annuities among all tasks. Some of the annuities in our design provided well over $200 K in expected NPV payout, in exchange for the $100 K price of the annuity. Thus, outright rejection of all annuities leads us to conclude that some people simply dislike the idea of any annuity, and are unwilling to consider them even when they can provide substantial economic benefit.

As an example of this disliking of high-actuarial-value annuities, consider the three options displayed in the sample task shown in Figure 1. Taking into account standard mortality rates and an annual discount factor of 0.97, the actuarial value for each annuity is $264,900 for Option A, $174,100 for Option B, and $165,700 for Option C. In Study 1, 41% of respondents selected "none of the above" in this example choice task. In Study 2, 36% of respondents in the basic information condition and 24% of respondents in the enriched information condition selected "none of the above." This strong aversion to annuities with a high actuarial benefit relative to upfront costs (more than would ever be available in the market, in fact) suggests some individuals are unwilling to consider annuities regardless of the benefit

offered. In the next section, we focus on describing these "annuity haters."

4.3 | Estimation results: Willingness to consider annuities

In this section, we describe how the 283 subjects who chose at least one annuity in Study 1 differ from the 80 "annuity haters." Table 3 shows the univariate analysis, which compares annuity haters to the rest of the sample using each variable separately. Measured variables are standardized by rescaling them to a value between 0 and 1, except for life expectations which are left in years. The only variable which exhibits a significant difference in both studies is fairness: in terms of the underlying 4-point fairness scale, annuity haters consider annuities to be "Somewhat unfair," while the rest of the respondents consider them to be closer to "Acceptable." Study 1 also suggests that annuity-haters are more likely to be female, over 60, more risk-averse, and, perhaps surprisingly, wealthy as measured by retirement savings over $150,000. Study 2 also measured gender, age, and retirement savings, but these significant demographic findings of Study 1 did not replicate (recall that only the basic information condition of Study 2 is relevant as a replication of Study 1). Conversely, Study 2 found a significant difference in numeracy, but Study 1 did not.

We now move from the univariate analysis shown in Table 3 to a logistic regression multivariate analysis. This approach allows the model to take all variables into account simultaneously, and hence control for confounds. In other words, the logistic regression shows the marginal effect of each variable while holding all other variables constant. Table 4 shows results for the three logistic regressions of selecting at least one annuity on individual characteristics versus disliking annuities a priori (the annuity haters) for Study 1 and the two conditions of Study 2. In both studies, most demographics are not significant correlates of buying annuities. In both studies, the exceptions echo the results of the univariate analysis in that choosing at least one annuity is associated with having lower retirement savings and lower risk-aversion in Study 1, and with being more numerate in Study 2. It seems that age and gender—found to be significant predictors by the univariate analysis in Study 1 but not by the multivariate analysis of the same data—are merely correlated with other significant explanatory variables. Interestingly, the multivariate analysis of Study 1 suggests an inverse-U-shape effect of retirement savings,[4] with a significant negative coefficient on individuals with over $150 K saved. Unfortunately, this pattern does not replicate in Study 2 even directionally. The multivariate analysis also finds that survey respondents in Study 1 who clearly identify a family member as a potential beneficiary are significantly more

TABLE 3 Univariate analysis of individual characteristics for both studies

	Study 1, N = 363, 22% annuity haters				**Study 2, basic info, N = 334, 20% annuity haters**				**Study 2, enriched info N = 323, 16% annuity haters**			
Variable	Mean| never buy	Mean | buy some	Diff (buy-not)	Tstat	Mean| never buy	Mean | buy some	Diff (buy-not)	Tstat	Mean| never buy	Mean | buy some	Diff (buy-not)	Tstat
Male	**0.39**	**0.54**	**0.15**	**2.4**	0.39	0.42	0.03	0.47	0.41	0.4	−0.01	−0.15
Age 50 to 54	0.24	0.22	−0.02	−0.41	0.24	0.22	−0.01	−0.24	0.22	0.23	0.01	0.19
Age 55 to 59	0.23	0.28	0.05	1	0.21	0.28	0.07	1.19	0.31	0.18	−0.13	−1.92
Age 60 to 65	**0.35**	**0.23**	**−0.12**	**−2.03**	0.22	0.17	−0.05	−0.92	0.18	0.22	0.04	0.74
Saved 75 to 150 K	0.07	0.12	0.05	1.28	0.13	0.13	0	−0.07	0.16	0.17	0.02	0.28
Saved over 150 K	**0.33**	**0.19**	**−0.14**	**−2.39**	0.18	0.18	0	0.01	0.24	0.2	−0.03	−0.51
Subjective life expectancy	84.15	82.92	−1.23	−0.95	85.49	85.83	0.34	0.27	83.04	85.13	2.09	1.36
Numeracy	0.42	0.43	0	0.14	**0.45**	**0.51**	**0.06**	**3.03**	0.48	0.5	0.02	1.01
Perceived fairness	**0.37**	**0.55**	**0.19**	**5.78**	**0.43**	**0.63**	**0.2**	**6.78**	**0.41**	**0.6**	**0.19**	**4.9**
Medium loss-aversion	0.3	0.33	0.03	0.43	0.33	0.35	0.02	0.31	0.33	0.37	0.04	0.52
High loss-aversion	0.33	0.22	−0.1	−1.76	0.37	0.33	−0.04	−0.6	0.45	0.36	−0.09	−1.19
Subjective health	–	–	–	–	0.75	0.74	−0.01	−0.24	0.73	0.74	0	0.08
Medium risk-aversion	0.13	0.13	0	0.05	–	–	–	–	–	–	–	–
High risk-aversion	**0.5**	**0.36**	**−0.14**	**−2.27**	–	–	–	–	–	–	–	–
Subjective understanding	0.67	0.66	−0.01	−0.43	–	–	–	–	–	–	–	–
Beneficiary family	0.84	0.9	0.06	1.33	–	–	–	–	–	–	–	–
Bequest important	0.68	0.68	0	−0.15	–	–	–	–	–	–	–	–
Married	0.61	0.58	−0.03	−0.53	–	–	–	–	–	–	–	–
Has children	0.71	0.63	−0.08	−1.37	–	–	–	–	–	–	–	–
HH income 35 to 100 K	0.61	0.52	−0.09	−1.49	–	–	–	–	–	–	–	–
HH income over 100 K	0.19	0.14	−0.05	−0.95	–	–	–	–	–	–	–	–

Note. Items in bold are significant at $p < .05$.

TABLE 4 Multivariate logistic regressions of individual characteristics for both studies

	Study 1, N = 363, 22% annuity haters				Study 2, basic info, N = 334, 20% annuity haters				Study 2, enriched info N = 323, 16% annuity haters			
Variable	**Coefficient**	***t*-Statistic**	**Mean X**	**SD. X**	**Coefficient**	***t*-Statistic**	**Mean X**	**SD. X**	**Coefficient**	***t*-Statistic**	**Mean X**	**SD. X**
Constant	1.80	1.14	1.00	0.00	−2.59	−1.51	1.00	0.00	−1.30	−0.80	1.00	0.00
Male	0.48	1.52	0.50	0.50	−0.15	−0.45	0.41	0.49	−0.53	−1.43	0.40	0.49
Age 50 to 54	−0.47	−1.04	0.22	0.42	0.05	0.12	0.23	0.42	0.00	0.01	0.23	0.42
Age 55 to 59	0.23	0.51	0.27	0.44	0.66	1.55	0.26	0.44	−0.68	−1.51	0.20	0.40
Age 60 to 65	−0.61	−1.42	0.26	0.44	−0.15	−0.36	0.18	0.39	0.24	0.46	0.21	0.41
Saved 75 to 150 K	0.39	0.74	0.11	0.31	−0.29	−0.63	0.13	0.34	0.00	0.01	0.17	0.38
Saved over 150 K	**−0.81**	**−2.14**	**0.22**	**0.41**	−0.01	−0.03	0.18	0.38	0.12	0.29	0.21	0.41
Subjective life expect.	−0.02	−0.89	83.19	9.54	0.01	0.67	85.77	8.03	0.03	1.31	84.80	9.02
Numeracy	−0.44	−0.62	0.43	0.24	**2.04**	**1.99**	**0.50**	**0.16**	0.71	0.58	0.50	0.15
Perceived fairness	**3.66**	**5.60**	**0.51**	**0.24**	**4.36**	**6.03**	**0.59**	**0.22**	**3.88**	**5.16**	**0.57**	**0.22**
Medium loss-aversion	−0.07	−0.20	0.32	0.47	−0.36	−0.93	0.34	0.48	−0.23	−0.51	0.37	0.48
High loss-aversion	−0.38	−1.04	0.25	0.43	−0.42	−1.08	0.34	0.48	−0.65	−1.48	0.38	0.49
Subjective health	–	–	–	–	−0.38	−0.43	0.75	0.19	−1.34	−1.31	0.74	0.20
Medium risk-aversion	0.03	0.06	0.13	0.33	–	–	–	–	–	–	–	–
High risk-aversion	**−0.71**	**−2.13**	**0.39**	**0.49**	–	–	–	–	–	–	–	–
Subjective understanding	0.13	0.14	0.66	0.17	–	–	–	–	–	–	–	–
Beneficiary family	**1.12**	**2.52**	**0.88**	**0.32**	–	–	–	–	–	–	–	–
Bequest important	−0.51	−0.78	0.68	0.24	–	–	–	–	–	–	–	–
Married	0.18	0.55	0.59	0.49	–	–	–	–	–	–	–	–
Has children	−0.45	−1.24	0.65	0.48	–	–	–	–	–	–	–	–
HH income 35 to 100 K	**−0.92**	**−2.37**	**0.54**	**0.50**	–	–	–	–	–	–	–	–
HH income over 100 K	−0.90	−1.75	0.15	0.36	–	–	–	–	–	–	–	–

Notes: Dependent variable in each regression is a binary indicator for whether the study participant ever selects an annuity (0 = always chooses self-management, 1 = at least one annuity chosen). Highlighted cells represent significant effects with $p < .05$.

likely to select annuities, a somewhat surprising result given theoretical predictions that individuals with family beneficiaries may like annuities less due to bequest motives or use of the family as a replacement for an annuity (Brown, 2007; Kotlikoff & Spivak, 1981). This intriguing result could suggest instead that individuals who are worried about becoming a burden on family are more open to the idea of annuities; more research is needed to better understand the tradeoff between bequests and dependence.

As in the univariate analysis, there is only one individual difference that has a large effect and replicates across both studies: perceived fairness of annuities (measured by a direct question on a 4-point scale following Kahneman et al., 1986, see above for details): individuals who perceive annuities to be fair are much more likely to select some in our studies.[5] The coefficients on fairness are much larger than the coefficients on all other measures, which is meaningful given that the measures have all been standardized to be between 0 and 1. To get a sense of the effect's magnitude, imagine an average respondent in Study 1, who considers annuities to be about half way between "Somewhat Unfair" and "Acceptable," and has a probability of 0.16 of being an annuity-hater according to the estimated logistic regression. Keeping all variables at their average level while changing the fairness perception to "Completely fair" reduces the person's probability of being an annuity hater to 0.03. Conversely, changing to "Very Unfair" increases the probability of being an annuity hater to 0.56. We also included several other psychological measures in our logistic regression that we expected to influence overall liking of annuities, such as risk aversion, loss aversion, numeracy, and life expectancy. None of these measures had a significant effect on willingness to consider annuities, with the exception of a negative effect of very high levels of risk aversion in Study 1 and a positive effect of numeracy in the basic-information condition of Study 2. It is worth noting that the negative effect of risk aversion is contrary to normative economic theory, which predicts that higher risk aversion should lead to stronger preference for guaranteed life income because an annuity is fundamentally an insurance product.

In addition to evaluating the individual characteristics of which individuals do and do not like annuities in our studies, the results reported in Table 4 also allow us to observe the effect of providing the "enriched" cumulative payout table in the second condition of Study 2. Recall from Figure 1 that the enriched condition "did the math" for participants by multiplying out the monthly payouts (including any annual increases) by number of years to calculate the cumulative payout for various survival ages. In our previous work (Shu et al., 2016), we found that this enriched information table

made participants value particular annuity attributes, such as annual increases, at levels more similar to their full actuarial value. It also increased overall liking of annuities. We also observe that latter result in the data analysis reported here; by comparing the constant estimated for condition 1 of Study 2 (−2.59) to that of condition 2 (1.29), we can see a meaningful drop in the overall percentage of individuals who never choose any annuity at all across our 20 tasks. Put into percentage terms, 20% of participants in condition 1 never chose an annuity (similar to the 22% in Study 1), but this percentage dropped to only 16% of participants in condition 2; in parallel, the number of participants who never choose the self-management option increased from 24% in condition 1 to 39% in condition 2 ($p < .05$). These results suggest that providing the enriched table helped our study respondents recognize the overall value of these annuities over time.

5 | DISCUSSION

While the studies reported here are relatively simple in design, they still yield some interesting and novel insights about the types of individuals who do and do not like annuities. Looking overall at the percentage of individuals who never selected any of the highly valuable annuities across our 20 study tasks, a relatively high percentage (approximately 20%) dislike annuities strongly enough to never select one. Encouragingly, this percentage drops to 16% when an enriched information display is provided that helps individuals recognize the value of the annuities over time. Such a display offers hope to marketers and planners who hope to encourage purchase of annuities that simple changes in how information is provided can be powerful as interventions to increase perceived value.

More novel are the findings about which individual differences are significant predictors of who likes and dislikes annuities. Standard demographic characteristics, such as gender, age, marital status, and income are all insignificant in our data. Characteristics predicted to be important based on traditional economic models, such as health, life expectations, saved assets, and numeracy, are either insignificant or small in their effect. Some measures predicted by traditional models to be important that are significant are actually opposite in the predicted effect, such as risk aversion and well-identified family beneficiaries. We also used this opportunity to test psychological measures, such as loss aversion that more recent behavioral models have predicted as important for annuities. Interestingly, the coefficient on high loss aversion is consistently negative across all studies, but not significant, consistent with our prediction that high loss aversion (unlike risk aversion) can help explain dislike of annuities.[6]

However, by far the strongest of all the individual differences we measured at predicting liking of annuities is the question of whether the individuals think annuities are "fair."

TABLE 5 Full set of fairness questions

Please rate how fair your think a life annuity product is.

Completely fair acceptable somewhat unfair very unfair

How much do you agree with each of the following questions? (7-point Likert scales)

- I feel like I understand the life annuity market well.
- The system behind life annuities should be changed.
- I would avoid companies that sell life annuities if I could.
- It is clear where the money for this product comes from.
- It is fair that the company is allowed to keep the excess funds.
- I feel that I would have too little control over my retirement money if I bought an annuity.

Prior research on consumer fairness has suggested that judgments of fairness are affected by the way that profits are shared between the firm and consumer (Kahneman et al., 1986), the intentions of the firm (Campbell, 1999), the firm's perceived wealth and power (Seligman & Schwartz, 1997), and whether underlying costs are variable or fixed (Nunes, Hsee, & Weber, 2004). In this project, our fairness measure was a simple one taken directly from Kahneman et al., 1986. It is difficult using only this measure to determine what our participants had in mind when they answered the question, or what outside influences might affect these fairness judgments. We do know that the other process-oriented fairness questions also collected in the study, which included questions like "I feel like I understand the life annuity market well" and "It is fair that the company is allowed to keep the excess funds" (see Table 5 for full set), correlated highly with the overall fairness measure, suggesting that understanding the shared-risk model that underlies annuities could be an important input. It is also possible that exposure to negative media coverage of other types of annuity products (e.g., variable annuities instead of life annuities) could affect perceptions, as could access (or lack of access) to financial planners who understand the value of the product. Additional concerns could be the belief that annuities are only for the wealthy and healthy individuals with long life expectancies, although our data suggest (perhaps ironically) that wealthier individuals are less likely to choose any annuity in our task. More research is necessary to understand the drivers of these fairness perceptions. From a positive perspective for marketers of these products, however, it may be that the annuity puzzle is more a problem of perception than of the financial tradeoffs inherent in the product.

Our findings offer several practical implications for financial planners who are working with clients to design optimal decumulation plans for retirement. While economists have argued for the important role of life annuities in retirement, especially as a tool to manage longevity risk and uncertainty, demand by consumers has been limited. Our research identifies which clients may be most open to the possibility of annuities—specifically, individuals who are less loss averse and consider annuities more fair will be more willing to consider annuity options. Ongoing research suggests that these individual differences are more important

in decumulation decisions than in the accumulation stage (Shu & Payne, 2013; Shu & Shu, 2018); while most workers agree on the need to save for the future and respond well to standard savings interventions, the decumulation process requires greater personalization to the needs and preferences of the client. As legislators consider making annuities a more available option in workers' 401(k) plans (Rubin & Tergesen, 2018), helping individuals make wise choices about incorporating annuities into their retirement plans will be an increasingly important task.

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ENDNOTES

[1]Decumulating private retirement savings is not the only source of income because most Americans receive Social Security benefits. Among retirees in the bottom half of the income distribution, Social Security benefits are in fact the majority of their retirement income (Poterba, 2014).

[2]They compare a one-year certificate of deposit to a security that "pays a higher interest rate at the end of the year conditional on living, but pays nothing if you die before year-end," and they conclude that "if you attach no value to wealth after death, then the second, annuitized, alternative is a dominant asset" (p. 1573).

[3]Payne et al. (2013) found that wording probabilistic life expectations questions in either a "live to" or "die by" frame changed average estimate life expectations by approximately 10 years. Because "live to" framing has been found to have better predictive power for retirement decisions, we recommend and use it here.

[4]Economic research on annuities suggests that retirees with about $100 K are the best candidates for a $100 K annuity since they benefit from the insurance aspect of guaranteed income independent of longevity.

[5]The importance of fairness as a predictor for liking of annuities was also documented in Shu et al. (2016); this paper explores this finding, as well as other characteristics of individuals who dislike annuities, in much greater detail.

[6]Additional research by Shu and Payne (2013) finds that high levels of individual loss aversion are a strong and significant predictor of which individuals intend to claim their Social Security retirement benefits early, consistent with this predicted effect on annuities.

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SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section at the end of the article.

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