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Retirement income beliefs and financial advice seeking behaviors

Alejandro Murguía[a], Wade D. Pfau[b,*]

[a]*McLean Asset Management, 1900 Gallows Road, Suite 350, Tysons, VA 22182, USA*
[b]*McLean Asset Management, The American College of Financial Services, 1900 Gallows Road, Suite 350, Tysons, VA 22182, USA*

Abstract

This investigation identifies and validates a series of salient behavioral finance and psychological constructs that influence retirement income planning. We show how these scales relate to each other as well as retirement income concerns and investment behaviors. We also describe how four investment personas can be linked with the Advisor Usefulness and Retirement Income Self-Efficacy scales to successfully identify preferred financial implementation methods. This can assist individuals in more readily recognizing their relative strengths and weaknesses when implementing a retirement income strategy, and financial professionals can present advice in a manner that addresses a client's concerns and preferred implementation.

JEL classifications: D14

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1. Introduction

While it is generally accepted that irrational behaviors influence general financial decisions, research detailing how various psychological constructs affect financial behaviors specific to retirement income planning has lagged. Moreover, advances from behavioral finance and psychology have progressed in a parallel manner reflecting the different academic departments that help to identify these constructs. The interplay between behavioral finance,

*Corresponding author: Tel.: +1-610-526-1569; fax: +1-703-556-8628.
E-mail address: wade@retirementresearcher.com

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psychology, and retirement planning is one that should be examined to better identify and promote successful financial behaviors while mitigating the negative ones.

After we briefly address how various behavioral finance and psychological constructs have been linked to general financial behaviors, we detail the development of specific self-efficacy, financial bias, numeracy, and advisor usefulness scales. While these are generally accepted social science constructs, these scales were created with an increased level of specificity to retirement income. We assess their ability to reliably quantify these factors. We further examine how these factors associate with each other, retirement income concerns, investment behaviors, overall retirement income outlook, and the use of an advisor. This presents a further indication of construct and criterion validity for the scales (DeVellis, 2017). The results identify four financial implementation personas in relation to their retirement income self-efficacy and perceptions about the usefulness of financial advisors. These personas link to various behavioral finance constructs, retirement income concerns, investment behaviors, and retirement outlooks. This provides a framework to identify individual preferences for receiving financial advice and avenues that maximize those preferences. It also addresses the potential areas of strengths and weaknesses for the different types of retirees. Altogether, this supports greater retirement income planning success.

2. Literature review

We provide a brief review of the constructs that will be included in our investigation. First, Tversky and Kahneman (1974) identified that individuals have two approaches to their decision-making process. One is predicated on a quick and simple heuristic approach via mental shortcuts, and another is deeply analytical and measured. While many mental shortcuts are very adaptive for everyday living, they are frequently maladaptive when making personal financial decisions. Additionally, loss aversion is a significant behavioral finance construct that permeates throughout the personal finance field. It is not only the idea that losses are more psychologically impactful than gains, but that individuals evaluate these gains and losses relative to a reference point (Kahneman & Tversky, 1979). Our tendency to rely on heuristics for financial decisions and the effect of loss aversion leads to many well-known financial biases including hindsight, recency, survivorship, affinity, gambler's fallacy, and the endowment effect.

Other behavioral finance constructs have started to indicate potential avenues for insight. Inertia has been advanced as a foundational contributor to explaining financial behavior (Gal, 2006). The concept of inertia indicates that individuals tend to maintain the status-quo. To change this baseline for the status quo, there must be an improvement, not just a substitution, to the current situation that makes the effort for change worthwhile. This push past indifference also requires that alternatives be posed as clear choices. The key dynamic for differentiation between loss aversion and inertia is the push and pull between action versus inaction (e.g., inertia) as opposed to the psychological valence of a gain versus a loss (e.g., loss aversion). Gal (2006) posits that inertia is a more impactful construct than loss aversion as a keystone principle in behavioral finance.

Numeracy is the ability to comprehend numerical concepts such as probabilities and other mathematical procedures. In the field of personal finance, it is frequently referred to as financial literacy or risk literacy. One's level of financial literacy has been identified as having a major impact into financial decision making (Lusardi & Mitchell, 2014). Financial literacy has also been associated with an inability to understand the impact of portfolio volatility on investment returns (Newall, 2016). Low financial literacy is a pervasive global observation (Kell, 2014) and unfortunately only 57% of Americans made a passing grade in a standard financial literacy test (Zumbrum, 2015). Numeracy studies within the medical field has also found that older adults experienced difficulty using numerical information to compare Medicare health plans (Hibbard et al., 2001). Numeracy is an important personal consideration when developing a retirement income plan. Agarwal and Mazumder (2013) point out that one's financial choices may not be optimal due to low proficiency or a general avoidance of mathematical concepts.

While numeracy is the objective measure of mathematical competence, few studies have investigated the differences between numeracy and perceived numeracy. Balasubramnian and Sargent (2020) found that discrepancies between perceived and objective financial literacy lead to weaker financial decisions. They conclude that the gap between the two is of great importance when investigating consumer financial behavior. In addition, perceived financial literacy can be as or more important than actual financial literacy in influencing financial behaviors (Allgood & Walstad, 2016). Unfortunately, this overestimation gap is frequently observed in individuals scoring lowest on numeracy tasks. Kruger and Dunning (1999) observe that this occurs due to the double burden of lacking the general capacity to make sound choices and that this incompetence hinders the metacognitive ability to realize it. This construct is widely recognized as the Dunning-Kruger effect. While a meta-analysis of over 201 studies indicated that increasing financial knowledge has little impact on financial behaviors (Fernandes, Lynch, & Netemeyer, 2014), Kruger and Dunning (1999) found that addressing these blind spots (overestimation gap) by improving individual skills helped participants recognize their shortcomings more effectively.

Self-efficacy is a psychological construct espoused by Bandura's social cognitive theory (Bandura, 1977). It is the conviction of how well one can successfully execute a specific course of action. It differs from general confidence because it represents an individual's perception of competently achieving more localized tasks. Hence, a high degree of self-efficacy in one domain does not imply a high degree in another area. Due to this domain specificity, it is important to measure self-efficacy in the field of study (Bandura, 1997). Lown (2011) created a general financial self-efficacy scale to measure the behavioral aspects of personal financial management. The scale was positively associated with a high level of confidence to manage money. Asebedo and Seay (2018) observed financial self-efficacy to be positively related to savings behavior after accounting for various demographic variables. In addition, Asebedo and Browning (2020) found portfolio withdrawal rates to be associated with financial self-efficacy. Overall, financial self-efficacy is an important construct in helping promote effective retirement income planning behaviors.

Many studies try to identify the additive benefits that a financial professional provides to one's overall investment return. Blanchett and Kaplan (2013) quantify how advisors have positively impacted retirement income decisions via improved financial planning decisions. Vanguard has also identified various value-added factors that an advisor can potentially

provide to improve an individual's financial standing (Kinniry et al., 2015). While these studies identify the benefits of an advisory relationship, a lack of fee transparency and general mistrust may lead to an underutilization of financial professionals. While there is a lack of availability for financial advice across the general population, among those who have access to advice, there potentially remains skepticism about an advisor's overall value. Therefore, assessing one's belief about the cost effectiveness of a financial advisor may indicate who is most likely to use one. The five-stage model for advice seeking behavior posited by Grable and Joo (1999) theorizes that individuals assess the benefits and cost of engaging in a range of retirement planning activities (Marsden, Zick, & Mayer, 2011). With the increasing popularity of various self-directed methods and business models to implement a retirement income plan, such as automated investment strategies and hourly financial planners, matching one's financial implementation approach (using or not using a financial advisor) to appropriate methods can positively influence retirement outcomes.

3. Method

The methodology includes several steps. First, we discuss scale construction. We utilize exploratory factor analysis with a Varimax rotation across the four scales to assess if they present as valid and meaningful constructs. Cronbach's α further analyzes internal reliability and helps determine the final question set for each scale. Additionally, the Pearson correlation coefficient reviews retest reliability among the scales. These steps indicate the degree of content and construct validity for the scales (DeVellis, 2017).

For the second part of this investigation, we examine bivariate correlations between the scales to further assess construct validity and measure criterion validity. Furthermore, we assess multivariate relationships between these constructs against various dependent variables that relate to investment behaviors, perceived retirement risks, overall retirement outlook, and advice implementation to determine predictive validity (DeVellis, 2017). This analysis is conducted using ordinary least squares regressions for continuous dependent variables and logistic regression for binary ones; all coefficients in the regression analyses are standardized.

We create a Financial Implementation Matrix centered on Advisor Usefulness and Retirement Income Self Efficacy scales to indicate how to identify preferred financial planning implementation methods. All results are computed using SAS.

3.1. Constructing the scales

After reviewing various sources related to our constructs surrounding retirement income, we created 157 questions to be tested. These questions were reviewed by roughly 350 volunteers to provide initial feedback. These volunteers included a mix of financial professionals and individuals who are active readers of RetirementResearcher.com. This website largely focuses on retirement income planning topics. These volunteers provided feedback and suggestions about the questions in terms of their quality, clarity, and conciseness. The focus at this stage was on content validity.

This feedback helped reduce the number of questions to less than 90, which were then provided to the participants of this study. Participants were recruited as a convenience sample of 1,478 individuals from the same source of RetirementResearcher.com readership. Participants were asked to complete an online questionnaire. They were given 14 days to complete the survey during the month of July 2019. As an incentive for participation, we offered them a retake of the final questionnaire once the analysis was completed. We also provided reports of their results. While total participants peaked at 1,478, the number of specific completed surveys by topic varies because participants could drop out at any point, and some had left before all topics had been introduced. As well, answering a question about net worth was optional and reduced the number of respondents available to use in the regression analysis. For retest purposes, the finalized survey was administered on March 27, 2020, and again on September 10, 2020, roughly six months apart. It should be noted that due to the coronavirus disease 2019 (COVID-19) pandemic, this period experienced pronounced market volatility and most likely great personal uncertainty for the respondents. While the sample is not intended to be random and reflective of the population at large, it is indicative of individuals for whom retirement income is a salient personal topic. Many of those taking the survey can be viewed as taking an active interest in retirement planning topics and being more knowledgeable about retirement income than the average layperson.

3.2. Descriptive statistics and exploratory factor analysis

With 1,478 total participants, a power analysis indicated that the sample size was well above the number of participants needed to test our hypotheses with the exploratory factor analysis even as some participants did not complete every iteration of the study. In addition, we captured other information such as age and net worth to control for these additional variables during the subsequent regression analysis.

Descriptive participant data are provided in Table 1. We were able to attract participants in which retirement is a relevant life milestone. For example, 61% (n = 845) of participants were in between 59 and 70 years old. Males represent 77% of responses (n = 1,143) and females 23% (n = 335). 86% of the respondents are married (n = 1,270) and 14% (n = 208) are single. While an optional question, 50% (n = 372) of the 740 respondents report a net worth of $1-3 million dollars.

Descriptive statistics for all scales are presented in Table 2. These scales are divided between psychological and behavior finance constructs, retirement income concerns, investment behaviors, and retirement outlook. The table presents means and standard deviations and a range of scores. Higher scores within the range represent the degree of strength for the construct being measured.

For Financial Biases, Retirement Income Self-Efficacy, and Advisor Usefulness, we will also refer to subsequent tables with exploratory factor analysis to determine whether these scales reflect our distinctly hypothesized constructs, Cronbach's α to determine internal scale consistency, and Pearson correlation retest scores to indicate temporal consistency (DeVellis, 2017).

Table 1 Demographic information

	Respondents	
	n	%
Total participants		
Men	1,143	77%
Women	335	23%
Age classes		
Younger than 40	64	4%
40-46	64	4%
47-52	97	7%
53-58	267	18%
59-64	460	31%
65-70	385	26%
71-76	131	9%
Above 76	8	1%
Marital status		
Spouse/partner	1,270	86%
Single	208	14%
Net worth range		
Less than $500k	46	6%
$500k - $1M	91	12%
$1M - $2M	210	28%
$2M - $3M	162	22%
$3M - $4M	85	11%
$4M - $5M	48	6%
Greater than $5M	98	13%

Table 2 Descriptive information for all scales

Variable	*N*	Mean	Standard deviation	Minimum	Maximum
Psychological and behavioral finance constructs					
Financial biases	1,058	2.13	0.48	1	3.75
Inertia	1,002	1.27	0.40	1	2.5
Retirement income self-efficacy	1,142	4.39	1.03	1	6
Advisor usefulness	969	3.32	1.41	1	6
Numeracy	1,025	5.25	1.64	0	8
Numeracy self-awareness	1,025	0.18	0.27	−0.75	0.96
Portfolio loss aversion	1,020	0.38	0.26	0	1
Retirement income concerns					
Lifestyle	1,209	3.90	0.94	1	6
Longevity	1,175	2.63	1.30	1	6
Liquidity	1,174	3.91	1.03	1	6
Investment behaviors					
Dividend Agnosticism	1,008	4.10	1.29	1	6
Non-forecasting versus forecasting	1,157	4.67	1.07	1	6
Retirement outlook					
Nest egg satisfaction	1,016	3.64	1.08	1	5
Retirement income plan anxiety	1,016	2.21	0.73	1	4

3.3. Financial biases and inertia

We created statements reflecting various financial biases. Specifically, we focused on hindsight, gambler's fallacy, affinity, survivorship bias, herd mentality, endowment, and recency heuristics. We presented statements and asked the participant to select the degree to which each of the following statements best represents their opinion. The options were presented as a four-item Likert scale ranging from *strongly disagree* (score of 1) to *strongly agree* (score of 4). For example, one potential question would read: "I have participated in popular investment strategies because I did not want to miss out on the opportunity." The average financial bias score of 2.13. The scale midpoint is 2.5. Participants perceive themselves with slightly below average levels of financial biases. We recognize the potential for a social desirability bias with this question set and discuss it in the results section.

We measure inertia by asking how long it took a participant to act after acknowledging a need for an investment or financial planning adjustment. Categorized responses for both questions ranged from 1 to 5: (1) Less than three months; (2) three to six months; (3) six to 12 months; (4) one to two years; (5) more than two years. The mean inertia score of 1.27 indicates that it takes our participants, on average, a little more than three months to address any needed adjustments to their investments and plans.

We include inertia in our exploratory factor analysis of our financial biases item set since inertia may be influenced by other heuristics. Results in Table 3 indicate that the different financial biases largely present as one overall factor with an Eigenvalue of 7.24. While we expected the various financial biases to present as separate and distinct constructs, the data indicate that the varied biases manifest as a singular construct of overall financial heuristics. Hindsight, affinity, gamblers fallacy, and survivorship biases present with the highest factor loadings in the first column of Table 3. While herd mentality questions are present in the second factor construct, the items detailing this bias has significant cross factor loadings with the first and third factors as well. Inertia did not cross load with the first factor structure and loads separately as its own distinct factor with an Eigenvalue of 1.45. The data indicate that the financial biases present as a single generalized level of psychological noise. The higher the score on their Financial Bias scale, the greater the tendency to rely on heuristics for financial decisions. It is also interesting that our two-item inertia checklist loaded as a separate factor and did not combine within the first factor structure along with the majority of the financial bias items. This supports inertia as a separate construct from the other financial biases.

The final Financial Bias item set is presented in bold. The Financial Bias scale has a Cronbach's α score of .82. With respect to retest, the Pearson correlation coefficient is 0.80 ($p < .0001$). This supports excellent internal reliability and very good consistency between the time periods measured, especially during the emotionally charged time period measured as a result of the COVID pandemic.

3.4. Retirement income Self-Efficacy

While there are self-efficacy scales that measure financial attitudes (Lown, 2011), there is not one addressing the retirement income planning domain. Lown's (2011) six-item scale is

Table 3 Exploratory factor analysis, Cronbach's α, and Pearson correlation coefficient for financial bias scale

			Factor loadings for all items**							
		Factors	1	2	3	4	5	6	7	8
		Eigenvalues	7.24	1.55	1.45	1.38	1.18	1.09	1.05	1.04
Financial biases	Cronbach's coefficient α* 0.82	Pearson correlation coefficient* 0.8								
Hindsight 2			**0.67**							
Hindsight 1			**0.66**							
Hindsight 3			**0.64**							
Gambler's fallacy 1			**0.63**							
Affinity 4			**0.61**							
Gambler's fallacy 4			**0.60**							
Survivorship bias 2			**0.60**							
Survivorship bias 3			**0.60**							
Survivorship bias 1			0.56							
Herd mentality 4			0.56							
Survivorship bias 4			0.55							
Gambler's fallacy 2			0.55							
Affinity 1			0.54							
Endowment 1			0.54							
Affinity 3			0.53							
Herd mentality 1			0.51							
Herd mentality 3			0.51	0.43						
Gambler's fallacy 3			0.43							0.43
Endowment 3			0.43							
Recency 3									0.40	
Endowment 4										
Recency 2										
Herd mentality 2				0.41						
Affinity 2										
Hindsight 4								0.48		
Recency 4								0.44		
Recency 1										
Inertia***					0.65					
Inertia***				0.42	0.62					
Endowment 2										

Note. *Cronbach's α and Pearson correlation coefficients selected for the items in bold. They represent the final questions for each scale. **Only factor loadings greater or equal to 0.40 are presented. ***Used separately for the inertia checklist.

limited to one-item detailing retirement income (i.e., I worry about running out of money in retirement.). Our Retirement Income Self-Efficacy scale further expands the retirement income theme. We model our Retirement Income Self-efficacy scale after Badura's Guide for Constructing Self-Efficacy Scales (Bandura, 2006). Participants were shown statements detailing potential hurdles when implementing a retirement income plan. They were then asked to rate how certain they were in believing they could overcome each situation described. They rated themselves on a six-point Likert scale ranging from *strongly disagree* to *strongly agree*. The mean Self-Efficacy score of 4.39 suggests that most participants felt fairly confident about their ability to implement their retirement income plan. This was

expected since the sample included many participants who have a personal interest in the domain of retirement income planning.

Results from the factor analysis in Table 4 indicate that many questions sort within the first two factors with Eigenvalues of 6.80 and 5.06. The dimension in the first column identifies self-efficacy with statements that addressed both the need to deal with the emotional influence and overall competence of organizing a retirement income plan. An example includes how well someone can resist the temptation to try new solutions due to the fear that their plan is not good enough. The second factor structure introduces how well one can deal with personal issues that may naturally arise as they implement their plan. For example, asking how well someone can deal with an increasing lack of interest in financial matters as they get older reflects this. Statements about dealing with one's eventual cognitive decline also loaded on this second column. Many items touched on all these issues and loaded on both factor structures. Because both of these factors capture an overall sense of retirement income self-efficacy, we chose questions for the final item set that successfully loaded on both columns.

The items in bold represent the final Retirement Income Self-Efficacy items for the scale. The final question set presents a Cronbach's α score of .91. With respect to retest, the Pearson

Table 4 Exploratory factor analysis, Cronbach's α, and Pearson correlation coefficient for Retirement Income Self-Efficacy scale

			Factor loadings for all items**	
		Factors	1	2
		Eigenvalues	6.80	5.06
Self-Efficacy items	Cronbach's coefficient α*	Pearson correlation coefficient*		
	0.91	0.71		
6			0.81	
5			0.79	
3			0.72	
9			0.70	
20			0.70	
11			**0.69**	**0.45**
18			**0.66**	**0.54**
15			0.62	
17			0.61	
8			**0.60**	**0.52**
2			0.59	0.46
4			0.58	0.47
10			**0.58**	**0.56**
14			**0.56**	**0.55**
19			**0.49**	**0.64**
12			0.41	0.63
1				
16				0.74
13				0.75
7				0.83

Note. *Cronbach's α and Pearson correlation coefficients selected for the items in bold. They represent the final questions for each scale. **Only factor loadings greater or equal to 0.40 are presented.

correlation coefficient is 0.71 ($p < .0001$). This supports excellent internal reliability and very good consistency between the time periods measured. In addition, as compared with Lown's Financial Self-Efficacy scale, our Retirement Income Scale reports higher levels of reliability (0.91 vs. 0.76) and comparable factor loading scores. Lown's financial self-efficacy scale does not report retest scores among their sample of 726 university employees (Lown, 2011).

3.5. Advisor usefulness

While studies have identified the benefits of working with a financial advisor, a general skepticism remains toward the true benefit of financial advice. Ex ante beliefs of perceived traits and stereotypes are difficult to overcome (Bargh, Chen, & Burrows, 1996). Working with an advisor is related to various planning and behavior activities. These include goal setting, retirement needs planning, investment diversification, retirement account optimization, reserves or contingency funds, behavioral guidance, and increased retirement confidence (Marsden et al., 2011). Hence, a scale measuring the cost effectiveness of these activities with an advisor may be valuable in determining the potential implementation options that retirees are likely choose. For this scale, participants identifying as financial advisors were removed from the data set to avoid any potential conflicts in their answers about the perceived utility of a financial professional.

For each entry, we present opposing statements based on perceived advisor usefulness. We focus on both an advisor's role and their cost effectiveness. Items were presented via a semantic differential method. One statement is on the left and the other on the right. Participants are asked to identify from a six-point scale, situated between both statements, which statement they relate with the most. A sample entry may read:

1. I can readily achieve my financial goals without the assistance of a financial advisor.
2. A financial advisor can readily help me achieve my financial goals.
3. Statement 1 0 0 0 0 0 0 Statement 2

In this example, picking the last circle would reflect a score of 6 and indicates a strong identification with perceiving high advisor usefulness. The average score of 3.32 indicates a slightly below average usefulness score for financial advisors (3.5 is the midpoint).

The results in Table 5 specify a three-factor structure for advisor usefulness with Eigenvalues of 8.24, 3.14, and 2.42 across our proposed questions. The items within the first factor structure provide a description of what an advisor does from a holistic planning perspective. The second factor structure provides the additional component of how an advisor can potentially keep a retiree from making costly mistakes. The third factor structure identifies statements that present the advisor as a superfluous intermediary who is becoming increasingly irrelevant in today's environment. The final item set for the scale, in bold, are taken from the first factor structure because it is the most dominant factor structure and best represents our intended focus of addressing a more complete purview of how an advisor may add value within a client relationship. This factor also reflects the various planning activities that result from working with an advisor (Marsden et al., 2011). Our Advisor Usefulness scale has a Cronbach's α score of 0.96, and a Pearson correlation coefficient of

Table 5 Exploratory factor analysis, Cronbach's α, and Pearson correlation coefficient for advisor usefulness scale

			Factor loadings for all items**		
		Factors	1	2	3
		Eigenvalues	8.24	3.14	2.42
Advisor usefulness	Cronbach's coefficient α*	Pearson correlation coefficient*			
	0.96	0.65			
11			**0.87**		
16			**0.87**		
10			**0.86**		
8			0.84		
7			**0.84**		
9			**0.84**		
13			**0.84**		
15			0.81		
12			0.72		
4			0.69	0.46	
18			0.68		0.47
14			0.54		0.52
19			0.42		0.45
5			0.42	0.64	
6				0.77	
20					0.56
17					0.68
3				0.80	
2				0.58	0.47
1					0.59

Note. *Cronbach's α and Pearson correlation coefficients selected for the items in bold. They represent the final questions for each scale. **Only factor loadings greater or equal to 0.40 are presented.

0.65 ($p < .0001$). This supports excellent internal reliability and adequate consistency between the time periods measured.

3.6. Numeracy and numeracy Self-Awareness (Dunning Kruger)

We based our numeracy scale on the Weller et al. (2013) numeracy scale. While we maintained the mathematical integrity of each question, we reframed certain questions to reflect a retirement income context. Participants were asked to answer eight questions largely detailing a general understanding of probabilities. Our participants average test score is 66% (5.25/8). As a general measure of perceived numeracy, we asked participants how many of the questions did they think they answered correctly. On average, participants overestimate their scores by 18 percentage points.

3.7. Portfolio loss aversion

To measure a general sense of portfolio loss aversion, we presented respondents with an equal probability gamble between a positive and negative portfolio outcome. After directions were presented, the first question read: Please state whether you would accept the

following options? A 50-50 gamble of your portfolio losing 11% or gaining 35%. As an example; if you had a $1,000,000 portfolio, would you take a 50-50 gamble of your investment portfolio losing $110,000 or gaining $350,000? Questions with a decreasing gain to loss ratio are presented until the respondent responds "no." The first question presented here represents a 3.18 gain to loss ratio (35% gain vs. 11% loss), and each subsequent question reduced the spread between the gain to loss ratio by roughly 20%. Accepting a lower gain to loss ratio reflects increasing levels of risk tolerance.

Scores were computed by dividing the number of questions completed by the total number of available questions. As an example, a score of 0.17 would indicate that only the most conservative question was answered "yes" (0.17 = 1/6). A low score indicates greater loss aversion. The average score was 0.38 indicating that the average gain to loss multiplier was 2.34. This means that the participants need, on average, a gain of 2.34 times the amount of the potential loss to engage in an equal probability bet.

3.8. Retirement income concerns

While the scales above represent our key psychological and behavioral finance variables for analysis, the following variables will also help address how these constructs influence retirement income concerns, investment behaviors, and retirement outlook.

First, we attempt to quantify retirement income goals by measuring the level of concern a respondent feels about achieving a retirement objective. We classify three distinct concerns; Longevity, Lifestyle, and Liquidity objectives. Scales for these retirement concerns were presented via sematic differential with a six-point scale. A high score indicates a greater level of concern.

3.8.1. Longevity

Longevity objectives are centered around addressing the main risk of retirement: outliving your money. Most examples center on financial independence and knowing that you can pay your basic expenses and not be a burden to others. The average Longevity score of 2.63 indicates an overall lower level of longevity concern across our participants.

3.8.2. Lifestyle

Lifestyle objectives focus on maintaining your desired standard of living and enjoying your retirement with more discretionary spending. These goals require you to maximize your spending power. This aspect of retirement planning is about maintaining or improving your current lifestyle, rather than living too conservatively throughout retirement. The average Lifestyle score of 3.90 indicates that achieving lifestyle objectives is an above average concern.

3.8.3. Liquidity

Liquidity objectives involve maintaining enough reserves for unexpected contingencies. Maintaining enough liquidity is especially important for family emergencies, home repairs, and an unexpected death or illness. The average score of 3.91 also indicates that avoiding unforeseen disruptions to a plan is an above average concern.

3.9. Dividend agnosticism

We also consider two different investment behavior scales. While dividend stocks produce income for their shareholders, from an economic perspective, no value is created or destroyed from issuing dividends. The structure of capital is irrelevant. With dividend payouts, the capital just moves from one theoretical pocket to the other. Regardless of this, a significant number of retirees favor a dividend matching approach to retirement income. The industry further facilitates this focus with various "investing for yield" financial products aimed at retirees. We developed a six-item Dividend Agnosticism scale with a semantic differential format. A low score indicates a preference for dividend producing stocks and a high score indicates an indifference for dividend stocks. The average score of 4.1 indicates that most respondents are somewhat agnostic to dividend producing stocks for retirement income.

3.10. Non-Forecasting versus forecasting investment approach

Second, while there are many investment approaches, we wanted to single out the degree to which investors favor a forecasting or non-forecasting investment approach. A forecasting approach usually anticipates either a general market or individual stock movement or both. This is frequently referred to as an active approach to investing. A non-forecasting approach accepts market prices as a best estimate of price. This is usually identified as a passive investment approach. We created a five-item Forecasting versus Non-Forecasting scale (NF) to capture this construct. In the NF scale, forecasting is the low score, and non-forecasting is the high score. The average score of 4.67 indicates that most participants exhibit a non-forecasting approach within their investment strategy.

3.11. Nest egg satisfaction and retirement income plan anxiety

To measure retirement outlook, our participants were presented with the following statements: "I'm where I thought I would be with my retirement nest egg" and "I feel anxious about my retirement income strategy" They were asked to rate their nest egg satisfaction statement on a five-point Likert scale and their retirement income anxiety question on a four-point Likert scale. Responses ranged from *strongly disagree* (low score) to *strongly agree* (high score). Participants average score of 3.64 for nest egg satisfaction indicates a somewhat above average perception of their retirement nest egg. Furthermore, an average score of 2.21 for retirement income plan anxiety indicates a below average apprehension about their retirement income strategy.

4. Results

Results in Table 6 display bivariate correlations between our newly developed scales, retirement income concerns, and investment behaviors. Correlations between these scales

Table 6 Correlation table

	Retirement income self-efficacy	Financial biases	Numeracy	Numeracy self-awareness	Advisor usefulness	Inertia	Portfolio loss aversion
Retirement income self-efficacy							
Financial biases	−0.25****	—					
Numeracy	0.08*	−0.24****	—				
Numeracy self-awareness	0.02	0.13****	−0.47****	—			
Advisor usefulness	−0.43****	0.19****	−0.12***	−0.03	—		
Inertia	−0.12****	0.11***	0.0	−0.06	0.10**	—	
Portfolio loss aversion	0.11***	−0.10***	0.11***	0.01	−0.09**	−0.08*	—
Longevity concern	−0.44****	0.18****	−0.04	−0.02	0.21****	0.10**	−0.06
Liquidity concern	−0.15****	0.10**	0.05	−0.11***	0.13***	0.08*	−0.08**
Lifestyle concern	0.15****	−0.05	0.09**	−0.01	−0.05	−0.01	0.18****
Dividend agnostic	0.23****	−0.37****	0.21****	−0.09**	−0.20****	−0.01	0.08*
Non-forecasting versus forecasting	0.34****	−0.35****	0.11***	−0.09**	−0.11***	−0.01	0.08**

*$p < .05$
**$p < .01$
***$p < .001$
****$p < .0001$

indicate very good levels of validity as evidenced by the convergent and discriminant relationships in expected directions.

4.1. Psychological and behavioral finance and scales

High levels for the retirement income self-efficacy scale are negatively related to financial biases ($r = -0.25$, $p < .0001$), inertia ($r = -0.12$, $p < .0001$), and perceived advisor usefulness ($r = -0.43$, $p < .0001$) scores. Self-efficacy is positively related to numeracy ($r = 0.08$, $p < .02$) and loss aversion tolerance ($r = 0.10$, $p < .0001$).

Financial biases are negatively related to numeracy ($r = -0.24$, $p < .0001$) and loss aversion tolerance ($r = -0.10$, $p < .0001$) and positively relate to a lack of numeracy awareness ($r = 0.13$, $p < .0001$), inertia ($r = 0.11$, $p < .0001$), and perceived usefulness of an advisor ($r = 0.12$, $p < .0001$).

High numeracy is related to a lower perceived advisor usefulness ($r = -0.12$, $p < .0001$) but a higher loss aversion tolerance ($r = 0.11$, $p < .0001$). There is no observable relationship between numeracy and inertia. However, higher inertia levels are positively related to advisor usefulness ($r = 0.10$, $p < .0001$) and greater levels of loss aversion ($r = -0.08$, $p < .05$).

All variables with significant associations are in the expected direction. Self-reported scales, especially those that potentially paint an unfavorable impression of a respondent, carry the risk of a social desirability bias in their responses. It is interesting to note that our self-reported financial bias score is also associated in the expected direction with more objective measures of numeracy, lack of numeracy awareness, and inertia. In addition, socially desirable traits like self-efficacy are also associated with numeracy in the expected direction.

With regards to the numeracy and numeracy awareness, our results support a Dunning-Kruger effect (Kruger & Dunning, 1999). There is a negative relationship between one's level of numeracy and perceived numeracy ($r = -0.47$, $p < .0001$). The worst one performs on numeracy, the better one thought they performed. Furthermore, Fig. 1 separates numeracy scores and perceived numeracy scores by quartiles. Participants in the first quartile (worst 25%) overestimate their score by 88% while participants the fourth quartile underestimate their score by 7%. The lower the quartile positioning, the greater the overestimation. In contrast, the higher scoring quartile for numeracy slightly underestimate their skill. This underestimation among top quartile performers is also observed in the original investigation of the Dunning-Kruger effect (Kruger & Dunning, 1999).

4.2. Retirement income concerns

Longevity concerns are associated with higher levels of financial biases ($r = 0.18$, $p < .0001$), inertia ($r = 0.10$, $p < .01$), the perceived usefulness of an advisor ($r = 0.21$, $p < .0001$), and significantly lower levels of self-efficacy ($r = -0.44$, $p < .0001$). While not as strong, liquidity concerns also reflect similar directional relationships to financial biases ($r = 0.10$, $p < .01$), inertia ($r = 0.08$, $p < .02$), advisor usefulness ($r = 0.13$, $p < .0001$), and self-efficacy ($r = -0.15$, $p < .0001$). Additionally, higher liquidity concerns are associated with

Fig. 1. Numeracy score versus expected score

lower loss aversion tolerance ($r = -0.08$, $p < .01$). Lifestyle concerns exhibit significant positive associations with self-efficacy ($r = 0.15$, $p < .0001$), numeracy ($r = 0.09$, $p < .01$), and loss aversion tolerance ($r = 0.18$, $p < .0001$).

Results across our scales indicate a hierarchy of retirement income concerns. At a more basic level, the presence of increased financial biases, lower numeracy scores, and lower levels of self-efficacy relate to a greater concern for achieving essential spending needs and accommodating unexpected emergencies during retirement. In addition, higher levels of liquidity concerns reflect greater loss aversion. There may also be a recognition among those with higher longevity and liquidity concerns that a financial professional can help them overcome their personal hurdles and retirement concerns.

In contrast, achieving more discretionary spending goals signals a shift beyond the threshold of longevity and liquidity concerns. While achieving essential spending needs are a requirement for any successful retirement income plan, participants with high levels of lifestyle concerns are not overly anxious about the ability to fulfill their longevity needs ($r = -0.27$, $p < .0001$). These individuals usually desire spending increases to achieve more lifestyle objectives in retirement. This generally requires a greater exposure to market volatility that is associated with greater levels of self-efficacy, numeracy, and loss aversion tolerance. Higher levels of numeracy self-awareness are related to the need to account for unexpected contingencies.

4.3. Investment behaviors

4.3.1 Dividend agnostic

An indifference toward dividend stocks (high score) for retirement income is associated with greater levels of retirement income self-efficacy ($r = 0.23$, $p < .0001$), numeracy ($r = 0.20$, $p < .0001$), and loss aversion tolerance ($r = 0.08$, $p < .05$). In contrast, a focus on dividends for retirement income (low dividend agnostic score) is related to higher levels of financial biases ($r = -0.37$, $p < .0001$), perceived advisor usefulness ($r = -0.20$, $p < .0001$), and lower levels of numeracy self-awareness ($r = -0.09$, $p < .01$). Those with a higher understanding of numerical concepts exhibit the belief that there is no true economic benefit by focusing on dividend producing stocks for a retirement income plan. Additionally, investors most susceptible to financial biases and lacking numeracy self-awareness may be emphasizing the benefits of dividend stocks for retirement income while minimizing the risk of focusing on a concentrated selection of stocks. A non-dividend focused approach and a non-forecasting investment style ($r = 0.42$, $p < .0001$) also supports this association.

4.3.2. Non-Forecasting versus Forecasting investment strategy

A high score on the Non-Forecasting versus Forecasting scale indicates a preference for a non-forecasting (passive) investment approach. A low score indicates a preference for forecasting (active). A non-forecasting investing approach is associated with higher levels of retirement income self-efficacy ($r = 0.34$, $p < .0001$), numeracy ($r = 0.11$, $p < .001$), and to a lesser extent loss aversion tolerance ($r = 0.08$, $p < .01$). Participants identifying with a forecasting approach exhibit a higher susceptibility to financial biases ($r = -0.35$, $p < .0001$) and low numeracy self-awareness ($r = -0.09$, $p < .01$). While the results are not intended to convey the benefits of one investment approach over another, results indicate that high self-efficacy, numeracy, and portfolio loss aversion tolerance are more salient for participants espousing a greater affinity for a non-forecasting investment approach. While these individuals may have the ability and domain confidence to attempt to identify market mispricing, they may also recognize the inherent difficulty and the potential for chance outcomes in these endeavors. Instead, these participants exhibit a preference to efficiently capture general market returns. Conversely, participants supporting market forecasting preferences are more vulnerable to financial biases; perhaps from the repeated exposures to the vagaries of unpredictable stock market movements. Coupled with a lack of numeracy self-awareness and lower retirement self-efficacy, these participants are more likely to seek professional guidance for help ($r = 0.11$, $p < .001$).

Overall, correlations indicate that our scales for retirement income self-efficacy, financial bias, numeracy, advisor usefulness, inertia, and portfolio loss aversion present with criterion validity as all relationships were in the expected direction. In addition, these constructs have significant implications in how they are related to each other, retirement income concerns, and investment behaviors that are very impactful to retirement income success. In the next section, we will assess how these variables are related to retirement outlooks and advisor implementation.

Table 7 Regression analysis of psychological and behavioral finance constructs with retirement outlooks

	Nest egg satisfaction	Retirement income strategy anxiousness
Sample	577	577
F value	13.15	12.12
Global *F* Pr > *F*	****	****
R^2	0.20	0.19
Intercept		
Estimate	0.12	0.11
Standard error	0.09	0.10
Prob	0.19	0.24
Self-efficacy		
Estimate	0.37	−0.29
Standard error	0.04	0.04
Probability	****	****
Financial biases		
Estimate	−0.01	0.20
Standard error	0.04	0.04
Probability	0.70	****
Inertia		
Estimate	−0.01	0.09
Standard error	0.04	0.04
Probability	0.86	*
Numeracy		
Estimate	−0.03	0.03
Standard error	0.05	0.05
Probability	0.45	0.50
Numeracy awareness		
Estimate	0.01	−0.02
Standard error	0.05	0.05
Probability	0.91	0.68
Portfolio loss aversion		
Estimate	−0.03	0.02
Standard error	0.04	0.04
Probability	0.45	0.69
Advisor usefulness		
Estimate	−0.07	0.02
Standard error	0.04	0.04
Probability	0.10	0.64
Gender		
Estimate	−0.15	−0.14
Standard error	0.10	0.10
Probability	0.15	0.18
Marital status		
Estimate	0.06	−0.09
Standard error	0.12	0.12
Probability	0.59	0.47
Age		
Estimate	0.05	−0.17
Standard error	0.04	0.04
Probability	0.18	****

(continued on next page)

Table 7 (Continued)

	Nest egg satisfaction	Retirement income strategy anxiousness
Net worth		
Estimate	0.17	0.00
Standard error	0.04	0.04
Probability	****	0.90
Gender. Female is the reference variable		
Marital status. Married is the reference variable		

*$p = < 0.05$
**$p = < 0.01$
***$p = < 0.001$
****$p = < 0.0001$

4.3.3. Retirement outlook

Table 7 indicates the characteristics associated with the degree to which participants felt that their retirement nest eggs were on track with their expectations and whether they felt anxious about their retirement income strategy. Ordinary least squares regressions with standardized coefficients are used to assess these independent variables with our newly created scales and participant demographic variables, which include gender, marital status, age, and net worth. We find a significant relationship with retirement income self-efficacy (estimate = 0.37, $p < .0001$) and net worth (estimate = 0.17, $p < .0001$) with nest egg satisfaction. The results point out the importance of self-efficacy over other psychological constructs relating to a proxy for retirement satisfaction. Moreover, while net worth is a significant indicator, self-efficacy is more influential (estimates = 0.37 vs. 0.17).

With regard to retirement anxiousness, retirement income self-efficacy (estimate = −0.29, $p < .0001$), levels of financial biases (estimate = 0.20, $p < .0001$), age (estimate = −0.17, $p < .0001$), and inertia (estimate = 0.09, $p < .02$) are significant contributors. While self-efficacy is in the expected opposite direction than its relationship to nest egg satisfaction, it is again the largest contributor in the model. Lower self-efficacy suggests a greater the level of retirement anxiousness while holding all other variables constant. Results also indicate that a greater susceptibility to financial heuristics may lead to more anxiety regarding one's retirement income success. Additionally, an inability to execute financial tasks in a timely manner also leads to greater levels of retirement anxiousness. Although net worth is related to nest egg satisfaction, it is not significantly related to retirement anxiousness. Age is the only significant demographic variable. Our younger age cohorts, largely consisting of 40- to late 50-year-olds exhibited more anxiety about their retirement income strategy than those who are already near or into their retirement.

These results continue to provide support for the validity of our scales and their impact on retirement income outlooks. Results also indicate when controlling for demographic variables, these psychological constructs continue to exert a significant influence on one's retirement outlook. Retirement income self-efficacy is the only variable that significantly relates to both nest egg satisfaction and retirement income strategy anxiousness. Maladaptive investment behaviors such as increased financial biases and inertia also relate to increased

levels of retirement income anxiousness. While numeracy, numeracy awareness, portfolio loss aversion tolerance, and perceived advisor usefulness are associated with various investment behaviors and retirement risks, these associations do not manifest when assessing retirement income outlooks at the multivariate level.

4.3.4. Financial implementation style

While we have assessed how behavioral finance and psychological factors affect retirement income beliefs, investment behaviors, and retirement outlook, we want to further analyze their potential influence on financial implementation methods. We utilize logistic regression to examine the degree of influence of our behavioral finance and psychological factors on whether participants are currently in a financial advisory relationship. Results in Table 8 indicate that perceived advisor usefulness (estimate = 0.99, odds ratio [*OR*] = 2.72, $p < .0001$) is the only significant predictor variable in the model. Holding all other variables constant, for every unit increase in our Perceived Advisor Usefulness scale, the odds of being in an advisory relationship increase by a factor of 2.72 times. Results provide strong support for perceived advisor usefulness as the key indicator of advisor utilization. A higher perceived usefulness of an advisor means that one is more likely to engage in such a relationship.

The perceived level of advisor usefulness can help identify what implementation avenues certain individuals respond to best and tailor approaches to those preferences. The significant results for perceived advisor usefulness do not remove the potential impact of reverse causality (i.e., endogeneity) when choosing to utilize an advisor. However, the inclusion of control variables (i.e., net worth, etc.) in the model to adequately capture their potential influence over the use of an advisor, helps reduce the effects of endogeneity (Rosenbaum & Rubin, 1984). We will discuss this factor further in our conclusions section.

Being able to reliably identify who is most likely to implement a retirement income plan with the assistance of a financial advisor is a significant step forward. Instead of trying to convince skeptical individuals of using an advisor, a better approach may be to identify their preferences for receiving financial advice and provide avenues that maximize those preferences. By facilitating this approach, individuals may be more likely to engage in behaviors that ultimately lead to retirement income success.

Because advisor usefulness is the main determinant for directly working with an advisor and retirement income self-efficacy is a very strong variable throughout this investigation for identifying retirement income beliefs, risks, and investment behaviors, we establish a Financial Implementation Matrix with these factors to help us identify how an investor prefers to implement financial tasks. By placing perceived advisor usefulness on the vertical axis and retirement income self-efficacy on the horizontal axis, we can identify four investor personas that can be aligned with preferred financial implementation approaches. Fig. 2 presents the Financial Implementation Matrix and corresponding personas.

The top left quadrant identifies someone who is below average on perceived financial self-efficacy and high on perceived advisor usefulness. As a result, this person is more likely to have an advisor take the lead role in guiding their retirement plan. A profile score in this quadrant would be indicative of a delegator persona.

Table 8 Logistic regression analysis of psychological and behavioral finance constructs with advisory implementation

	In a current advisory relationship		
Sample	577		
Wald Test (χ^2)	72.39		
Pr > χ^2	<0.0001		
c-statistic	0.75		
Rescaled R^2	0.20		
Intercept			
Estimate	−1.17		
Standard error	0.17		
Probability	<0.0001		
		Wald 95% confidence interval limits	
Self-efficacy			
Odds ratio	1.24	0.99	1.56
Estimate	0.22		
Standard error	0.12		
Probability	0.06		
Financial biases			
Odds ratio	1.13	0.92	1.40
Estimate	0.12		
Standard error	0.11		
Probability	0.24		
Inertia			
Odds ratio	1.04	0.86	1.25
Estimate	0.03		
Standard error	0.09		
Probability	0.72		
Numeracy			
Odds ratio	1.06	0.83	1.36
Estimate	0.06		
Standard error	0.12		
Probability	0.62		
Numeracy awareness			
Odds ratio	1.15	0.91	1.47
Estimate	0.14		
Standard error	0.12		
Probability	0.25		
Portfolio loss aversion			
Odds ratio	1.15	0.93	1.43
Estimate	0.14		
Standard error	0.11		
Probability	0.20		
Advisor usefulness			
Odds ratio	2.72	2.13	3.46
Estimate	1.00		
Standard error	0.12		
Probability	****		
Gender			
Odds ratio	1.19	0.69	2.04
Estimate	0.09		
Standard error	0.14		

(continued on next page)

Table 8 (Continued)

	In a current advisory relationship		
Probability	0.53		
Marital status			
Odds ratio	0.74	0.38	1.44
Estimate	−0.15		
Standard error	0.17		
Probability	0.37		
Age			
Odds ratio	0.92	0.75	1.13
Estimate	−0.08		
Standard error	0.10		
Probability	0.44		
Net worth			
Odds ratio	1.03	0.84	1.25
Estimate	0.03		
Standard error	0.10		
Probability	0.79		
Gender. Female is the reference variable			
Marital status. Married is the reference variable			

*$p = < 0.05$
**$p = < 0.01$
***$p = < 0.001$
****$p = < 0.0001$

The top right quadrant identifies someone who is high on both self-efficacy and advisor usefulness. This describes someone who feels very confident about their own ability but also appreciates the value of an advisor. This persona enjoys contributing as an active partner with a financial professional. A profile score in this quadrant indicates that they are most likely a collaborator.

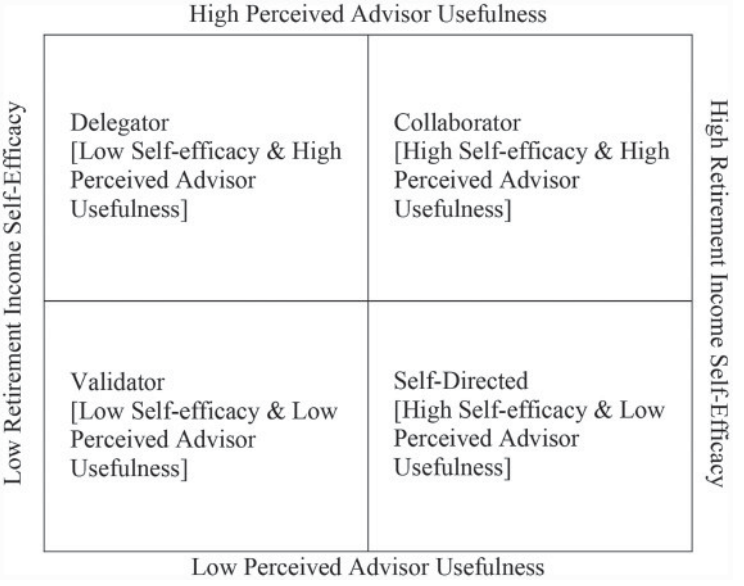

Fig. 2. Financial implementation Matrix

The bottom right quadrant is indicative of someone who is high on financial self-efficacy and low on perceived advisor usefulness. These individuals are confident about their aptitude to create and implement a retirement income plan and do not feel engaging an advisor for assistance is cost effective. This quadrant most likely reflects self-directed investor personas.

The bottom left quadrant identifies someone who is below average on perceived financial self-efficacy and is also low on perceived advisor usefulness. While those in this quadrant do not value an ongoing advisory relationship, their low self-efficacy score leaves open the possibility of seeking specialized guidance for complex financial decisions. Individuals here may seek a second opinion or a one-time consultation plan with an advisor as they continue to implement their strategy. A profile score in this quadrant relates to a validator persona.

Table 9 identifies the frequency breakdown between our four implementation personas and indicates whether these individuals are in a current advisory relationship. We do not include participants identifying as financial professionals in this analysis. Delegators (n = 332) and self-directed investors (n = 331) each represent 34% of our sample participants (n = 965). Collaborators (n = 179) and Validators (n = 123) represent 19% and 13%, respectively. Both Delegators and Collaborators (36.8% and 46.4%) are significantly more likely to have a current advisory relationship than Validators and Self-directed investors (13% and 10.9%). This is to be expected because the advisor usefulness score represents the vertical axis of the implementation matrix.

This matrix also provides potential insight into the type of financial service model each persona may best identify with. For example, Table 10 provides logistic regression results of the various behavioral finance, psychological, retirement concerns, and demographic variables described in this investigation for each persona type. Because the implementation matrix is based on perceived advisor usefulness and self-efficacy, we did not include these variables in the analysis. We also remove numeracy awareness from this analysis due to its insignificant findings in the previous multivariate analyses, its high association with numeracy, and the inclusion of other retirement income concern variables.

While delegator personas are naturally characterized by low self-efficacy and high advisor usefulness, they exhibit higher levels of longevity concerns (estimate = 0.43, OR = 1.54, $p <$ .001), more anxiety towards their retirement income strategy (estimate = 0.29, OR = 1.34, p < .01), and higher levels of financial biases (estimate = 0.30, OR = 1.34, $p <$ .01). These potential headwinds may be why a delegator persona may be more willing to outsource more financially driven tasks to professionals. Within this type of advisory relationship, an advisor can help address these concerns and biases with a financial plan that focuses on retirement income success and frames the investment process into a more goals-driven outcome. Client meetings with specific themes that address current events within a behavioral finance framework or that contextualize the investment experience may help bring awareness to financial biases.

The global Wald Chi-Square for Collaborators and the various independent variables are not significant (Wald χ^2 19.14, $p <$ .09). Collaborators do not reliably exhibit higher or lower levels of the various factors. However, post hoc Bonferroni (Dunn) t tests reveal Collaborators have higher net worth levels than Delegators and Validator personas (T = 2.65, $p <$ .05 for both). Hence, coupled with higher levels of self-efficacy and perceived advisor usefulness, the desire for collaboration may be due to the realization of the added

Table 9 Frequency of implementation by investor personas

	Delegators		Collaborators	
In advisor relationship	Yes	No	Yes	No
Frequency	122	210	83	96
Percent "yes"	36.8	63.3	46.4	53.6
	Validators		Self-directed	
In advisor relationship	Yes	No	Yes	No
Frequency	16	107	36	295
Percent "yes"	13.0	87.0	10.9	89.1
Total sample 965				

Table 10 Logistic regression analysis of psychological and behavioral finance constructs and investor type

	Delegator	Collaborator	Self-directed	Validator
Sample	576	576	576	576
Wald Test (χ^2)	67.47	19.14	73.85	27.99
Pr > χ^2	****	0.09	****	**
c-statistic	0.73	0.63	0.74	0.69
Rescaled R^2	0.19	0.06	0.21	0.10
Intercept				
Estimate	−0.88	−1.44	−0.87	−1.96
Standard error	0.16	0.17	0.17	0.20
Probability	<0.0001	<0.0001	<0.0001	<0.0001
Lifestyle concern				
Odds ratio	1.02	0.93	1.07	0.89
Estimate	0.02	−0.07	0.07	−0.11
Standard error	0.11	0.12	0.10	0.14
Probability	0.86	0.54	0.53	0.41
Longevity concern				
Odds ratio	1.54	0.85	0.53	1.37
Estimate	0.43	−0.17	−0.64	0.31
Standard error	0.12	0.14	0.14	0.15
Probability	***	0.25	****	*
Liquidity concern				
Odds ratio	1.18	0.98	0.95	0.86
Estimate	0.17	−0.03	−0.05	−0.15
Standard error	0.11	0.13	0.11	0.15
Probability	0.14	0.84	0.65	0.33
Retirement income anxiety				
Odds ratio	1.34	0.78	0.82	1.30
Estimate	0.29	−0.25	−0.20	0.26
Standard error	0.11	0.13	0.11	0.15
Probability	**	*	0.06	0.08
Financial biases				
Odds ratio	1.34	1.13	0.79	0.83
Estimate	0.30	0.12	−0.24	−0.19
Standard error	0.11	0.12	0.10	0.14
Probability	**	0.31	*	0.17
Inertia				
Odds ratio	1.14	1.05	0.75	1.09
Estimate	0.13	0.05	−0.29	0.08
Standard error	0.09	0.11	0.10	0.12
Probability	0.15	0.62	**	0.48
Numeracy				
Odds ratio	0.99	1.00	1.12	0.86
Estimate	−0.01	0.00	0.11	−0.15
Standard error	0.10	0.12	0.10	0.14
Probability	0.90	0.98	0.29	0.28
Portfolio loss aversion tolerance				
Odds ratio	0.96	0.97	1.21	0.75
Estimate	−0.05	−0.03	0.19	−0.29
Standard error	0.11	0.12	0.10	0.15
Probability	0.67	0.78	0.07	*
Gender				
Odds ratio	0.73	1.14	1.00	1.35

(continued on next page)

Table 10 (Continued)

	Delegator	Collaborator	Self-directed	Validator
Estimate	−0.15	0.06	0.00	0.15
Standard error	0.12	0.16	0.13	0.17
Probability	0.22	0.68	0.99	0.38
Marital status				
Odds ratio	0.70	1.63	0.62	1.84
Estimate	−0.18	0.25	−0.24	0.31
Standard error	0.16	0.17	0.16	0.19
Probability	0.27	0.16	0.13	0.10
Age				
Odds ratio	1.19	0.95	0.89	0.92
Estimate	0.17	−0.05	−0.12	−0.08
Standard error	0.11	0.13	0.11	0.14
Probability	0.12	0.69	0.27	0.57
Net worth				
Odds ratio	0.99	1.38	0.90	0.81
Estimate	−0.01	0.32	−0.10	−0.21
Standard error	0.10	0.11	0.10	0.14
Probability	0.90	**	0.31	0.14
Gender. Female is the reference variable				
Marital status. Married is the reference variable				

*p = < 0.05
**p = < 0.01
***p = < 0.001
****p = < 0.0001

complexities that arise from greater amounts of wealth. While a delegator may appreciate an advisor taking the lead, a collaborator may prefer situations that allow for active input in developing and implementing a retirement income strategy. High levels of communication and providing sound reasoning behind the decision-making process is most appropriate with this persona. In contrast to a delegator that may just want to know the proverbial "time," the collaborator may also want to know "how the clock is made."

Diagonally across from delegators, on the implementation matrix, are self-directed investors. While they exhibit a high degree of self-efficacy and low perceived advisor usefulness, self-directed investors also exhibit a significant negative relationship with longevity concerns (estimate = −0.64, OR = 0.53, p < .0001), financial biases (estimate = −0.24, OR = 0.79, p< .05), and inertia (estimate = −0.29, OR = 0.75, p < .01). Longevity concerns and degree of financial biases are in the opposite direction of delegators. In addition, while anxiety regarding their retirement income strategy is not significant at the p < .05 level of analysis (estimate = −0.20, OR = 0.82, p < .06), it was also trending in the opposite direction as delegators.

While a self-directed investor is less likely to utilize an advisor, there are various approaches that can engage and help them with a successful retirement income plan. Because this persona is actively involved in their retirement income plan and has high levels of self-efficacy, it is important that they have access to unbiased educational materials that convey the practical application of retirement income strategies. With the rise of financial

technologies, many automated advisory offerings are readily available for investments. In addition, online financial planning offers could also address the specific retirement income problems facing investors.

Lastly, validators exhibit a significant positive relationship to longevity concerns (estimate = 0.31, $OR = 1.37$, $p < .05$), and a negative relationship to portfolio loss aversion tolerance (estimate = −0.29, $OR = 0.75$, $p < .05$). While they do not view an ongoing advisor relationship as cost effective, their low levels of self-efficacy may lead them to seek the reassurance from an advisor in the form of a second opinion regarding the above-mentioned concerns. To provide the appropriate assistance for these individuals, advisors may need to give serious consideration to expanding their service offering to include a planning services as a stand-alone offer and not bundled with asset management.

Ultimately, the Financial Implementation Matrix is an effective way to determine what type of approach can best assist with implementing a retirement income plan. This is a more optimal approach than attempting to convince every investor that they should engage in an ongoing advisory relationship with asset management as its primary revenue source. Entry level offerings may also provide a stepping-stone into higher level service models as individuals learn firsthand about the complexities of developing and implementing a retirement income plan.

5. Conclusion

We quantify retirement income self-efficacy, financial biases, numeracy, numeracy self-awareness, inertia, and perceived advisor usefulness and create scales for these constructs specific to retirement income. In addition, we show how these scales relate to each other and more traditional measures, such as loss aversion, to further provide significant levels of construct validity. We find these scales to significantly relate to retirement income concerns such as longevity, lifestyle, and liquidity. Moreover, investment behaviors such as a preference for dividend stocks and investment approach are related to these constructs. One's retirement nest egg satisfaction and anxiety levels towards their retirement income strategy is also shown to be related to many of these factors. Overall, results indicate significant levels of criterion validity for the newly developed scales. And finally, we create four investment personas with our advisor usefulness and retirement income self-efficacy scales to successfully identify preferred financial implementation methods.

The implications for this investigation affect both individuals and financial professionals. Individuals can readily recognize their relative strengths and weaknesses when implementing a retirement income strategy. By clearly pointing out potential weak spots, an individual can take the necessary steps to fill in the needed gaps. For example, individuals low in numeracy can strive to attain a higher level of competence for retirement income success or can seek professional help. If they are lacking perceived self-awareness regarding their numeracy, this may serve as a wake-up call for them to temper their perceived expertise and to embrace a more receptive attitude towards individuals with more experience and knowledge in the subject matter. A high financial bias score may indicate the areas in which individuals are more susceptible to maladaptive behaviors. This information can also help them

focus on their strengths to successfully implement a retirement income plan. For example, an individual who may have an average numeracy score but is very self-aware of this may be more willing to embrace advice from third parties in a productive manner.

For a financial professional, the ability to present advice in a manner that resonates with an individual is paramount to a successful relationship. More importantly, it will help them follow through with their retirement income plan. For example, assessing individual levels of self-efficacy, numeracy, numeracy self-awareness, financial biases, inertia, and perceived advisor usefulness will help an advisor better understand their client and the relationship dynamic that is most likely to be more engaging. Having greater levels of insight into whether a client understands what is presented to them and how likely they will be candid about their comprehension is beneficial to assuring adherence to a plan. If an advisor has a sense of a client's numeracy and self-awareness, they can tailor investment presentations and recommendations in a productive manner. If an advisor knows how a client may be interpreting the investment landscape and current events, the advisor may be able to reach out and discuss these issues before the client potentially infers conclusions that are suboptimal to their plan. If an advisor has a sense of how timely a client implements advice, then the advisor can present next steps for a plan in a more digestible manner. And finally, an advisor can identify a relationship dynamic that will increase client satisfaction. A delegator and a collaborator need a different cadence with their advisor for the relationship to be productive. In addition, a validator and self-directed investor may need different options that do not require an ongoing professional relationship.

While this investigation significantly enhances our understanding of retirement income beliefs and retirement outcomes, no research is without limitations. Because our convenience sample largely consists of individuals interested and well-read in retirement income and possess greater levels of net worth than the larger population, further testing should be considered with a more diverse population. In addition, to address the potential issue of reverse causality for the Advisor Usefulness score, future investigations can address this beyond the use of control variables in the investigation, as we have, by utilizing a propensity score (Rosenbaum & Rubin, 1984). The propensity score methodology adjusts for this potential bias.

Ultimately, individuals and advisors should recognize how these factors affect the successful implementation of a retirement income plan. One can then be more aware of how to focus on individual strengths and weaknesses. Future studies should also continue to explore how various investor personas and implementation strategies can be individualized with greater levels of specificity to productively engage in a successful retirement plan implementation.

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