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The Psychology of Portfolio Withdrawal Rates

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Abstract

This study investigates how personality and psychological characteristics shape portfolio withdrawal rates (PWR) within a sample of 3,935 U.S. individuals age 50 and over from the Health and Retirement Study. Structural equation model results revealed that those with greater conscientiousness, extroversion, positive affect, and financial self-efficacy have lower PWR; whereas those with greater agreeableness, neuroticism, and negative affect have higher PWR. Findings from this study break new ground by establishing a link between personal psychological characteristics and PWR. Moreover, results provide insight to financial planning practitioners as they explore retirement income planning beyond its technical aspects and seek to maximize their clients' satisfaction from the consumption of their retirement portfolios.

1. Introduction

Little is known about what motivates the portfolio withdrawal decisions of retirees, as most studies on portfolio withdrawal rates address technical issues related to retirement income planning. Studies that address safe withdrawals rates, income portfolio product combinations, and retiree spending profiles help create a better understanding of the market factors that must be considered when developing retirement income plans, but do little to inform the human side of the decision-making process. With a wealth of knowledge related to technical planning issues, there is a gap in the literature regarding the behavioral characteristics that influence portfolio drawdown decisions.

Retirement planning in general can be separated into two phases, accumulation and distribution. Much of the current literature on retirement preparedness focuses on the level of accumulated financial wealth and assumes that financial wealth and post-retirement spending will be positively correlated. However, previous literature indicates that this assumption does not always hold true and provides evidence of a retirement consumption puzzle (Haider & Stephens, 2007). When considering post-retirement consumption, portfolio withdrawal rates are an important metric because they represent the magnitude of portfolio withdrawals relative to available financial assets and capture the true relationship between accumulated retirement wealth and post-retirement spending.

Spending down accumulated retirement assets is a rational behavior required to maximize utility from consumption over the lifecycle (Ando & Modigliani, 1963); however, much of the literature on post-retirement spending suggests that actual behavior may deviate from rational expectations. This is surprising, as a life cycle perspective would suggest that retirees would draw down their portfolios to fund the consumption goals that originally motivated their saving

behavior. As behavioral finance continues to gain traction under the recognition that consumers often fail to make optimal financial decisions, it has become increasingly important to integrate psychological concepts with retirement spending research. The purpose of this study is to investigate the relationship between psychological characteristics and portfolio withdrawal rates to deepen our understanding of the behavioral mechanisms that may influence post-retirement spending decisions. This study makes a significant contribution to the literature by using psychological theory to examine portfolio withdrawal decisions; thereby addressing and raising awareness of the human dimension that must be considered when developing retirement income plans.

2. Literature Review

2.1. Retirement Spending

A general assumption in the portfolio withdrawal literature is that retirees spend a constant amount of money each year based on a percentage of accumulated investment assets (Bengen, 1994; Cooley, Hubbard, & Walz, 1998; Guyton, 2004; Pfau, 2011). The economic rationale is that people save money during their working years to fund post-retirement consumption, and then draw down their wealth to fund their consumption goals.

The portfolio withdrawal rates of retirees are inconsistent with economic theory; many studies have found that retirees' portfolio values either held steady or increased over time (Rix 2000; Love, Palumbo, & Smith 2008; Smith, Soto, & Penner 2009; Poterba, Venti, & Wise 2011[a,b]; Browning, Guo, Cheng, & Finke 2016). This effect has been found to persist even under the required minimum distribution (RMD) rules associated with defined contribution and IRA accounts (Poterba, Venti, & Wise 2011[a]).

There are a number of factors that could explain the withdrawal rates of retirees. Browning, Huston, and Finke (2016) found that retirees' level of cognitive ability was positively related to portfolio drawdown rates, and that retirees with higher levels of cognitive ability were better equipped to incorporate factors of uncertainty into retirement spending decisions. Davies (1981) and De Nardi, French, and Jones (2009) argued that uncertain life expectancies were sufficient to explain post-retirement spending. Others have posed bequest motives as an explanation. Using survey data to model bequest motives as an explanatory predictor of post-retirement spending, Hurd (1987) found no evidence that bequest motives were relevant to portfolio withdrawals, which was consistent with the LCH. Subsequently, Hurd (2002) found that the marginal utility from consumption was much higher than the marginal utility from bequests; De Nardi, French, and Jones (2010) attributed the existence of bequests among survey participants to uncertain longevity, market returns, and medical costs. Browning et al. (2016) found that bequests and uncertainties related to longevity and medical expenses provided a partial explanation for post-retirement withdrawal rates, but did not completely explain retirees spending behavior. Their results pointed to the potential role of behavioral explanations for post-retirement consumption patterns and called for a more in-depth consideration of the psychological factors that influenced retirees' portfolio withdrawal decisions. Consequently, we turned to a psychological framework, the 3M Model of Motivation and Personality (3M), to investigate portfolio withdrawal rates and to lay a foundation for future research focused on the psychological mechanisms that affect portfolio withdrawal rate behavior.

2.2. The 3M Model of Motivation and Personality (3M)

The 3M is a model that systematically explains how personality traits combine with other psychological characteristics to influence consumer behavior (Mowen 2000). Personality is

broadly defined by the American Psychological Association (2017) as "individual differences in characteristic patterns of thinking, feeling and behaving." Personality traits are relatively consistent across time and describe an individual's fundamental propensity to behave and respond to situations, life events, and circumstances. The 3M argues that consumer behavior has roots in these personality traits, and therefore provides a useful framework for explaining the psychological origins of portfolio withdrawal rates.

The 3M employs four layers of psychological traits and characteristics to explain consumer behavior (see Figure 1): elemental, compound, situational, and surface. Surface traits lie at the top of the model and represent consumer behavior. Surface traits are specifically defined as the "enduring tendency of consumers to behave with respect to a product category or behavioral domain" (Mowen, 2000, p. 23). As viewed through the 3M, portfolio withdrawals are a consumer behavior related to spending decisions in retirement that can be observed and measured; thus, portfolio withdrawal behavior is considered a surface trait under the 3M. Surface traits are explained by underlying elemental, compound, and situational traits; these underlying traits and relevant literature are further discussed within the next sections.

[Insert Figure 1 here]

2.2.1. Elemental Traits

Elemental traits are defined as the "…basic, underlying predispositions of individuals that arise from genetics and a person's early learning history" (Mowen, 2000, 20). The *Big Five* personality traits are considered elemental traits that have been shown to affect consumer behavior (Mowen, 2000): openness to experience, conscientiousness, extroversion, agreeableness, and neuroticism (Costa & McCrae, 1992). Openness is characterized by curiosity, creativity, uniqueness, unconventional values, intense emotions, and a preference for life

experiences (Costa & McCrae, 1992). The openness trait has been linked to long-term saving and investing intentions (Mayfield, Perdue, & Wooten 2008). While open individuals exhibit less materialism, they also demonstrate less prudent money management tendencies (Troisi, Christopher, & Marek 2006). Thus, greater openness may be associated with higher portfolio withdrawal rates.

Conscientiousness is characterized by purpose, strong will, determination, planning, organizing, and executing tasks (Costa & McCrae, 1992). The conscientiousness trait has been found to support retirement planning behavior (Hershey & Mowen, 2000), is associated with more stable risk preferences (Soane & Chmiel, 2005), and has been linked to greater net worth levels (Nabeshima & Seay, 2015). Less conscientious individuals have demonstrated compulsive buying behavior (Mowen & Spears, 1999), and may be less likely to plan. Overall, the conscientiousness trait has been associated with more prudent financial behavior; thus, conscientious individuals may have lower portfolio withdrawal rates.

Extroversion is characterized by sociability, energy, cheer, optimism, excitement, and a preference to be with people (Costa & McCrae, 1992). Extroverted individuals reported greater net worth levels (Nabeshima & Seay, 2015), and may have an increased ability to adjust to retirement (Van Solinge & Henkens, 2005). This financial and adjustment success may be due to the strong presence of positive emotions for extroverted individuals, as positive emotions have been shown to precede prudent financial behavior (Guven, 2012). Consequently, extroverted individuals may be more in control of their spending decisions and exhibit lower portfolio withdrawal rates.

Agreeableness is characterized by altruism, sympathy, cooperation, helpfulness, and belief in the goodwill of others (Costa & McCrae, 1992). Agreeable individuals have less wealth

(Nabeshima & Seay, 2015), a lower propensity to invest in risky assets (Jadlow & Mowen, 2010), and increased compulsive buying behavior (Mowen & Spears, 1999). Agreeableness has also been linked to increased bequest motives (Sikkel & Schoenmakers, 2012). Overall, agreeable individuals may be more financially generous to others, even if it puts their own financial goals at risk (Costa & McCrae, 1992). Consequently, agreeable individuals may be more willing to spend their financial wealth at a greater rate than those who score lower on this trait.

Neuroticism is characterized by an enduring disposition to express negative emotions (Costa & McCrae, 1992). Neurotic individuals tend to exhibit high and enduring levels of worry, stress, and fear; they also demonstrate less ability to adjust to life circumstances. Individuals who score low on the neuroticism trait are calm and relaxed, even when facing stressful situations. Emotionally stable individuals (i.e., the opposite of neuroticism) tend to demonstrate prudent financial behavior (Mowen & Spears, 1999). Thus, based on these characteristics, neuroticism may be associated with higher portfolio withdrawal rates.

2.2.2. Compound Traits

Compound traits are defined as unidimensional dispositions resulting from a combination of the elemental traits. Compound traits are narrower than elemental traits and can apply to any life domain (e.g., health, education, financial). Positive affect and negative affect have been shown to affect consumer saving and spending decisions and meet the compound trait criteria under the 3M model. Consequently, these traits were investigated as compound traits within this study.

Positive affect is the experience of positive emotional states: happiness, joy, enthusiasm, attentiveness, excitement, etc. (Watson & Clark, 1999). Positive emotions have been shown to

positively influence earning ability, work success, self-control, and self-efficacy (Bandura, 1997; Lyubomirsky, King & Diener 2005). Guven (2012) found that happiness leads to better saving behavior, a future orientation, more control, less debt, and greater optimism. These results suggest positive affect facilitates prudent financial behavior and success and therefore, lower portfolio withdrawal rates.

Negative affect is the experience of negative emotional states: fear, frustration, nervousness, distress, etc. (Watson & Clark, 1999). Negative emotions have been shown to undermine saving goals among pre-retirees (Neukam & Hershey, 2003), and contribute to investment decisions that are detrimental to portfolio performance (Durand, Newby, & Sanghani, 2008). If emotionally stable individuals and those with positive emotions exhibit prudent financial behavior, then those with greater negative emotions may spend more and thus, withdraw more from their portfolio.

2.2.3. Situational Traits

Situational traits are "unidimensional predispositions to behave within a general situational context," such as the health, financial, or social environments (Mowen, 2000, 21). These domain specific traits emerge from a combination of elemental traits, compound traits, and situational forces. Mowen (2000) proposed that domain-specific self-efficacy falls within the situational trait category and is important to consumer behavior. Self-efficacy is defined as "...people's beliefs about their capabilities to exercise control over their own level of functioning and over events that affect their lives" (Bandura, 1991, p. 257). Bandura stated that self-efficacy is highly influential in the self-regulatory process and is a domain specific trait. Thus, *financial* self-efficacy (FSE) may serve a critical role in shaping portfolio withdrawal decisions. FSE has been linked to prudent financial behaviors and financial outcomes including saving, reduced

debt, and financial satisfaction (Asebedo & Payne, in press; Farrell, Fry, & Risse, 2016; Lown, 2011). Consequently, those with greater FSE may feel more in control over their financial situation and may exhibit similar wealth accumulation tendencies when making portfolio withdrawal decisions.

3. Hypotheses

3.1. Direct Effects

Informed by the 3M and existing literature, the direct effects associated with portfolio withdrawal rates were investigated through eight hypotheses:

Elemental traits:

H1: Openness to experience is associated with higher portfolio withdrawal rates.

H2: Conscientiousness is associated with lower portfolio withdrawal rates.

H3: Extroversion is associated with lower portfolio withdrawal rates.

H4: Agreeableness is associated with higher portfolio withdrawal rates.

H5: Neuroticism is associated with higher portfolio withdrawal rates.

Compound traits:

H6: Positive affect is associated with lower portfolio withdrawal rates.

H7: Negative affect is associated with higher portfolio withdrawal rates.

Situational traits:

H8: FSE is associated with lower portfolio withdrawal rates.

3.2. Indirect Effects

Based upon the 3M and existing literature, two additional hypotheses for indirect effects were investigated:

H9: Compound traits are indirectly connected to portfolio withdrawal rates through situational traits (i.e., FSE).

H10: Elemental traits are indirectly connected to portfolio withdrawal rates through combinations of situational and compound traits.

4. Method

4.1. Data and Sample

Data were utilized from the 2012 and 2014 waves of the Health and Retirement Study. The HRS is sponsored by the National Institute on Aging (grant number NIA U01AG009740) and is conducted by the University of Michigan. The 2014 RAND HRS file (RAND HRS Data, 2016) was paired with personality and psychological data from the 2012 and 2014 waves of the HRS Leave-Behind (LB) Psychosocial and Lifestyle HRS Questionnaire (Health and Retirement Study, 2016), which collects information from half the sample on a rotating basis at each collection cycle. The RAND HRS Data file is a user-friendly longitudinal data set based on the HRS data and was developed at RAND with funding from the National Institute on Aging and the Social Security Administration. Moreover, IRA withdrawals for the respondent and spouse were incorporated from the RAND HRS Tax Calculations 2000 – 2014 (v1) data file (RAND HRS Data, 2017); this data file contains information about federal, state, and FICA taxes for respondents to the HRS 2000 – 2014 surveys. They were developed at RAND with funding from the National Institute on Aging and the Social Security Administration. The sample was restricted to the financial respondent for households with financial assets greater than $0. The final analytic sample included 3,935 observations, representing over twenty-two million individuals age 50 and over after incorporating weighting information.

4.2. Variables

4.2.1. Outcome Variable: Portfolio Withdrawal Rate (Surface Trait)

Portfolio withdrawal rate levels in 2014 were the outcome of interest and were computed as portfolio distributions divided by financial assets. Portfolio withdrawal rates were transformed through a natural logarithmic function.

Portfolio distributions were defined as total household income plus IRA withdrawals minus other non-investment income sources. Total household income is the sum of all income in a household (e.g., earnings, capital, pension, annuities, Social Security, unemployment, government transfers, and other lump sum sources), but do not include IRA withdrawals; thus, IRA withdrawals were added to total household income. Non-investment income sources were removed from total household income to isolate portfolio distributions. Non-investment income sources included earnings, annuities, Social Security disability and retirement benefits, worker's compensation, other government transfers, business income (capital), rental income (capital), self-employment income (capital), and lump sum distributions from insurance, pension, or inheritance. As defined by the HRS, "pension" income encompasses both defined contribution and defined benefit employer-sponsored retirement plans. Thus, "pension" income sources were included as a portfolio distribution so that defined contribution plans (e.g., 401k, 403b, etc.) were accounted for.

Financial assets were defined as the sum of total household financial assets, including stocks, bonds, checking, savings, CDs, government savings bonds, t-bills, IRAs, and current defined contribution retirement plans. Respondents without any financial assets were excluded from the model.

4.2.2. Financial Self-Efficacy (Situational Trait)

One situational trait—financial self-efficacy (FSE)—was derived from the LB data. On an 11-point scale ranging from 0 *(no control at all)* to 10 *(very much control),* respondents rated the amount of control they had over their current financial situation. This measurement of FSE aligns with existing research (McAvay et al. 1996) and is consistent with Bandura's (1991) description of self-efficacy: "...people's beliefs about their capabilities to exercise control over their own level of functioning and over events that affect their lives" (p. 257).

4.2.3. Positive and Negative Affect (Compound Traits)

Two latent variables estimating positive and negative affect were utilized to measure respondents' proclivity to experience positive and negative emotional states. Indicators were constructed in accordance with recommended methodology based upon a series of emotions from the *Positive and Negative Affect Schedule—Expanded Form* (PANAS-X). Respondents reported on a five-point Likert-type scale the extent to which they felt various emotions within the past 30 days. Positive affect was estimated by 12 indicators: determined, enthusiastic, active, attentive, excited, inspired, hopeful, alert, happy, content, proud, and interested. Negative affect was estimated by 12 indicators: afraid, scared, upset, frustrated, guilty, ashamed, bored, hostile, jittery, nervous, sad, and distressed. The positive and negative affect constructs demonstrated adequate internal reliability with Cronbach's Alpha scores of .93 and .90, respectively.

4.2.4. Big Five Personality Traits (Elemental Traits)

Elemental traits were operationalized through the Big Five personality traits: openness to experience, conscientiousness, extroversion, agreeableness, and neuroticism. Each trait was measured as a latent variable with indicators obtained from the LB survey. Indicators were measured in accordance with recommended methodology on a 4-point Likert-type scale based upon the extent to which respondents felt various adjectives described them; higher scores

reflected greater identification with each Big Five trait. Openness to experience was measured by seven adjectives: creative, imaginative, intelligent, adventurous, sophisticated, curious, and broad-minded. Conscientiousness was measured by seven adjectives: organized, thorough, hardworking, self-disciplined, responsible, cautious, and thrifty. Extroversion was measured by five adjectives: outgoing, talkative, active, friendly, and lively. Agreeableness was measured by five adjectives: softhearted, sympathetic, caring, warm, and helpful. Lastly, neuroticism was measured by four adjectives: nervous, worrying, moody, and *not* calm. Each Big Five trait demonstrated adequate internal reliability with Cronbach's Alpha scores of .80 for openness, .73 for conscientiousness, .78 for extroversion, .81 for agreeableness, and .73 for neuroticism.

4.2.5. Control Variables

Socio-demographic and financial correlates included age, employment activity, coupled household status, gender, education, homeowner and mortgage holding status, non-mortgage related debt (e.g., credit card, family loans, etc.), self-reported health status, financial planning horizon, and likelihood of leaving a bequest of $100,000.

Age was included as a continuous variable, whereas all other control variables where measured categorically. Those who reported employment activity were coded as a 1; all other respondents were coded as a 0. Coupled households were coded as a 1; all other households were coded as a 0. A dichotomous variable was included to control for gender. Two categories were included for education: those with some undergraduate college education or higher were coded as a 1, while those with a high school education or less were coded as a 0. Mortgage and homeowner status were incorporated through three categories: (1) mortgage holding homeowner, (2) non-mortgage holding homeowner, and (3) non-homeowner. Self-reported health was measured on a Likert-type scale with potential values ranging from 1 *(poor)* to 5 *(excellent)*.

Financial planning horizon encompassed the respondent's perspective of the time period that is most important to them in planning their family's saving and spending, and was measured on a 5-point scale ranging from 1 *(next few months)* to *(longer than 10 years)*. Finally, bequest motives were incorporated through a variable measuring the probability (0% to 100%) of leaving a $100,000 bequest. If respondents reported a 0% likelihood to a precursor question of leaving a $10,000 bequest, then they are coded as a 0% on the $100,000 bequest variable.

4.3. Data Analysis

A Structural Equation Model with a Confirmatory Factor Analysis was employed using MPlus version 8 to account for measurement error associated with the psychological constructs and to investigate direct and indirect effects between variables (Kline, 2016; Muthén & Muthén 2015). A maximum likelihood estimator (i.e., MLR) with robust standard errors using a numerical integration algorithm was employed for model estimation (Muthén & Muthén 2015). The indirect effects were tested and reported using a bootstrap estimation approach with 5,000 samples according to recommended methodology (Shrout & Bolger, 2002). All dependent variables (portfolio withdrawal rates, FSE, positive affect indicators, negative affect indicators, and the Big Five personality trait indicators) were treated as continuous in the model (Muthén & Muthén, 2015). All control variables were modeled according to the full partial method (Little, 2013). Lastly, the HRS's weighting and complex sampling design information was incorporated in accordance with recommended methodology (Muthén & Muthén, 2015; Nielsen & Seay, 2014).

5. Results

5.1. Descriptive Statistics

A summary of the sample characteristics can be found in Tables 1 and 2. The sample was evenly represented by men and women (approximately 50% each). The majority were White (91%), and educated at the college level or beyond (67%). Respondents were relatively young, with an average age of 68 (range: 54-98). Most had annual income (excluding IRA withdrawals) over $49,000 (60%), financial assets greater than $99,999 (56%), and owned a home (86%). Half of the sample were homeowners without mortgage debt (50%). Respondents had an average FSE score of 7.62 (range of 0 to 10). On average, respondents identified more with the openness, conscientiousness, extroversion, and agreeableness traits; and less with the neuroticism trait. Respondents reported an average positive affect score of 3.62 (range 1 to 5), and an average negative affect score of 1.73 (range = 1 to 5).

[Insert Table 1 and Table 2]

5.2. Missing Data

List-wise deletion was utilized in the data preparation phase; however, missing data was permitted for the elemental traits (i.e., openness, conscientiousness, extroversion, agreeableness, and neuroticism) and compound traits (i.e., positive affect and negative affect). MPlus uses all available data to estimate the model using full information maximum likelihood (FIML) with the maximum likelihood (MLR) estimator (Muthén & Muthén, 2015).

5.3. Measurement Model

The measurement model was analyzed through a Confirmatory Factor Analysis (CFA) with indicators for the elemental and compound traits re-specified into parcels according to recommended methodology (Little, 2013). Results of the parceled CFA model are provided in Table 3 and Figure 2. Results revealed significant factor loadings across all parceled indicators above the .40 level. For local identification, an equality constraint was imposed for the

extroversion, agreeableness, and neuroticism indicators (Little, 2013). Moreover, the fixed factor method was employed for scale setting in accordance with recommended methodology (Little, 2013).

[Insert Table 3 and Figure 2 here]

5.4. Model Fit

The model chi-square *exact fit* test indicates the model should be tentatively rejected (χ^2(df 293) = 2553.81, p = <.001); however, this test is highly sensitive to model rejection with an increasing sample size (e.g., over 400 cases) (Kenny, 2015; Kline, 2016; Little, 2013). Other fit indices indicated a mediocre to good fit of the data: an RMSEA of .044 (90% CI = .043, .046) suggested a good/close model fit, a CFI index of .91 suggested an acceptable model fit, and a TLI index of .85 suggested a mediocre model fit (Little, 2013).

5.5. Structural Model Results

A structural diagram representing the statistically significant direct effects is provided in Figure 3. The structural model was estimated with indicators from the measurement model for the latent variables (see Table 3 and Figure 2) and included control variables according to the full partial method (Little, 2013): age, employment activity, couple status, gender, race, education, non-mortgage debt, homeowner and mortgage status, self-reported health status, financial planning horizon, and bequest likelihood. Overall, the model explained 20% of the variability in portfolio withdrawal rates.

[Insert Figure 3 here]

5.5.1. Direct effects with portfolio withdrawal rates.

Results for the direct effects with portfolio withdrawal rates (PWR) are provided in Table 4. Results provided support for hypotheses two (conscientiousness is associated with lower

PWR) and eight (FSE is associated with lower PWR). Specifically, PWR decreased by 7.69%[1] for every one-unit increase in FSE, holding all else constant *(b* = -.08; $\beta = -.06$*)*. Moreover, a one-unit increase in conscientiousness was associated with a 27.39% decline in PWR *(b* = -.32; $\beta = -.11$*)*, holding all else constant. Results did not reveal a direct relationship between the other elemental and compound traits (openness to experience, extroversion, agreeableness, neuroticism, positive affect, and negative affect) with PWR.

A higher PWR was associated with older individuals ($\beta = .07$), couples (compared to singles; $\beta = .10$), and those with non-mortgage debt (e.g., credit card, family loans, etc.; $\beta = .04$). A lower PWR was associated with employment activity ($\beta = -.34$), being White (as compared to non-White; $\beta = -.08$), having an undergraduate college education or higher ($\beta = -.07$), owning a home without a mortgage (compared to owning a home with a mortgage; $\beta = -.05$), and having a greater than 0% likelihood of leaving a bequest of $100,000 ($\beta = -.07, -.14$, and $-.12$ for a 1% to 49%, 50% to 99%, and 100% bequest likelihood, respectively).

[Insert Table 4 here]

5.5.2. Indirect effects with portfolio withdrawal rates through FSE.

In support of hypothesis nine, compound traits were indirectly connected to PWR through FSE (see Table 6). For an indirect effect to occur, a significant path from each of the compound traits directly to FSE should exist and was observed (see Table 5). Specifically, greater positive affect (β = .20) was associated with higher FSE. Greater negative affect was associated with lower FSE (β = -.25). The indirect effects from compound traits to portfolio withdrawal rates through FSE are provided in Table 6 and were computed with a bootstrap

[1] Interpretation of parameter estimates of a log dependent variable: Percentage change in *Y* for every one-unit change in *X* = $(e^b - 1) * 100$ (Benoit, 2011; Harness, Finke, & Chatterjee, 2009).

estimation approach with 5,000 samples (Shrout & Bolger, 2002). Holding all else equal, the significant indirect effects between compound traits and PWR were -.01 (.20 x -.06) for positive affect, and .01 (-.25 x -.06) for negative affect. Thus, greater positive affect was indirectly associated with lower PWR through higher FSE, and negative affect was indirectly associated with higher PWR through lower FSE.

Moreover, results revealed a direct relationship between the elemental traits and FSE (see Table 5). Greater conscientiousness was associated with higher FSE (β = .18), whereas greater agreeableness was associated with lower FSE (β = -.14). These direct relationships facilitated an indirect relationship with PWR through FSE (see Table 6). Greater conscientiousness was indirectly associated with lower PWR through higher FSE (β = -.01); greater agreeableness was associated with higher PWR through lower FSE (β = 01).

[Insert Table 5 and Table 6 here]

Results also supported hypothesis ten: elemental traits are indirectly connected to portfolio withdrawal rates through combinations of situational and compound traits. The direct effects between elemental and compound traits necessary for the indirect effects are provided in Table 7; the indirect effects from elemental traits to portfolio withdrawal rates (through compound and situational traits) are provided in Table 8 and were computed with a bootstrap estimation approach with 5,000 samples (Shrout & Bolger, 2002).

[Insert Table 7 and Table 8 here]

Significant direct effects between elemental traits and compound traits were observed (see Table 7). Specifically, openness was associated with greater positive affect (β = .11) and greater negative affect (β = .16). Extroversion was associated with greater positive affect (β = .54) and reduced negative affect (β = -.15). Agreeableness was associated with reduced positive

affect (β = -.20) and greater negative affect (β = .15). Lastly, neuroticism was associated with reduced positive affect (β = -.34) and greater negative affect (β = .86). Conscientiousness did not exhibit any significant direct relationship with positive or negative affect.

These direct relationships facilitated indirect effects for the extroversion, agreeableness, and neuroticism traits to PWR through combinations of positive affect, negative affect, and FSE; the indirect effects for openness and conscientiousness through positive affect, negative affect, and FSE were not statistically significant (see Table 8). Extroversion had a negative indirect relationship with PWR through greater positive affect and higher FSE (β = -.006). Agreeableness had a positive indirect relationship with PWR through reduced positive affect and lower FSE (β= .002). Neuroticism had a positive indirect relationship with PWR through reduced positive affect and lower FSE (β= .004). Thus, extroverted individuals are associated with lower PWR, whereas agreeable and neurotic individuals are associated with higher PWR.

6. Discussion

The analysis examined the direct and indirect relationships between various psychological characteristics and portfolio withdrawal rates, starting with basic personality traits. Many of the characteristics had indirect effects on PWR through FSE. Conscientiousness and FSE—characteristics commonly linked to increased levels of financial planning, organization, and control—had a direct negative relationship with PWR; in other words, conscientious individuals had lower portfolio withdrawal rates.

Having a college degree, being a mortgage-free homeowner, and having a bequest motive were also associated with lower PWR. The relationship between PWR and bequests was expected, as bequests create a demand for end-of-life resources. Less intuitive was how education and mortgage-free homeownership related to portfolio withdrawal rates. Education has

been found to be positively related to retirement wealth (Poterba, Rauh, Venti & Wise, 2007), and being mortgage-free reduces the demand for ongoing housing-related cash flows. Financially, these two factors in combination create an increased capacity to spend from the retirement portfolio.

An interesting consideration is how psychological characteristics influence financial habits, and how financial habits persist across various stages of the life-cycle. Habits have been found to form naturally as a result of goals (Aarts, Verplanken, & Knippenberg, 1998). When positive habits are developed it may be difficult to break those habits as a result of the positive emotions and outcomes that have been experienced as a result of certain actions (Aarts, Paulussen, & Schaalma, 1997). This may result in preferences for actions that are perceived to be constructive (saving) and distaste for actions that would have impeded progress towards previous goals (spending out of savings). If preferences for "positive" pre-retirement habits persist in retirement, it may slow the portfolio withdrawal rates of individuals with higher levels of conscientiousness and FSE.

Extroversion, conscientiousness, agreeableness, and neuroticism were indirectly related to PWR through compound traits (positive and negative affect) or a combination of compound and situational traits (FSE). Extroversion and conscientiousness had negative indirect relationships with PWR (lower), while agreeableness and neuroticism had positive indirect relationships with PWR (higher). Extroversion has been linked to increased levels of optimism. Having a positive evaluation of oneself and their environment may be essential for individuals to engage and persist in the long-term, oftentimes daunting, retirement planning process (Tang & Baker, 2016). Moreover, Guven (2012) found that positive emotions preceded prudent financial behaviors, such as controlled spending in retirement.

In addition to being directly related to PWR, conscientiousness is also indirectly related to PWR through FSE. Filbeck, Hatfield, and Horvath (2005) found a significant relationship between personality type and risk preferences. The stability of risk preferences has also been found to affect the composition of the retirement portfolio (Agnew, Anderson, & Szykman, 2015). Higher levels of conscientiousness have been linked to more consistent processes for evaluating risk and an aversion to taking chances when outcomes were uncertain (Soane & Chmiel, 2005). Because withdrawals from the retirement portfolio may be framed as a risky proposition, conscientious retirees may actively choose to reduce the uncertainty of future financial outcomes by minimizing their PWR. This is consistent with increased feelings of control in people with higher levels of FSE.

Agreeableness and neuroticism had a positive relationship with PWR through a negative relationship with FSE and a positive relationship with negative affect. Neuroticism and negative affect are associated with a pre-disposition to negative emotions. Fear, stress, and worry may decrease the likelihood of developing a retirement income plan, and for those that do plan, decrease the likelihood of sticking to the plan due to a lack of confidence in the plan's ability to meet their long-term income needs (Hung, Meijer, Mihaly, & Yoong, 2009). This may cause an over-reliance on the status-quo. For retirees that score higher in neuroticism and negative affect this means an increased propensity to spend impulsively and engage in other behaviors that may be detrimental to their long-term financial success.

Agreeableness had a negative relationship with FSE and positive relationship with negative affect, resulting in an indirect positive relationship with PWR (higher). Individuals who score higher in this trait have been found to have lower levels of wealth, less risky portfolio allocations, and more impulsive spending habits. These findings are consistent with lower levels

of FSE. When FSE is low retirees may display myopia and over-rely on their situational intuition when making portfolio withdrawal decisions. Such impulsivity may lead to a higher PWR that could put the long-term viability of the portfolio in jeopardy. This may be especially true when the decision is emotional and based on the well-being of another. Those who score higher in agreeableness may be more inclined to provide ongoing support for family members and valued charitable organizations. While this may strain the portfolio, it is also worth noting that agreeableness has been found to be one of the few predictors of life satisfaction and positive experiences in retirement (Robinson, Demetre, & Corney, 2010).

7. Implications and Conclusion

The purpose of this study was to investigate the relationship between psychological characteristics (starting with personality) and portfolio withdrawal rates to deepen our understanding of the behavioral mechanisms that may influence portfolio drawdown decisions. Overall, results reveal a story that is consistent with what is currently reflected in the saving and spending literature, suggesting that those who are good at accumulating wealth for retirement also transfer their prudent behavioral tendencies into their portfolio withdrawal decisions. Findings from this study provide insight to practitioners and researchers as they explore retirement income planning beyond its technical aspects and seek to better understand what motivates clients' retirement spending decisions.

The significant direct and indirect effects of the personality and psychological factors in the model suggest that performing a personality assessment on clients may reveal characteristics and attitudes that influence their portfolio withdrawal decisions. Characteristics more commonly associated with responsible financial behavior (conscientiousness, extroversion, positive affect, and financial self-efficacy) were directly and/or indirectly associated with lower portfolio

withdrawal rates. This is a positive outcome if it protects clients from overspending. However, if these characteristics relate to overly conservative spending, clients may lose utility from forgone consumption.

Conversely, agreeableness, neuroticism, and negative affect (characteristics commonly associated with less favorable financial decisions and outcomes) are indirectly related to higher portfolio withdrawal rates. Clients possessing these characteristics may be more prone to impulsive spending and be at greater risk of depleting the retirement portfolio. Identifying and understanding these relationships can better inform planners about the characteristics and attitudes that clients bring to the relationship and that influence their behavioral choices. With this insight, planners can more actively engage their clients, understand what triggers their financial behavior, and guide clients to more favorable long-term financial outcomes.

Finally, this study is the first to use psychological theory to explain portfolio withdrawal rates, thereby making a significant contribution to a body of literature that has historically focused on technical factors. It is important to note that the psychological findings were robust after controlling for socio-demographic and financial characteristics that have been shown to affect portfolio withdrawal rate decisions, underscoring the relevance of psychological factors for portfolio withdrawal rate behavior. Overall, results highlight the utility of psychological modeling in the portfolio withdrawal rate space and lay a foundation for future research.

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Figure 1. 3M Hierarchical Personality Structure, adapted from Mowen (2000)

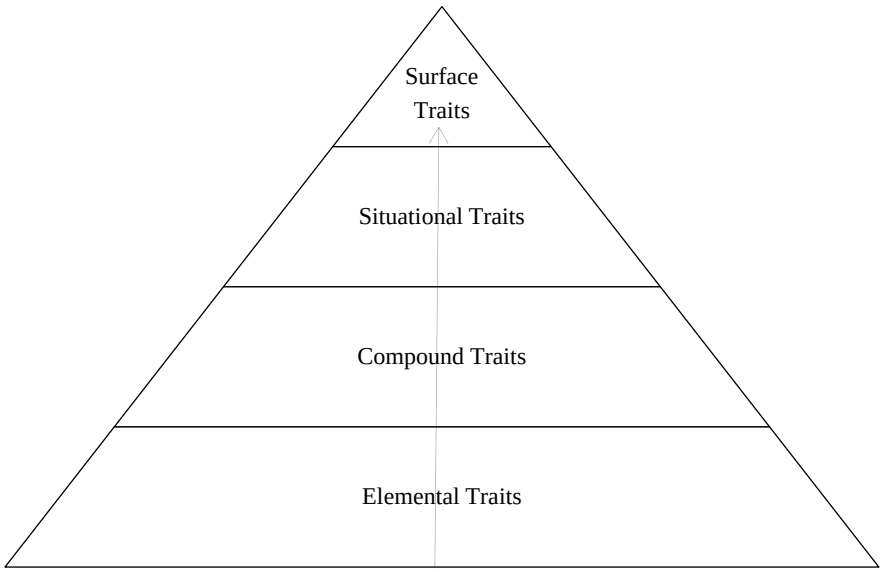
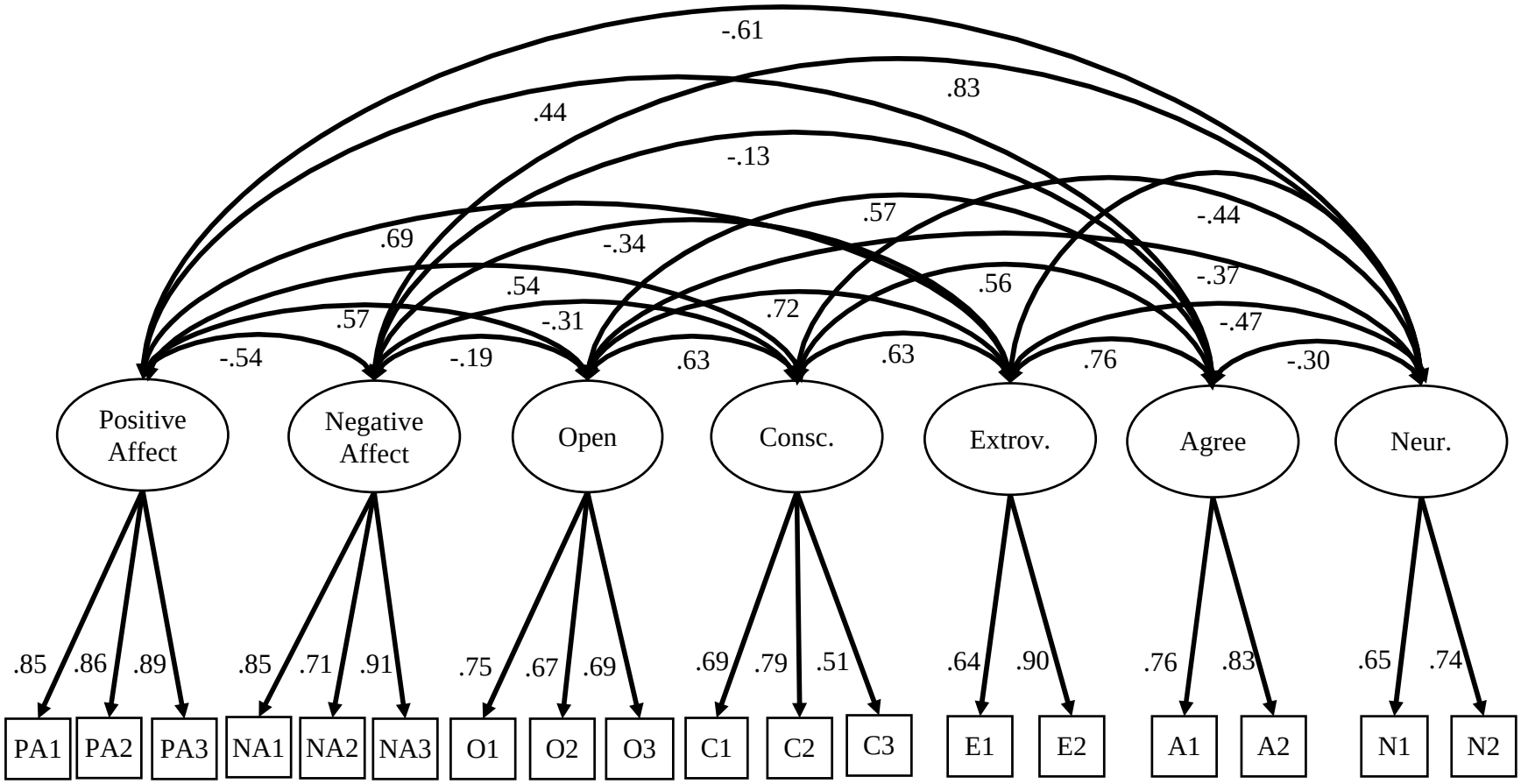
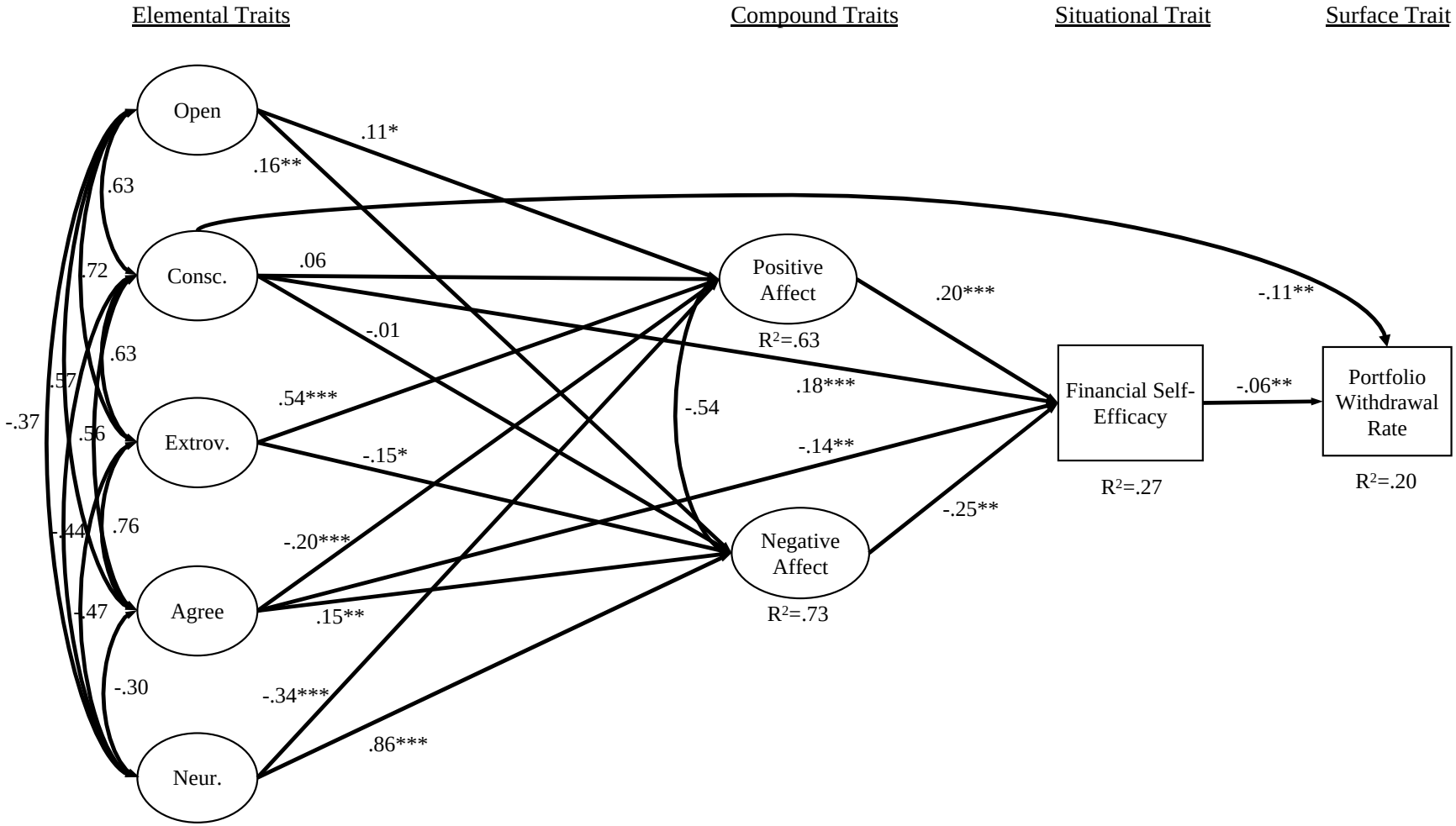


Figure 2. Confirmatory Factor Analysis Measurement Model (N=3,935)



Note: Model fit indices are: $\chi 2(293) = 2553.81$, p = <.001; RMSEA = .044, 90% CI [.043, .046], CFI = .91, TLI = .85. N=3,935. The fixed factor method was employed for scale setting (Little, 2013). Standardized pattern coefficients > .40 are in bold text and are the same as structure coefficients (i.e., Pearson correlations) when indicators depend upon a single factor (Kline, 2016). Standardized results were computed with STDYX standardization. All unstandardized and standardized pattern coefficients are significant at p < .001. For local identification, an equality constraint was imposed for the extroversion, agreeableness, and neuroticism indicators in accordance with recommended methodology (Little, 2013).

Figure 3. SEM Diagram for Direct Effects (N=3,935)



*Note: * p < .05; **p < .01; ***p < .001*. Model fit indices are: $\chi 2(293) = 2553.81$, p = <.001; RMSEA = .044, 90% CI [.043, .046], CFI = .91, TLI = .85. N=3,935. All results were computed with Mplus in STDYX standardization. The structural model was estimated with indicators from the measurement model for the latent variables and included control variables according to the full partial method (Little, 2013): age, working status, couple status, gender, race, education, non-mortgage debt, homeowner and mortgage status, self-reported health status, financial planning time horizon, and bequest likelihood. The indirect effects (see Tables 6 and 8) were tested using a bootstrap estimation approach with 5,000 samples (Shrout & Bolger, 2002).

Table 1. Sample Characteristics of Categorical Variables (N=3,935)

Variable	n	% (weighted)*
Gender		
Female	2150	50.13%
Male	1785	49.87%
Household status		
Couple	2243	59.27%
Single	1692	40.73%
Race		
White	3340	91.13%
Other	595	8.87%
Education		
Less than college	1509	33.07%
College or higher	2426	66.93%
Employment activity		
Yes	980	32.10%
No	2955	67.90%
Homeownership & mortgage		
Homeowner, with mortgage	1212	35.62%
Homeowner, no mortgage	2108	50.22%
Non-homeowner	615	14.17%
Presence of other debt		
Yes	1289	33.92%
No	2646	66.08%
Bequest likelihood of $100k		
0%	811	17.36%
1% to 49%	657	15.56%
50% to 99%	1353	37.02%
100%	1114	30.06%
Financial assets ($0 excluded)		
$1 to $24,999	1091	24.25%
$25,000 to $99,999	799	19.60%
$100,000 to $249,999	703	17.45%
$250,000 to $499,999	541	15.14%
$500,000 and above	801	23.56%
Household income (excluding IRA withdrawals)		
$0 to $24,999	715	15.32%
$25,000 to $49,999	1134	24.85%
$50,000 to $74,999	716	18.27%
$75,000 to $99,999	450	12.10%
$100,000 and above	920	29.46%

Note: Weighted percentages are provided to account for the oversampling techniques utilized by the HRS. The weighted sample represents 22,451,571 Americans age 50 and above. N = 3,935.

Table 2. Sample Characteristics of Scales and Continuous Variables (N=3,935)

Variable	Mean	se	Min	Max	Cronbach's Alpha
Log portfolio withdrawal rate	-3.20	0.06	-15.18	9.49	-
Age	68.08	0.35	54.00	98.00	-
Financial planning horizon	3.28	0.02	1.00	5.00	-
Self reported health	3.40	0.02	1.00	5.00	-
Situational Trait					
Financial self efficacy	7.62	0.05	0.00	10.00	-
Compound Traits					
Positive affect	3.62	0.02	1.00	5.00	0.93
Negative affect	1.73	0.01	1.00	5.00	0.90
Elemental Traits					
Openness to experience	2.99	0.01	1.00	4.00	0.80
Conscientiousness	3.33	0.01	1.00	4.00	0.73
Extroversion	3.17	0.01	1.00	4.00	0.78
Agreeableness	3.50	0.01	1.00	4.00	0.81
Neuroticism	1.96	0.01	1.00	4.00	0.73

Notes: The Taylor Series method was employed to incorporate the HRS's complex sampling design information (Muthén and Muthén 2015). The weighted sample represents 22,451,571 American adults age 50 and over. *N*=3,935.

Table 3. CFA Results for Elemental and Compound Traits with Parcels (N=3,935)

	Unstandardized		Standardized		
Parameter	Estimate	SE	Estimate	SE	R^2
Pattern coefficients					
Openness					
Openness ➔ Parcel 1 (creative, imaginative, intelligent)	0.46	0.01	**0.75**	0.01	0.57
Openness ➔ Parcel 2 (sophisticated, adventurous)	0.45	0.01	**0.67**	0.02	0.44
Openness ➔ Parcel 3 (curious, broad-minded)	0.39	0.01	**0.69**	0.02	0.47
Conscientiousness					
Conscientiousness ➔ Parcel 1 (organized, thorough)	0.43	0.02	**0.69**	0.02	0.48
Conscientiousness ➔ Parcel 2 (hardworking, self-disciplined)	0.42	0.02	**0.79**	0.02	0.62
Conscientiousness ➔ Parcel 3 (responsible, cautious, thrifty)	0.22	0.01	**0.51**	0.02	0.26
Extroversion[a]					
Extroversion ➔ Parcel 1 (outgoing, talkative)	0.47	0.01	**0.64**	0.01	0.41
Extroversion ➔ Parcel 2 (friendly, lively, active)	0.47	0.01	**0.90**	0.01	0.80
Agreeableness[a]					
Agreeableness ➔ Parcel 1 (caring, softhearted, sympathetic)	0.41	0.01	**0.76**	0.01	0.57
Agreeableness ➔ Parcel 2 (helpful, warm)	0.41	0.01	**0.83**	0.01	0.69
Neuroticism[a]					
Neuroticism ➔ Parcel 1 (worrying, nervous)	0.43	0.01	**0.65**	0.02	0.42
Neuroticism ➔ Parcel 2 (moody, not calm)	0.43	0.01	**0.74**	0.02	0.55
Positive Affect					
Positive Affect ➔ Parcel 1 (determined, enthusiastic, active, attentive)	0.45	0.02	**0.85**	0.01	0.72
Positive Affect ➔ Parcel 2 (inspired, hopeful, alert, excited)	0.46	0.01	**0.86**	0.01	0.74
Positive Affect ➔ Parcel 3 (proud, interested, happy, content)	0.47	0.02	**0.89**	0.01	0.78
Negative Affect					
Negative Affect ➔ Parcel 1 (afraid, upset, scared, frustrated)	0.31	0.02	**0.85**	0.01	0.72
Negative Affect ➔ Parcel 2 (guilty, bored, hostile, ashamed)	0.20	0.01	**0.71**	0.02	0.51
Negative Affect ➔ Parcel 3 (jittery, nervous, sad, distressed)	0.36	0.02	**0.91**	0.01	0.83

Note: Model fit indices are: $\chi 2(293) = 2553.81$, p = <.001; RMSEA = .044, 90% CI [.043, .046], CFI = .91, TLI = .85. N=3,935. The fixed factor method was employed for scale setting (Little, 2013). Standardized pattern coefficients > .40 are in bold text and are the same as structure coefficients (i.e., Pearson correlations) when indicators depend upon a single factor (Kline, 2016). Standardized results were computed with STDYX standardization. All unstandardized and standardized pattern coefficients are significant at p < .001.

[a] For local identification, an equality constraint was imposed for the extroversion, agreeableness, and neuroticism indicators in accordance with recommended methodology (Little, 2013).

Table 4. Direct Effects with Portfolio Withdrawal Rates (PWR), N=3,935

Parameter	Unstandardized Estimate	Unstandardized SE	Standardized Estimate	Standardized SE
Situational Trait				
Financial self-efficacy (FSE) ➔ PWR	-0.08**	0.03	-0.06**	0.02
Compound Traits				
Positive affect ➔ PWR	0.08	0.08	0.04	0.04
Negative affect ➔ PWR	-0.09	0.10	-0.05	0.06
Elemental Traits				
Openness ➔ PWR	0.13	0.12	0.04	0.04
Conscientiousness ➔ PWR	-0.32**	0.11	-0.11**	0.04
Extroversion ➔ PWR	-0.18	0.19	-0.06	0.07
Agreeableness ➔ PWR	0.27†	0.15	0.09†	0.05
Neuroticism ➔ PWR	0.10	0.21	0.03	0.08
Control Variables				
Age ➔ PWR	0.03**	0.01	0.07**	0.02
Work ➔ PWR	-2.26***	0.14	-0.34***	0.02
Couple ➔ PWR	0.62***	0.15	0.10***	0.02
Female ➔ PWR	0.09	0.15	0.01	0.02
Race White ➔ PWR	-0.88**	0.26	-0.08**	0.02
College education ➔ PWR	-0.45***	0.11	-0.07***	0.02
Non-mortgage debt ➔ PWR	0.27*	0.11	0.04*	0.02
Self-report of health ➔ PWR	0.05	0.06	0.02	0.02
Financial planning horizon ➔ PWR	-0.10†	0.06	-0.04†	0.02
Homeowner, no mortgage ➔ PWR	-0.32**	0.12	-0.05**	0.02
Non-homeowner ➔ PWR	-0.18	0.20	-0.02	0.02
$100k bequest 1% to 49% ➔ PWR	-0.61**	0.23	-0.07**	0.03
$100k bequest 50% to 99% ➔ PWR	-0.89***	0.22	-0.14***	0.03
$100k bequest 100% ➔ PWR	-0.81***	0.18	-0.12***	0.03
R^2	0.20			

Note: †$p < .10$. *$p < .05$. **$p < .01$. ***$p < .001$. All results were computed with Mplus. Standardized results are provided in STDYX standardization for continuous independent variables and STDY standardization for binary independent variables.

Table 5. Direct Effects for Compound and Elemental Traits with Financial Self Efficacy (FSE)

Parameter	Unstandardized		Standardized	
	Estimate	SE	Estimate	SE
Compound Traits with FSE				
Positive affect ➔ FSE	0.27***	0.06	0.20***	0.04
Negative affect ➔ FSE	-0.29**	0.08	-0.25**	0.07
Elemental Traits with FSE				
Openness ➔ FSE	-0.08	0.09	-0.04	0.04
Conscientiousness ➔ FSE	0.36***	0.08	0.18***	0.04
Extroversion ➔ FSE	0.26†	0.13	0.13†	0.06
Agreeableness ➔ FSE	-0.28**	0.09	-0.14**	0.04
Neuroticism ➔ FSE	0.25	0.18	0.13	0.09
R^2	0.27			

Note: †$p < .10$. *p < .05. **p < .01. ***p < .001. All results were computed with Mplus. Standardized results are provided in STDYX standardization.

Table 6. Indirect Effects for Elemental and Compound Traits with Portfolio Withdrawal Rates (PWR) through Financial Self Efficacy (FSE)

Parameter	Unstandardized		Standardized	
	Estimate	SE	Estimate	SE
Compound Traits to PWR through FSE (indirect effect)				
Positive affect ➔ FSE ➔ PWR	-0.02*	0.01	-0.01*	0.01
Negative affect ➔ FSE ➔ PWR	0.02*	0.01	0.01†	0.01
Elemental Traits to PWR through FSE (indirect effect)				
Openness ➔ FSE ➔ PWR	0.01	0.01	0.00	0.00
Conscientiousness ➔ FSE ➔ PWR	-0.03*	0.01	-0.01*	0.01
Extroversion ➔ FSE ➔ PWR	-0.02	0.01	-0.01	0.00
Agreeableness ➔ FSE ➔ PWR	0.02*	0.01	0.01*	0.00
Neuroticism ➔ FSE ➔ PWR	-0.02	0.02	-0.01	0.01

Note: †$p < .10$. *$p < .05$. **$p < .01$. ***$p < .001$. All results were computed with Mplus. Standardized results are provided in STDYX standardization. The indirect effects were tested using a bootstrap estimation approach with 5,000 samples (Shrout & Bolger, 2002).

Table 7. Direct Effects for Elemental Traits with Compound Traits

Parameter	Unstandardized Estimate	Unstandardized SE	Standardized Estimate	Standardized SE
Positive affect				
Openness ➔ Positive affect	0.16*	0.07	0.11*	0.05
Conscientiousness ➔ Positive affect	0.09	0.06	0.06	0.04
Extroversion ➔ Positive affect	0.83***	0.10	0.54***	0.06
Agreeableness ➔ Positive affect	-0.30***	0.08	-0.20***	0.05
Neuroticism ➔ Positive affect	-0.51***	0.05	-0.34***	0.03
R^2	0.63			
Negative affect				
Openness ➔ Negative affect	0.29**	0.09	0.16**	0.05
Conscientiousness ➔ Negative affect	-0.02	0.08	-0.01	0.05
Extroversion ➔ Negative affect	-0.26*	0.13	-0.15*	0.07
Agreeableness ➔ Negative affect	0.27**	0.10	0.15**	0.06
Neuroticism ➔ Negative affect	1.49***	0.11	0.86***	0.03
R^2	0.73			

Note: †$p < .10$. *$p < .05$. **$p < .01$. ***$p < .001$. All results were computed with Mplus. Standardized results are provided in STDYX standardization.

Table 8. Indirect Effects for Elemental Traits to Portfolio Withdrawal Rates through Compound and Situational Traits

Parameter	Unstandardized		Standardized	
	Estimate	SE	Estimate	SE
Elemental Traits to PWR through Compound Traits AND FSE (indirect effects)				
Openness ➔ Positive affect ➔ FSE ➔ PWR	-0.004	0.00	-0.001	0.00
Openness ➔ Negative affect ➔ FSE ➔ PWR	0.007	0.00	0.002	0.00
Conscientiousness ➔ Positive affect ➔ FSE ➔ PWR	-0.002	0.00	-0.001	0.00
Conscientiousness ➔ Negative affect ➔ FSE ➔ PWR	0.000	0.00	0.000	0.00
Extroversion ➔ Positive affect ➔ FSE ➔ PWR	-0.018*	0.01	-0.006*	0.00
Extroversion ➔ Negative affect ➔ FSE ➔ PWR	-0.006	0.01	0.002	0.00
Agreeableness ➔ Positive affect ➔ FSE ➔ PWR	0.007*	0.00	0.002*	0.00
Agreeableness ➔ Negative affect ➔ FSE ➔ PWR	0.006	0.00	0.002	0.00
Neuroticism ➔ Positive affect ➔ FSE ➔ PWR	0.011*	0.01	0.004*	0.00
Neuroticism ➔ Negative affect ➔ FSE ➔ PWR	0.035†	0.02	0.012†	0.01

Note: †$p < .10$. *$p < .05$. **$p < .01$. ***$p < .001$. All results were computed with Mplus in theta parameterization. Standardized results are provided in STDYX standardization. The indirect effects were tested and reported using a bootstrap estimation approach with 5,000 samples (Shrout & Bolger, 2002).