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How Does Consumers' Financial Vulnerability Relate to Positive and Negative Financial Outcomes? The Mediating Role of Individual Psychological Characteristics

Vulnerable consumers are at particular risk of financial detriment due to, for example, low financial literacy or numeracy, high debt, low income, or impactful changes in personal circumstances. We introduce a comprehensive and formative measure of financial vulnerability that integrates these risk factors and is grounded in definitions of vulnerability from financial regulation bodies and government agencies such as the Consumer Financial Protection Bureau. Across three studies of US individuals, we assess the nomological validity of this measure of financial vulnerability through its relationship with positive and negative financial outcomes (e.g., savings levels, paying credit card balances in full each month, being in arrears) as well as relevant psychological characteristics (e.g., personal savings orientation [PSO], money management skills, financial self-efficacy). Moreover, we examine whether and how these psychological characteristics mediate the relationship between financial vulnerability and financial outcomes. We conclude with an overview of implications for policy makers and business practitioners.

Today's consumers face increasing self-responsibility for making consequential financial decisions affecting their immediate as well as future financial well-being. For instance, an ongoing shift from defined benefit to defined contribution plans heightens individuals' responsibility for managing their own pension savings and preparing for retirement (Deetlefs et al. In press; van Rooij, Lusardi, and Alessie 2011), transferring the burden of smoothing consumption over one's lifetime from pension plan providers to

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individual consumers (Alessie and Lusardi 1997; Browning and Crossley 2001). However, given overall low levels of financial literacy and dropping household savings rates (Organisation for Economic Cooperation and Development 2017), many consumers seem either ill-prepared or unable to take on increased financial responsibility. Indeed, only 57% of all US consumers understand basic concepts within personal finance (Klapper, Lusardi, and van Oudheusden 2015), while many consumers are also at risk of spending their retirement funds too quickly given the widespread presence of hyperbolic discounting (Laibson 1998).

Aforementioned challenges are magnified for so-called “vulnerable” consumers, for whom the negative consequences of poor financial choices are even direr (Financial Conduct Authority (FCA) 2015). Consumer vulnerability is commonly conceptualized as a limited ability to engage effectively in the marketplace or a state of powerlessness, which arises from an interaction of individual characteristics (e.g., age, health, cognitive capacity, socioeconomic status), individual states (e.g., life transitions), and external conditions (e.g., discrimination) (Baker, Gentry, and Rittenburg 2005). Vulnerable consumers have also been referred to as “at-risk consumers,” who are conceptualized as “marketplace participants who, because of historical or personal circumstances or disabilities, may be harmed by marketers’ practices or may be unable or unwilling to take full advantage of marketplace opportunities” (Pechmann et al. 2011, 23).

Vulnerable consumers are at particular risk of financial detriment as a result of, for example, low financial literacy or numeracy, high debt, low income, or impactful changes in personal circumstances, such as the death of a spouse or redundancy (FCA 2015). While different regulatory, statutory, and consumer advocacy groups variously define consumers’ financial vulnerability, overlaps exist, and there is a consensus that vulnerable consumers are at particular financial disadvantage. They are more likely to make poor financial choices and suffer financially when financial service providers do not act with appropriate levels of care (Personal Finance Research Centre 2017). Moreover, their financial stability is tenuous (Consumer Financial Protection Bureau (CFPB) 2013), and their behavior is controlled more by short-term circumstances (Bertrand, Mullainathan, and Shafir 2006).

More generally, academic research has observed that financial difficulty can yield negative impacts in psychological terms, such as reducing peoples’ cognitive capacities (Mullainathan and Shafir 2013), and increasing stress levels (Brown, Taylor, and Wheatley Price 2005; Gathergood 2012). Psychologically, stress is known to trigger a shift from goal-directed to more habitual behavior (Schwabe and Wolf 2009). Furthermore, key

risk factors of vulnerability, such as living in poverty, are known to yield increases in time discounting (Haushofer and Fehr 2014), shifting people's focus from more distant to more present considerations. Such research has implications for several financial behaviors such as saving (Soman and Zhao 2011; Ülkümen and Cheema 2011), and managing one's finances (Ameriks, Caplin, and Leahy 2003)—behaviors that are typically conceptually characterized as entailing longer-term goal-directed behavior. Financial self-efficacy, similarly, is known to mediate the relationship of financial literacy—another key risk factor for financial vulnerability—with financial outcomes (Fernandes, Lynch, and Netemeyer 2014; Peeters et al. 2018; Perry and Morris 2005). Together, the above research invites the suggestion that consumers facing difficult financial circumstances may experience psychological, as well as financial consequences.

Against this backdrop, understanding the role of vulnerability in consumer financial decision-making is of ever-increasing importance. Recently, the FCA (2015)—the United Kingdom's financial regulation body—has collated a list of risk factors characterizing financial vulnerability, comprising a subset of risk factors previously identified by the CFPB (2013)—the US government agency responsible for consumer protection in the financial sector. Importantly, both the CFPB (2013) and its United Kingdom's counterpart—the Money Advice Service (2015)—have stressed the importance of psychological factors in better understanding issues of financial capability. Although policy makers thus seem cognizant of the relevance and importance of financial vulnerability for consumer financial decision-making, and are interested in the associated individual psychological characteristics, academic research in this specific area remains scarce.

Consumer researchers do show an increasing interest in the area of consumer financial decision-making in general (Lynch 2011), and an emerging stream of research identifies how individual psychological characteristics relate to positive and negative financial outcomes. In this regard, regulatory focus (Briley and Aaker 2006), time preference (Lynch and Zauberman 2006), propensity to plan for money (Lynch et al. 2010), PSO (Dholakia et al. 2016), financial self-efficacy (Lown 2011), money management skills (Garðarsdóttir and Dittmar 2012), and individual differences in the consideration of future consequences (Joireman, Sprott, and Spangenberg 2005) are considered particularly relevant. Moreover, previous research supports the relevance of the individual risk factors of financial vulnerability as identified by the FCA (2015) and the CFPB (2013), such as high-debt levels (Wang 2010), being older or younger (Cui and Choudhury 2003; Griffiths and Harmon 2011; Moschis, Mosteller, and Fatt 2011), receiving

welfare payments (Anderson, Strand, and Collins 2018; Litt et al. 2000), suffering from physical disability (Kaufman-Scarborough and Childers 2009; Rinaldo 2012), or coping with bereavement (Gentry et al. 1995). However, the current literature is fragmented and (1) has not developed a comprehensive measure of financial vulnerability that integrates the various risk factors identified by policy makers; (2) has not engaged in a systematic examination of how such a measure would relate to key financial outcomes as well as the previously mentioned psychological characteristics; and (3) failed to examine how these psychological characteristics could mediate the associations between financial vulnerability and financial outcomes. We aim to address these important gaps in our understanding of the nature and role of financial vulnerability.

Elucidating the salient psychological capacities, attitudes, or values linking financial vulnerability with financial outcomes could serve as a basis upon which to develop tailored supportive financial advice, communications, or effective policy interventions. While it might be difficult to quickly effectuate change in the actual risk factors associated with financial vulnerability (e.g., high debt, low income, loss of a job), certain psychological characteristics (such as consumers' PSO or financial self-efficacy) may attenuate financial vulnerability by weakening its link with negative financial outcomes. Importantly, such psychological characteristics may be malleable through, for example, (just-in-time) financial education, or other interventions such as workshops or self-help groups, targeted at providing vulnerable consumers with hands-on financial advice (c.f., Fernandes, Lynch, and Netemeyer 2014).

To achieve our research aims, we conducted three studies in which we collected data from US individuals on the risk factors related to financial vulnerability, the psychological characteristics described above, and key financial outcomes. Study 1 entails a convenience sample ($N = 396$) recruited through Amazon Mechanical Turk (MTurk), whereas Study 2 employs a nationally representative sample ($N = 515$) recruited through Qualtrics. Study 3 involves a subsample of returning participants from Study 2 who completed a follow-up survey after three months ($N = 253$). Confirming its nomological validity, our results consistently show that our measure of financial vulnerability is negatively associated with positive financial outcomes (e.g., savings and investment levels, paying credit card balances in full each month), and positively associated with negative financial outcomes (e.g., being in arrears on critical payments, being in receipt of welfare). Regarding the psychological characteristics, financial vulnerability is negatively associated with a consumer's PSO, money management skills, financial self-efficacy, consideration of

future consequences, future time-preference, and overall regulatory focus. Overall, including the psychological characteristics in our investigation increases our understanding of the channels through which financial vulnerability is associated with financial outcomes. In this regard, PSO, money management skills, and financial self-efficacy are key characteristics, having important mediating effects. Finally, our results indicate satisfactory test–retest reliability of our measure of financial vulnerability.

Our research makes three contributions to the existing literature. First, we introduce a comprehensive measure of consumers' financial vulnerability which integrates the risk factors identified by the CFPB (2013) and FCA (2015), and test its nomological validity through its relationship with relevant psychological characteristics and financial outcomes. Here, we build on previous research, which has incidentally examined specific aspects of financial decision-making for consumers scoring high or low on one particular risk factor of vulnerability (e.g., Soman and Cheema's (2011) study on saving by low-income consumers), but which has not engaged in a systematic investigation of the broader nature and role of financial vulnerability. The importance and relevance of developing a formative measure of financial vulnerability that integrates the most pertinent risk factors instead of looking at them individually is underlined by the observation of the FCA (2015), 23) that "[a]n important factor in understanding vulnerability is the realization that people are often exposed to multiple risk factors."

Second, by simultaneously examining several psychological characteristics and financial outcomes, we provide a more holistic perspective on financial vulnerability than previous studies, which typically focused on the relationship of a single psychological characteristic with one particular financial outcome. In particular, we increase our insights into which psychological characteristics yield broader utility given their roles as mediators that help understand the underlying mechanism through which financial vulnerability is associated with these outcomes, thereby answering vital "how" and "why" questions (see Baron and Kenny 1986). Our investigation into the mediating role of psychological characteristics is specifically motivated by Haushofer and Fehr's (2014) observation that key risk factors of financial vulnerability, such as living in poverty, can have causal effects on consumers' psychological characteristics. Indeed, these authors suggest that researchers and policy makers should consider psychological variables as novel intervention targets for poverty alleviation and call for more research on the psychological consequences of poverty and the economic behavior resulting from these psychological consequences. In this regard, our findings suggest that a strong PSO and/or a sense of financial self-efficacy can intervene in the relationship

of financial vulnerability with negative financial outcomes and are thus particularly relevant psychological characteristics to include in future theoretical frameworks and empirical studies.

Third, our findings are valuable for policy makers and business practitioners, who can use our financial vulnerability measure to identify to what extent their target groups and/or clients are "at risk" of financial detriment. In particular, by identifying and bringing together items and instruments that address each of the CFPB (2013) and FCA's (2015) risk factors, our integrated measure can be used by practitioners to identify the general severity of consumers' financial vulnerability in terms of how many risk factors they are experiencing. Such knowledge can then be used to determine what resources and support systems should be put in place to ensure consumers are served with appropriate levels of care. Furthermore, while information remedies, such as financial education or extended product disclosures, can be effective when consumers are lacking such skills or awareness, meta-analyses show such approaches to have only limited effectiveness (Fernandes, Lynch, and Netemeyer 2014; Miller et al. 2015). This sentiment is echoed by the CFPB (2013) and Money Advice Service (2015), who stress the role of psychological factors in better understanding issues of financial capability. In this regard, while our results do suggest some importance for pragmatic money management skills in tempering the association of financial vulnerability with negative financial outcomes, they highlight a similar importance of nonskills based psychological characteristics. In particular, we identify PSO—a psychological characteristic that embodies values, rather than skills or awareness—and financial self-efficacy—a psychological characteristic that refers to personal agency regarding financial matters—as promising characteristics. In doing so, our findings suggest additional strategic levers for policy makers and business practitioners to better support vulnerable consumers.

The remainder of this paper is organized as follows. We first provide some institutional background and review relevant literature. We then present the data, method, and results of Studies 1–3. We continue with an overview and discussion of these three studies' findings. Finally, we conclude, provide implications for public policy makers as well as business practitioners, and list some limitations which offer promising opportunities for future research.

INSTITUTIONAL BACKGROUND AND RELEVANT LITERATURE

The importance of examining consumers' financial vulnerability and the psychological characteristics that may mediate its relationship

with financial outcomes becomes evident when considering some figures on poverty, savings, and access to finance. According to the CFPB (2013), the low-income and economically vulnerable population in the United States includes as many as 100 million people, or about 33% of the total population, while nearly 46 million people live in households with incomes below the federal poverty line. The same report indicates that in 2012 over 132 million people, or about 44% of the total population, lacked the savings to cover basic expenses for three months if unemployment, a medical emergency, or another crisis led to a loss of stable income. Furthermore, about 24 million people have no bank account, and about 60 million are "underbanked," meaning they do not have access to mainstream banking products, services, or lines of credit. Finally, 25% of US adults, or about 50 million people, lack the necessary traditional credit data to build a FICO credit score, and may thus find it very difficult to obtain a loan or mortgage at an affordable rate.

Financial Vulnerability

Financial vulnerability is a subjective term that currently lacks a formal definition or integrated measure in the academic literature. Instead, the current state of our understanding is best summarized in reports by government agencies such as the CFPB (2013), and regulators such as the FCA (2015). The CFPB, in a report on empowering low-income and economically vulnerable consumers, characterizes vulnerable consumers as those whose financial stability is tenuous. The FCA, in a report on consumer credit and consumers in vulnerable circumstances, considers vulnerable consumers as individuals who, due to personal circumstances, are especially susceptible to financial detriment. Although neither of these reports introduces a formal scale to measure the extent to which individual consumers are financially vulnerable, they do list a set of common risk factors of vulnerability, which is supported by previous consumer and public policy research (Cui and Choudhury 2003; Griffiths and Harmon 2011; Moschis, Mosteller, and Fatt 2011; Wang 2010; e.g., Anderson, Strand, and Collins 2018; Gentry et al. 1995; Kaufman-Scarborough and Childers 2009; Litt et al. 2000; Rinaldo 2012). This set of risk factors forms the basis of the financial vulnerability measure we develop in this paper.

According to the CFPB and FCA, these risk factors include low education, numeracy or financial literacy, physical disabilities, severe or long-term illnesses, or mental health issues, low income, high debt, caring responsibilities, being either "younger" or "old," lack of English language skills, and impactful changes in personal circumstances, such as a divorce,

death of a spouse, or a redundancy. Of course, not every consumer falling in one or more of these categories will necessarily experience financial detriment, but each is expected to increase the susceptibility to financial adversity and the severity of its consequences. In the present paper, our aim is not to examine the individual effects of these different risk factors. Instead, we set out to develop a comprehensive and formative measure of financial vulnerability that integrates these risk factors.

Financial Outcomes

The Federal Reserve, in a report on household financial management, distinguishes between four key financial management activities: cash-flow management, credit management, saving, and investment (Hilgert, Hogarth, and Beverly 2003). The financial outcomes that we examine in this paper tap into these four critical domains of consumer financial decision-making. That is, we examine the total amount of savings and investments, being in arrears regarding three critical payments (household utilities, rent/mortgage, consumer credit), being in receipt of welfare payments, repaying credit card balances in full each month, saving money from each paycheck, and having sufficient emergency savings to cover three months of expenses.

Psychological Characteristics

Existing consumer research has identified several psychological characteristics that are significantly related to consumer financial decision making. However, research has yet to indicate whether any such characteristics may also intervene in the relationship between financial vulnerability and financial outcomes. The current investigation is founded on a review of the pertinent literature, which results in examining a comprehensive, while nonexhaustive, range of psychological characteristics, which are briefly introduced below.

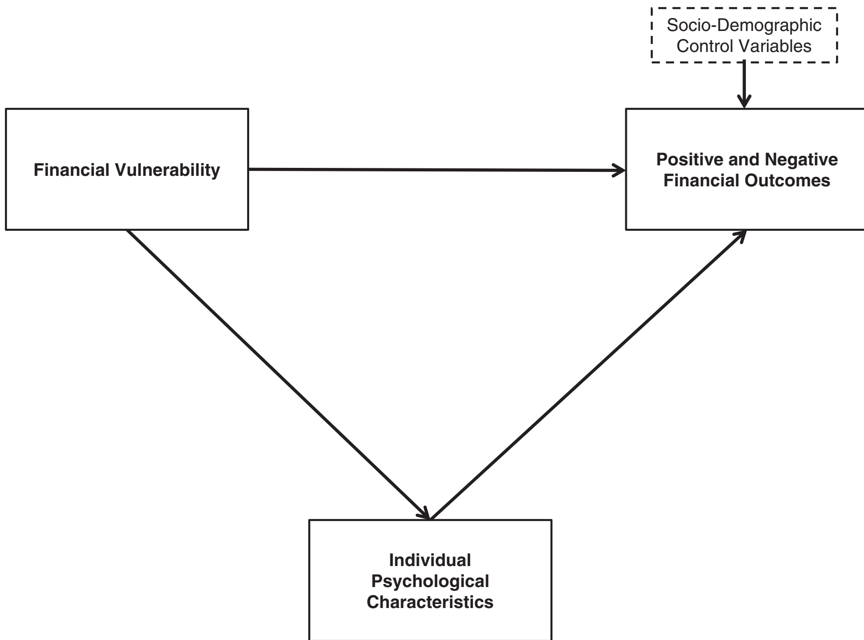
Joireman, Sprott, and Spangenberg (2005) illustrate how individuals who score high on the consideration of future consequences scale allocate more of their money to financial options that maximize long-term positive financial outcomes. Briley and Aaker (2006) report that regulatory focus on promotion stimulates spending and hampers saving. Lynch and Zauberman (2006) discuss how a present-focused time preference (Frederick, Loewenstein, and O'Donoghue 2002) is associated with an underweighting of future benefits, and thus a tendency to overspend and undersave. Lynch et al. (2010) demonstrate that the propensity to plan for money is

positively correlated with consumers' FICO credit scores. Lown (2011) proposes a measure of financial self-efficacy—the perceived ability to succeed in managing one's financial affairs—which is particularly relevant in the context of consumer vulnerability, as individuals with high self-efficacy are typically more successful in coping with stressful circumstances (Park and Folkman 1997). Garðarsdóttir and Dittmar (2012) show how better money management skills are negatively associated with the tendency to spend money in general, and financial worry. Finally, and more recently, Dholakia et al. (2016) introduce PSO as a psychological factor reflecting the chronic tendency to attach value to saving money in a consistent and sustained manner. They observe higher PSO to be an intermediary factor between one's financial literacy and savings behavior and show that helping people to develop greater PSO positively influences their financial behavior in terms of saving.

Given their established relationships with consumer financial decision-making, the aim of this article is to examine how consumers' financial vulnerability is differentially related to these psychological characteristics and a set of key financial outcomes and, in turn, whether and how these characteristics mediate the relationship between vulnerability and these financial outcomes. We have a general expectation that financial vulnerability is positively related to negative financial outcomes and negatively related to positive financial outcomes, while individual psychological characteristics may intervene in this relationship. This expectation is based not only on aforementioned research by Haushofer and Fehr (2014) on the psychology of poverty, but also on research at the intersection of psychology and economics by Davies and Lea (1995), which suggests that psychological characteristics of consumers, such as their attitude toward debt, may be consequences rather than causes of their individual situations, such as the amount of debt they are in. Finally, research on scarcity suggests that financial constraints, such as those experienced by financially vulnerable consumers, focalize attention on short-term, more immediate demands and goals (Mullainathan and Shafir 2013), affecting individuals' time preference and consideration of future consequences. As such, there is reason to expect that the risk factors of financial vulnerability, such as low income, high debt, and low financial literacy, are not only directly associated with financial outcomes, but also indirectly, through their effect on individual psychological characteristics such as PSO and the consideration of future consequences, which thus act as mediators.

Being the first of its kind, the current work is of an exploratory nature, and does not aim to test a set of formal hypotheses regarding specific effects

FIGURE 1
Conceptual Framework



of each individual psychological characteristic on financial outcomes in the context of consumers' financial vulnerability. Figure 1 summarizes the overall conceptual framework that we examine in this paper.

STUDY 1

Data and Method

Participants

A total of $N = 396$ US participants were recruited via MTurk, with some participants ($n = 36$) excluded based on giving either incomplete responses (e.g., missing data regarding the risk factors of financial vulnerability) or invalid responses (e.g., entering higher monthly than annual income numbers, reporting very implausible monthly debt repayments). The remaining participants ($N = 360$) ranged 18–69 years old ($M_{age} = 32.86$, $SD = 9.90$), comprised 189 males (52.5%), 160 educated to university level (44.4%), and 70 nonwhite participants (19.4%). Participants received \$3 for completing our 20-minute study, which exceeds the recommended minimum pay rate of \$6 per hour for MTurk workers (Paolacci 2015). Recent studies show that MTurk samples provide data that are at least as reliable as those

from traditional sample pools (Goodman, Cryder, and Cheema 2013; Paolacci, Chandler, and Ipeirotis 2010) and are in fact more diverse in terms of sociodemographics than student pools (Mason and Suri 2012).

Measurement

Beyond the sociodemographic factors detailed above, our survey made assessments in three domains: financial vulnerability, psychological characteristics, and financial outcomes. Below, we overview each assessment and provide some descriptive statistics. Table S1 in Appendix S1, Supporting Information, available online provides a complete account of all scales including item wording.

Financial Vulnerability. In line with the CFPB (2013) and FCA (2015), we measured participants' financial vulnerability in ten discrete areas, detailed below. A participant's overall vulnerability score represented a composite total of the areas in which their survey responses suggested vulnerability, with higher scores indicating a more vulnerable consumer. As one area comprised three sub-issues, participants' vulnerability score can range from zero to 12.

Education. The FCA (2015) and CFPB (2013) report low literacy as a risk factor of financial vulnerability. In this regard, consumer research typically considers high school completion as a relevant cut-off point, and finds that saving rates are considerably lower among high-school dropouts (e.g., Boshara and Emmons 2015). Accordingly, not completing high school resulted in a score of one on the vulnerability scale (0.8% of participants).

Numeracy. We used the single-item Berlin Numeracy Test (Cokely et al. 2012), which has been validated as a highly discriminant measure of consumers' numeracy, and is well suited to educated samples such as MTurk workers. An incorrect response (58% of participants) resulted in a score of one on the vulnerability scale.

Financial Literacy. Following Klapper, Lusardi, and van Oudheusden (2015), we assessed financial literacy in four areas: financial numeracy, compound interest, risk diversification, and inflation. Applying these authors' cut-off point, participants correctly answering fewer than three out of four items were deemed financially illiterate (31.4% of participants), thus receiving a score of one on the vulnerability scale. We selected four items from van Rooij, Lusardi, and Alessie's (2011) financial literacy instrument that directly correspond to the financial literacy areas used by Klapper, Lusardi, and van Oudheusden (2015).

Physical Disability, Severe or Long-Term Illness, and Mental Health Issues. We used a binary response item similar to that used in the University of Michigan's Health and Retirement Study (Juster and Suzman 1995). Reporting any such health issues resulted in a score of one on the vulnerability scale (12.5% of participants).

Low Income. Monthly net income was assessed via an item adapted from the US Consumer Finance Monthly Survey operated by The Ohio State University (2016): "What is the current monthly net income of your household?" The question prompted participants to consider various sources of income and deductions and presented 14 income range response options. To determine vulnerability, we assessed whether participants' income was below the US Federal Poverty Guideline (US Department of Health and Human Services 2017). To do so, we calculated each participant's annual income by taking the arithmetic mean of their selected monthly income range and multiplying by 12. Furthermore, we determined each participant's household size in accordance with their reported relationship status (Single/Separated/Divorced/Widow(er) = Single Occupancy; Partner/Married/Civil Partner = Dual Occupancy) and the presence of children younger than 18 years old living at home. Participants received a score of one on the vulnerability scale if their annual income, taking into account household size, was below the US Federal Poverty Guideline, which is defined as a certain amount of income for a household of a specific size (19.2% of participants).

Debt-to-Income Ratio. This item was again adapted from the US Consumer Finance Monthly Survey: "How high are the monthly debt obligations of your household?" To calculate debt-to-income ratio, we divided monthly debt (arithmetic mean of selected debt range) by monthly income (arithmetic mean of selected income range). Participants received a score of one on the vulnerability scale if their debt-to-income ratio was larger than 36% (34.7% of participants)—which is a common threshold for an acceptable "back end" debt ratio (i.e., debt payments including mortgage/rent) by US lenders (Bankrate 2017). Using "high debt" as a specific cut-off point for this risk factor of financial vulnerability is in line with a report on consumer credit and consumers in vulnerable circumstances by the FCA (2014).

Caring Responsibilities. Reporting caring responsibilities on a binary response item from the "Caregiving in the U.S." study by the AARP Public Policy Institute and National Alliance for Caregiving (2015) resulted in a score of one on the vulnerability scale (4.2% of participants).

Age. The FCA (2015) notes that being “old” (over 80 years) or “younger” (not specified) are each risk factors for financial vulnerability. As we had no participants over 80 years old in our sample, we focused on being younger as a risk factor. In line with the US Census Bureau’s (2014) “young adults” category, we classified anyone between 18 and 34 years of age as younger, receiving a score of one on the vulnerability scale (68.1% of participants).

English Language Skills. The FCA (2015) notes lack of English language skills as a risk factor. We categorized anyone who indicated English was not their native language as vulnerable for this factor, scoring one on the vulnerability scale (1.9% of participants).

Changes in Circumstances. The FCA (2015) specifies changes in life circumstances such as a job loss, spousal bereavement, or separation/divorce as risk factors. Three binary-response items asked participants whether they had experienced any such changes in the previous year, with each confirmatory response adding a score of one to the vulnerability score. In total, 11.7% of participants had experienced at least one such circumstance, while 0.8% experienced two. The remainder of participants had not experienced any such circumstances.

Psychological Characteristics. Based on a review of the pertinent literature as described previously, we assessed five psychological measurements across four domains in Study 1.

Time Preference. To assess preference for immediate versus delayed consumption, we used a single item from Binswanger and Carman (2012) that asks participants to choose one of six options, with each option presenting a pair of dollar amounts representing (1) working-life spending and (2) retirement spending. Each option increases the ratio of consumption in favor of higher retirement consumption. The item specifies that participants should assume prices to remain constant. Higher scores indicate a more future-oriented time preference.

Propensity to Plan for Money. We used a 6-item scale from Lynch et al. (2010), which assesses to what extent people proactively manage and plan their financial lives. An example item is “I set financial goals for what I want to achieve with my money.” We adapted the items so that they did not refer to any specific time frame but reflect a more general sentiment toward continual financial planning. Responses were given on a 5-point Likert scale (“Strongly Disagree” to “Strongly Agree”). Higher scores indicate

a greater tendency toward financial planning. Construct reliability is good, with a Cronbach's alpha of .89.

Personal Savings Orientation. We used Dholakia et al.'s (2016) 9-item scale, which assesses the merit attributed to being a proactive saver. An example item is "Saving money should be an important part of one's life." Responses are given on a 7-point Likert scale ("Strongly Disagree" to "Strongly Agree"). Higher scores indicate a stronger PSO. Construct reliability is good, with a Cronbach's alpha of .83.

Regulatory Focus. We used using Higgins et al.'s (2001) 11-item scale, which measures the relative extent to which participants are motivated by (1) a promotion-focus, prioritizing gains; or (2) a prevention-focus, prioritizing minimizing losses. The scale yields a promotion- (six items) and prevention-focus (five items) score, with higher scores reflecting stronger tendencies in that area. An example item for promotion-focus is "How often have you accomplished things that got you 'psyched' to work even harder?" An example item for prevention-focus is "Would you say that not being careful enough has gotten you into trouble at times?" Responses are given on a 5-point Likert scale ("Never or Seldom" to "Very Often"). Construct reliability for promotion-focus is adequate (Cronbach's alpha .70), for prevention-focus it is good (Cronbach's alpha .84).

Financial Outcomes. Our survey assessed six financial outcomes. First, we asked participants about their household savings: 15.8% indicated having less than $250 in total savings; 25.8% had between $250 and $2,500; 21.2% had between $2,500 and $10,000; 21.9% had between $10,000 and $50,000; and 15.3% had over $50,000. Second, we asked participants about their household investments: 43.9% indicated having less than $250 in total investments; 15% had between $250 and $2,500; 16.6% had between $2,500 and $10,000; 12.8% had between $10,000 and $50,000; and 11.7% had over $50,000. Third, we presented three separate items asking participants whether they had fallen into arrears in the last year, offering three response options: 0 (No); 1 (Yes)—Once; and 2 (Yes)—More than once. For household utilities ("heating, electricity, gas, water, etc.") 8.3% of participants had fallen into arrears once, 11.4% more than once. For consumer credits ("credit cards, hire-purchase arrangements, or other nonmortgage loan payments") 7.2% of participants had fallen into arrears once, and 7.2% more than once. For rent/mortgage repayments for the main dwelling 6.7% of participants had fallen into arrears once, and 8.6% more than once. Finally, participants indicated whether they were currently in receipt of income via "public assistance or welfare payments from the state or local welfare office" (0 [No], 1 [Yes]) (5.9% of participants).

Design and Procedure

We recruited MTurk participants for a "survey inquiring about financial decision-making." Participants were redirected from the MTurk platform to an online Qualtrics survey, which explained that the survey was interested in "psychological factors that influence financial decisions." We first asked about sociodemographics (including items to assess financial vulnerability and financial outcomes). We then asked about propensity to plan for money, financial literacy, PSO, time preference, numeracy, and regulatory focus.

Results

To get an understanding of the extent to which participants are exposed to multiple risk factors and establish the need to assess the breadth of financial vulnerability through a measure that integrates these risk factors, we first present the sample distribution of financial vulnerability scores. Next, to establish the nomological validity of our measure, we present zero-order correlations between financial vulnerability, psychological characteristics, and financial outcomes. Then, we present results on the discriminant validity of our financial vulnerability measure. Subsequently, to establish the predictive validity of our measure, and obtain a first indication of the channels through which financial vulnerability is associated with the financial outcomes, we present hierarchical linear regression analyses. Finally, to better understand the underlying mechanism of the association of financial vulnerability with the financial outcomes, we formally test for mediation by the psychological characteristics.

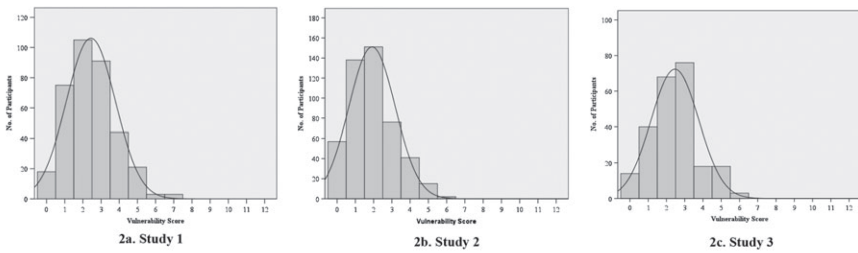
Distribution of Observed Scores for Financial Vulnerability

Figure 2a presents the distribution of observed scores for financial vulnerability, which ranged from zero to seven out of a possible maximum of 12. On average, participants were vulnerable in 2.44 areas ($SD = 1.35$); 18 participants scored zero on the vulnerability scale. These results confirm the notion of the FCA (2015, 23) that individuals are often exposed to multiple risk factors, and indicate that most participants experience at least some form of financial vulnerability.

Nomological Validity of the Financial Vulnerability Measure

Table 1 presents zero-order correlations indicating that financial vulnerability has significant correlations with several psychological characteristics and financial outcomes which support its face validity and are consistent with our expectations. On the one hand, higher financial vulnerability scores were significantly positively correlated with negative

FIGURE 2
Distribution of Observed Scores on Financial Vulnerability Assessment for Studies 1–3



financial outcomes such as having been in arrears and receiving welfare. On the other hand, higher financial vulnerability scores were significantly negatively correlated with positive financial outcomes regarding savings and investments levels, PSO, promotion- and prevention regulatory focus, and a future-oriented time preference. That is, financial vulnerability goes together with attaching less value to saving money in a consistent and sustained manner, less goal-oriented behavior in general, and being more present-focused.

Discriminant Validity of the Financial Vulnerability Measure

According to MacKenzie, Podsakoff, and Jarvis (2005) one can test the discriminant validity of both formative and reflective measures by assessing whether (1) the measures are less than perfectly correlated and/or (2) whether they share less than half of their variance with any other measure in the study at hand, that is, construct intercorrelations are less than .71 (Fornell and Larcker 1981). Our financial vulnerability measure meets these requirements for establishing discriminant validity, with all correlations being lower than unity and below .71. The highest correlation of our financial vulnerability measure with any of the psychological characteristics is −.20 with promotion focus.

Predictive Validity of the Financial Vulnerability Measure

To further assess the predictive validity of our financial vulnerability measure, we conducted hierarchical multiple linear regressions for each of the six financial outcomes. To investigate the channels through which financial vulnerability is associated with these financial outcomes, we followed the approach of Addoum, Korniotis, and Kumar (2016) and Persico, Postlewaite, and Silverman (2004) and examined how the incremental inclusion of sociodemographic and psychological factors in the regression specifications affect the coefficient estimates of the financial vulnerability

TABLE 1

Zero-Order Correlations between Financial Vulnerability, Psychological Factors, and Financial Outcomes for Study 1

	1	2	3	4	5	6	7	8	9	10	11	12
1. Financial Vulnerability	–											
2. Propensity to Plan	.01	–										
3. Personal Savings Orientation	−.09	.67***	–									
4. Future Time Preference	−.16**	.03	.07	–								
5. Prevention-Focus	−.17**	.15**	.18**	.04	–							
6. Promotion-Focus	−.20***	.34***	.32***	.07	.14**	–						
7. Savings	−.31***	.10	.25***	.02	.10†	.19***	–					
8. Investments	−.22***	.12*	.24***	.01	.08	.18**	.74***	–				
9. Arrears (1)	.27***	−.09	−.17**	−.05	−.11*	−.04	−.31***	−.24***	–			
10. Arrears (2)	.27***	−.12*	−.21***	−.01	−.07	−.04	−.31***	−.24***	.55***	–		
11. Arrears (3)	.26**	−.06	−.11*	−.11*	−.16**	−.05	−.23***	−.15**	.66***	.52***	–	
12. Receive Welfare	.34***	−.13**	−.14**	.06	−.09	−.09	−.25***	−.18**	.21**	.23***	.23***	–

Note: $N = 360$. Household savings/investments scored 1 to 16 (less to more savings/investments). Arrears 1 = Utilities, Arrears 2 = Consumer Credits, Arrears 3 = Rent/Mortgage. Arrears scored 0–2 (No, Yes—Once in previous 12 months, Yes—More than once in previous 12 months). Welfare scored as 0—No, 1—Yes.

$^{*}p < .05$; $^{**}p < .01$; $^{***}p < .001$.

measure. We are particularly interested in assessing whether the direct effect of consumers' financial vulnerability on the financial outcomes weakens or becomes insignificant when also including the psychological characteristics in the regression models, as this would suggest that these characteristics mediate the effect of financial vulnerability. That is, we aim to find out whether vulnerable consumers' experiences of particular financial outcomes might be partly explained in terms of how financial vulnerability may manifest itself through consumers' psychological characteristics.

Indeed, Baron and Kenny (1986) propose a test for establishing mediation that requires (1) a direct relationship between an independent variable (e.g., financial vulnerability) and an outcome variable (e.g., a financial outcome such as being in arrears); (2) a direct relationship between an independent variable and a mediator variable (e.g., a psychological characteristic such as PSO); (3) a direct relationship between a mediator variable and an outcome variable (e.g., a financial outcome such as being in arrears); and (4) a partly reduced or no effect of an independent variable on an outcome variable when simultaneously controlling for the mediator variable by including it in the regression model. From Table 1, we observe that financial vulnerability correlates directly with four of the psychological characteristics—PSO, future-oriented time preference, promotion-focus, and prevention-focus—as well as with each of the financial outcomes. These four psychological characteristics also directly correlate with the various financial outcomes.

Based on these observations, each regression model thus progressed by including financial vulnerability as sole predictor in Step 1, adding sociodemographic factors as additional predictors in Step 2, and adding the psychological characteristics as further predictors in Step 3. Two of the sociodemographic factors were coded as dummy variables for the purpose of these analyses: University Education (0 = Non-University Educated, 1 = University Educated), and Race (0 = Non-White, 1 = White). Table 2 outlines the results of these hierarchical regression analyses, which are discussed in more detail below.

In Step 1 of each regression model, our financial vulnerability measure yielded significant predictive value for the financial outcome in question, being positively associated with negative financial outcomes (arrears and welfare) and negatively associated with positive financial outcomes (savings and investments). At Step 2, the financial vulnerability measure retained significant predictive validity for all four negative financial outcomes and for one positive financial outcome (savings levels). At

TABLE 2

Predictive Validity of the Financial Vulnerability Measure for Study 1

	Savings			Investments			Arrears 1			Arrears 2			Arrears 3			Welfare		
	Step 1 β	Step 2 β	Step 3 β	Step 1 β	Step 2 β	Step 3 β	Step 1 β	Step 2 β	Step 3 β	Step 1 β	Step 2 β	Step 3 β	Step 1 β	Step 2 β	Step 3 β	Step 1 Exp(B)	Step 2 Exp(B)	Step 3 Exp(B)
Financial Vulnerability	−.31***	−.20***	−.15**	−.22***	−.08	−.04	.27***	.31***	.29***	.30***	.31***	.26***	.26***	.25***	.22***	2.69***	3.01***	3.33***
Sociodemographic Factors																		
Age		.12*	.12*		.25***	.26***		.16**	.16**		.09	.09		.02	.02		1.04	1.03
Gender		−.12*	−.13**		−.09	−.09		.01	.01		.08	.08		.01	.02		.77	.78
Ethnicity		−.05	−.05		−.05	−.05		−.01	−.02		.03	.02		−.07	−.08		.30	.30
University Educated		.24***	.26***		.21***	.24***		−.04	−.04		.01	−.01		−.01	.01		.14	.12
Psychological Factors																		
Propensity to Plan			−.13*			−.09			−.01			−.01			−.01			.63
Personal Savings Orientation			.31***			.29***			−.15*			−.21**			−.08			.66
Future Time Preference			−.01			−.01			.01			.04			−.06			1.24
Regulatory Focus: Prevention			−.03			−.03			−.04			−.01			−.11*			1.04
Regulatory Focus: Promotion			.08			.07			.06			.07			.05			.96
R^2	.10	.18	.25	.05	.15	.22	.07	.10	.12	.08	.09	.13	.07	.07	.10	.10	.14	.16
Model fit	38.28***	15.35***	11.50***	18.76***	12.54**	9.72***	27.16***	7.43***	4.81***	29.05***	7.16***	5.34***	25.88***	5.58***	3.78***	1.11	1.95	1.45
ΔR^2		.08	.07		.10	.07		.02	.03		.02	.04		.01	.03		.04	.02
ΔModel fit		8.78***	6.46***		10.49***	6.02***		2.39†	2.07		1.64	3.30**		.54	1.92†		–	–

Note: $N = 360$. Household savings/investments scored 1 to 16 (less to more savings/investments). Arrears 1 = Utilities, Arrears 2 = Consumer Credits, Arrears 3 = Rent/Mortgage. Arrears scored 0–2 (No, Yes—Once in previous 12 months, Yes—More than once in previous 12 months). Welfare scored as 0—No, 1—Yes. All analyses except Welfare are hierarchical linear regressions. Welfare is binary logistic regression, thus odds ratios (Exp(B)) >1.00 indicate a *positive* relationship, with odds ratios (Exp(B)) <1.00 indicating *negative* relationships. Model fits for binary logistic models represent Chi Square goodness-of-fit tests, and R^2 represents Cox & Snell R^2.

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

Step 3, the financial vulnerability measure retained significant predictive value for these five financial outcomes. We note that including the psychological characteristics in the regression models reduced the direct effect of financial vulnerability on several financial outcomes (savings, investments, consumer credit arrears and rent/mortgage arrears), suggesting the presence of an indirect effect of financial vulnerability on the financial outcomes through the psychological characteristics. That is, according to Baron and Kenny (1986), the psychological characteristics appear to play a mediating role. Accordingly, we continue by formally testing for mediation effects as in Hayes (2013).

Mediation of the Association of Financial Vulnerability with Financial Outcomes

We investigated whether the psychological characteristics mediate the association between financial vulnerability and the financial outcomes using the bootstrapping method espoused by Hayes (2013), with each analysis employing $N = 5{,}000$ bootstrapped samples.

Analyses indicated that PSO was the sole psychological characteristic to yield significant mediation of financial vulnerability, with mediation occurring for all financial outcomes except for rent/mortgage arrears and being in receipt of welfare. Figure 3 presents these mediation results. As per Hayes (2013), significant mediation is evident in panels A to D where in each instance the 95% confidence interval for the indirect effect of financial vulnerability on financial outcomes via PSO does not cross zero. These results indicate that the effect of financial vulnerability on the financial outcomes can be explained through its negative association with the psychological characteristic of PSO. That is, our results suggest that the more-frequent experience of negative financial outcomes by financially vulnerable consumers can be partly explained by more financially vulnerable consumers generally also having less favorable views regarding the merit of proactively saving money as measured by their PSO.

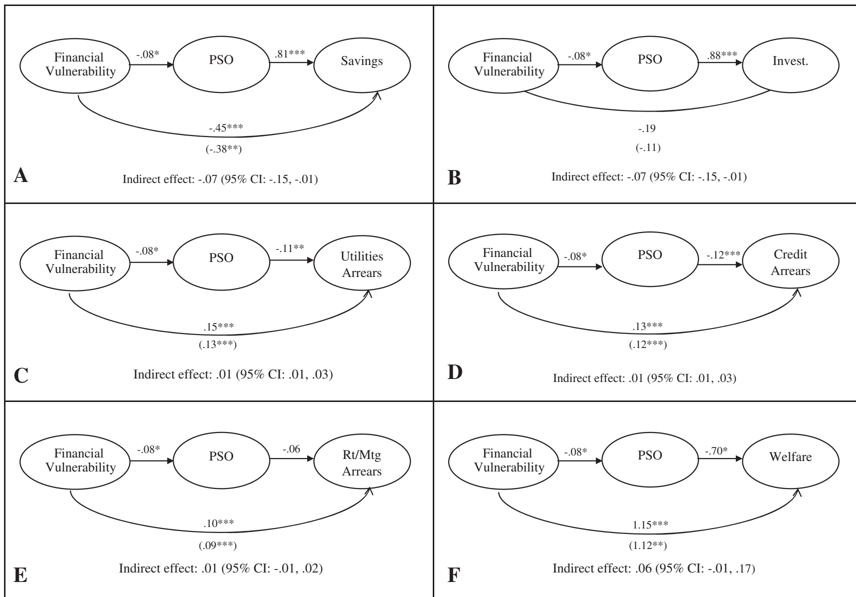
STUDY 2

Data and Method

Participants

Study 2 had two objectives. First, we wanted to examine the robustness of the results of Study 1 using a nationally representative sample. Second, we wanted to expand the range of psychological characteristics and financial outcomes under investigation. To these ends, a total of $N = 515$ US participants were recruited through Qualtrics, which maintains a large and nationally representative online panel of Americans that researchers can

FIGURE 3
Mediation of Financial Vulnerability on Financial Outcomes by Personal Savings Orientation for Study 1



Note: $N = 360$. Direct effect presented in parentheses. Invest = Investments; PSO = Personal Savings Orientation; Rt/Mtg = Rent/Mortgage arrears. *$p < .05$; **$p < .01$; ***$p < .001$.

access for a fee. A number of participants ($n = 35$) were excluded based on giving incomplete or invalid responses. The remaining participants ($N = 480$) ranged 18–99 years old ($M_{age} = 52.42$, SD = 14.81), and comprised 236 males (49.2%), 240 educated to university level (50%), and 74 nonwhite participants (15.4%). In contrast to Study 1, Study 2 also included “old” (>80 years) participants ($N = 7$) who thus were vulnerable for that risk factor.

Measurement

Similar to Study 1, our survey collected sociodemographic data and made assessments regarding financial vulnerability, psychological characteristics, and financial outcomes.

Financial Vulnerability. Financial vulnerability was measured as in Study 1, with the only difference being that in Study 2 participants provided exact figures about their net income and debt instead of selecting the most appropriate of a range of income and debt categories. In Appendix S1

available online, Table S2 provides a complete account of all scales including item wording and Table S4 describes the proportions of the sample that were categorized as at-risk according to each risk factor of financial vulnerability in Study 2.

Psychological Characteristics. Apart from time preference and propensity to plan for money, measured as in Study 1, we assessed three additional psychological characteristics in Study 2.

Financial Self-Efficacy. We used Lown's (2011) 6-item scale, which measures personal agency regarding financial matters or the belief that one can succeed at a given financial task. An example item is "I lack confidence in my ability to manage my finances" (reverse-scored). Responses are given on a 7-point Likert scale ("Does not describe me at all" to "Describes me very well"). Construct reliability is good, with a Cronbach's alpha of .88.

Consideration of Future Consequences. We used eight relevant items from Strathman et al.'s (1994) 12-item scale, which measures individual differences in the extent to which people consider distant versus immediate consequences of behaviors. An example item is "I only act to satisfy immediate concerns, figuring the future will take care of itself" (reverse-scored). Responses are given on a 7-point Likert scale ("Does not describe me at all" to "Describes me very well"). Construct reliability is good, with a Cronbach's alpha of .83.

Money Management Skills. We used Garðarsdóttir and Dittmar's (2012) 9-item scale, which measures proactivity regarding managing money. An example item is "I always know exactly how much money I owe." Responses are given on a 7-point Likert scale ("Does not describe me at all" to "Describes me very well"). Construct reliability is good, with a Cronbach's alpha of .85.

Financial Outcomes. Our survey assessed six distinct financial outcomes, of which three were also measured in Study 1 (savings and investments levels, being in receipt of welfare). First, participants indicated on average having $279,154 in total savings (SD = $664,930; Median = $21,634). Second, participants indicated on average having $329,109 in total investments (SD = $1,607,991; Median = $3,500). To address the skewed distributions, we followed prior literature in consumer financial decision-making (Gerhard, Gladstone, and Hoffmann 2018; Nyhus and Webley 2001) and took the natural log of total savings and investments for the purpose of our analyses. To accommodate for the fact that some participants had zero savings or investments, we added 1 to the value of each of

these variables before taking the log. Third, participants were asked to indicate whether they were currently in receipt of welfare (0—No; 1—Yes): 4% did. Fourth, the survey asked participants to indicate whether they paid their credit card balances in full each month (0—No; 1—Yes): 59% did. This question was taken from Hilgert, Hogarth, and Beverly (2003). Fifth, the survey asked participants to indicate whether they saved or invested money out of each pay check (0—No; 1—Yes): 57.9% did. This question was also taken from Hilgert, Hogarth, and Beverly (2003). Finally, participants were asked about their financial fragility as in West and Friedline (2016), by indicating whether they had set aside emergency or rainy day funds that would cover three months of expenses in case of sickness, job loss, economic downturn, or other emergencies. Responses were given on a 7-point Likert scale ("Totally Disagree" to "Totally Agree"): 17.1% totally disagreed with this statement, while 44.2% totally agreed.

Design and Procedure

Participants were recruited from a large nationally representative online panel of Americans maintained by Qualtrics, who pays participants for completing surveys and ensures a consistent panel quality. Participants were informed that the survey aimed to "understand individual financial decisions that consumers make." We first asked about sociodemographics (including items to assess financial vulnerability and financial outcomes). We then asked about money management skills, financial self-efficacy, consideration of future consequences, time preference, and propensity to plan for money.

Results

As in Study 1, we first present the distribution of financial vulnerability scores. Second, we present zero-order correlations between financial vulnerability, psychological characteristics, and financial outcomes. Third, we present results on the discriminant validity of our financial vulnerability measure. Fourth, we present hierarchical linear regression analyses. Fifth, we formally examine mediating effects of the psychological characteristics.

Distribution of Observed Scores for Financial Vulnerability

Figure 2b presents the distribution of observed scores for financial vulnerability, ranging from 0 to 6 out of a possible maximum of 12. Participants were deemed to be vulnerable in 1.91 areas (SD = 1.27), indicating a lower average level of financial vulnerability compared to

Study 1. However, as in Study 1, it is clear that many participants are exposed to multiple risk factors.

Nomological Validity of the Financial Vulnerability Measure

Table 3 presents zero-order correlations between financial vulnerability, psychological characteristics, and financial outcomes. As in Study 1, higher financial vulnerability was significantly negatively correlated with saving and investments levels, having emergency savings, saving from each paycheck, and paying off credit card balances in full each month. Also, as in Study 1, higher financial vulnerability was significantly positively correlated with receiving welfare. Higher financial vulnerability was significantly negatively correlated with money management skills, financial self-efficacy, consideration of future consequences, and marginally significantly negatively correlated with a future-oriented time perspective. That is, financial vulnerability goes together with a lower self-reported proactivity regarding managing money, less perceived personal agency regarding financial matters, a greater consideration of immediate instead of distant consequences of one's behavior, and being more present-focused.

Discriminant Validity of the Financial Vulnerability Measure

We again assess the construct intercorrelations: all are lower than unity and below .71. The highest correlation of our financial vulnerability measure with any of the psychological characteristics is −.35 with financial self-efficacy. Hence, the financial vulnerability measure displays sufficient discriminant validity (Fornell and Larcker 1981; MacKenzie, Podsakoff, and Jarvis 2005).

Predictive Validity of the Financial Vulnerability Measure

To further assess the predictive validity of the financial vulnerability measure, we conducted a series of hierarchical multiple linear regressions (see Table 4). As in Study 1, in Step 1 of each of the six regression models, our vulnerability measure yielded significant predictive value across all financial outcomes, being positively associated with a negative financial outcome (welfare) and negatively associated with positive financial outcomes (savings and investments levels, having emergency savings, paying off credit card balances in full each month, saving money from each paycheck). Controlling for sociodemographic factors in Step 2, the vulnerability measure retained significant predictive validity across all financial outcomes. Adding psychological factors in Step 3, the vulnerability measure only retained significant direct predictive validity for the receiving

TABLE 3

Zero-Order Correlations between Financial Vulnerability, Psychological Factors, and Financial Outcomes for Study 2

	1	2	3	4	5	6	7	8	9	10	11	12
1. Financial Vulnerability	–											
2. Money Management Skills	$-.15^{**}$	–										
3. Financial Self-Efficacy	$-.35^{***}$	$.39^{***}$	–									
4. Consideration of Future Consequences	$-.20^{***}$	$.26^{***}$	$.36^{***}$	–								
5. Future Time Preference	−.08	.04	.01	.02	–							
6. Propensity to Plan	.02	$.43^{***}$	.05	.07	$.13^{**}$	–						
7. SavingsLN	$-.21^{***}$	$.28^{***}$	$.38^{***}$	$.12^{*}$	.06	.07	–					
8. InvestmentsLN	$-.29^{***}$	$.20^{***}$	$.42^{***}$	$.15^{**}$	$.13^{**}$	$.09^{*}$	$.55^{***}$	–				
9. Have Emergency Saving	$-.25^{***}$	$.43^{***}$	$.58^{***}$	$.17^{***}$	.05	$.12^{**}$	$.52^{***}$	$.53^{***}$	–			
10. Pay Off Credit Card Balances Each Month	$-.21^{***}$	$.42^{***}$	$.44^{***}$	$.14^{**}$	.04	$.12^{*}$	$.35^{***}$	$.39^{***}$	$.53^{***}$	–		
11. Save Money from Each Paycheck	$-.13^{**}$	$.27^{***}$	$.32^{***}$	.04	$.08^{\dagger}$	$.14^{**}$	$.48^{***}$	$.33^{***}$	$.40^{***}$	$.28^{***}$	–	
12. Receive Welfare	$.20^{***}$	$-.19^{***}$	−.06	$-.12^{*}$	.01	−.01	$-.16^{**}$	$-.11^{*}$	$-.16^{***}$	−.05	−.05	–

Note: $N = 480$. Household savings/investments log transformed for analysis.
$^{*}p < .05$; $^{**}p < .01$; $^{***}p < .001$.

TABLE 4

Predictive Validity of the Financial Vulnerability Measure for Study 2

	SavingsLN			InvestmentLN			Emergency Saving			Pay Off CC Balances			Save from Each Paycheck			Welfare		
	Step 1 β	Step 2 β	Step 3 β	Step 1 β	Step 2 β	Step 3 β	Step 1 β	Step 2 β	Step 3 β	Step 1 Exp(B)	Step 2 Exp(B)	Step 3 Exp(B)	Step 1 Exp(B)	Step 2 Exp(B)	Step 3 Exp(B)	Step 1 Exp(B)	Step 2 Exp(B)	Step 3 Exp(B)
Financial Vulnerability	−.21***	−.12**	−.05	−29***	−.14**	−.08	−.25***	−.15**	−.03	.70***	.79**	.93	.81**	.81*	.92	2.04***	1.82**	1.90**
Sociodemographic Factors																		
Age		−.01	−.05		.13**	.11**		.07	−.01		1.01	1.00		.97***	.96***		.98	.99
Gender		−.14**	−.08†		−.12**	−.07		−.16***	−.06		1.39	.94		1.62*	1.30		1.43	1.23
Ethnicity		.02	.04		−.01	.02		−.01	.03		1.09	.99		1.00	.85		.96	.81
University Educated		.26***	.22***		.36***	.31***		.20***	.13**		.36***	.35***		.39***	.42***		4.00*	4.37*
Psychological Factors																		
Money Management Skills			.18***			.02			.26***			3.06***			1.74***			.39**
Financial Self-Efficacy			.25***			.26***			.45***			1.65***			1.53***			1.54*
Consideration of Future Consequences			−.05			−.04			−.09*			.81			.80			.70
Future Time Preference			.03			.08*			.02			1.02			1.07			1.07
Propensity to Plan			−.03			.06			−.01			.88			1.03			1.38
R^2	.05	.13	.23	.08	.26	.32	.06	.14	.41	.05	.11	.30	.02	.11	.22	.04	.05	.08
Model fit	22.78***	14.69***	13.93***	43.86***	32.39***	22.15***	31.63***	15.69***	33.14***	5.00	6.92	8.78	.95	9.18	5.69	2.48	5.83	3.94
ΔR^2		.09	.10		.17	.07		.08	.27		.06	.19		.09	.11		.01	.03
ΔModel Fit		12.14***	11.53***		27.13***	9.27***		11.04***	43.54***		–	–		–	–		–	–

Note: $N = 480$. Household savings/investments log transformed for analysis. Credit Card Balances, Save from Each Paycheck, and Welfare all scored as 0—No, 1—Yes. SavingsLN, InvestmentsLN, and Emergency Saving entailed hierarchical linear regressions. All remaining outcomes entailed binary logistic regressions, where odds ratios (Exp(B)) >1.00 indicate a *positive* relationship, with odds ratios (Exp(B)) <1.00 indicating *negative* relationships. Model fits for binary logistic models represent Chi Square goodness-of-fit tests, and R^2 represents Cox & Snell R^2.

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

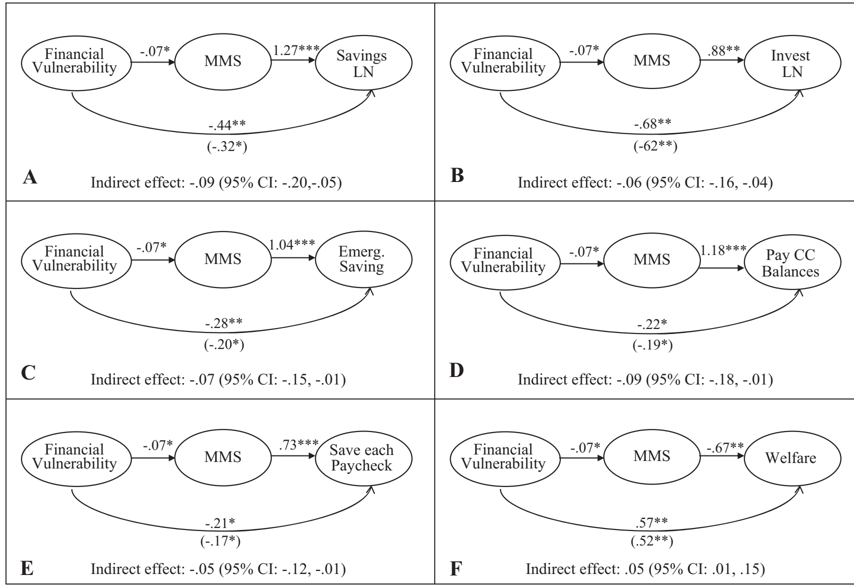
welfare outcome. That is, as in Study 1, including the psychological characteristics in the regression models diminished the direct effect of financial vulnerability on the financial outcomes, suggesting an indirect effect of financial vulnerability on the financial outcomes through the psychological characteristics, which act as mediators (Baron and Kenny 1986). Accordingly, we formally test for mediation next.

Mediation of the Association of Financial Vulnerability with Financial Outcomes

Based on the observation from Table 3 that financial vulnerability significantly correlates with all financial outcomes, and that the psychological factors with which financial vulnerability is correlated (all but propensity to plan) also demonstrate significant correlations across several financial outcomes, we explored the extent to which said psychological factors yielded mediation of financial vulnerability on financial outcomes. Mediation analyses proceeded in the same manner as in Study 1 and show that financial vulnerability has significant indirect effects via money management skills, financial self-efficacy, and consideration of future consequences. In all three cases, the psychological factors attenuated the overall effect of financial vulnerability on financial outcomes.

Beginning with money management skills, Figure 4 indicates that this psychological characteristic partially mediated the association between financial vulnerability and all financial outcomes. This is evidenced by reduced (but still significant) direct effects of financial vulnerability as compared to the total effect, and by confidence intervals for the indirect effect which do not cross zero. Figure 5 shows a similar pattern for financial self-efficacy, with mediation occurring across all financial outcomes. In several instances, financial self-efficacy is seen to fully mediate the association of financial vulnerability, as evidenced by the lack of a significant direct effect (savings, emergency saving, paying off credit card balances in full each month, and saving from each paycheck). Partial mediation is evident for investment levels and receiving welfare. Finally, consideration of future consequences yielded significant mediation of financial vulnerability on having emergency savings and paying off credit card balances in full each month (Figure 6). Taken together, these mediation results indicate that the effect of financial vulnerability on the financial outcomes can be explained through its negative association with the psychological characteristics of money management skills, financial self-efficacy, and the consideration of future consequences. That is, financial vulnerability is generally associated with a lower tendency to be a proactive money manager, a reduced perception of financial self-efficacy, and a diminished

FIGURE 4
Mediation of Financial Vulnerability on Financial Outcomes by Money Management Skills for Study 2



Note: $N = 480$. Direct effect presented in parentheses. CC = Credit Card; Emerg. Saving = Emergency Savings; MMS = Money Management Skills. *$p < .05$; **$p < .01$; ***$p < .001$.

emphasis on longer-term outcomes, which translates into experiencing more negative financial outcomes.

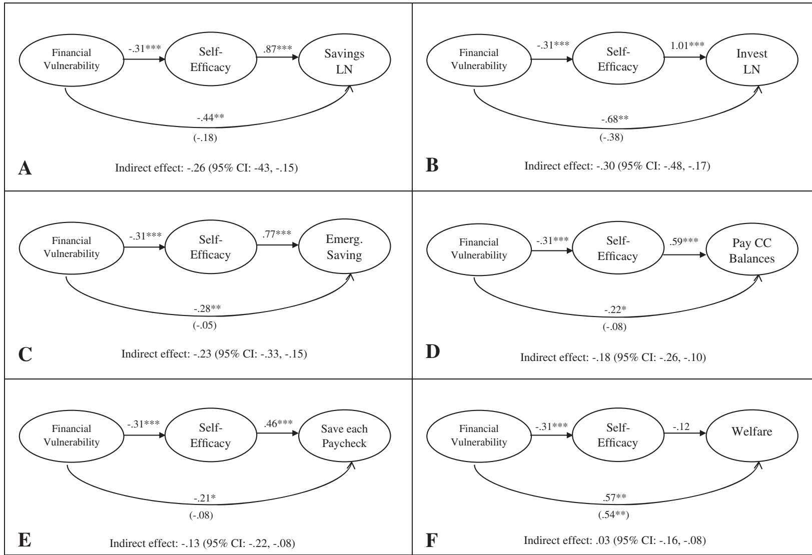
STUDY 3

Data and Method

Participants

The objective of Study 3 was to examine the test–retest reliability of our measure of financial vulnerability. To this end, participants of Study 2 were recontacted by Qualtrics after three months and invited to participate in a short follow-up survey ($N = 253$). As in Study 2, a number of participants ($n = 16$) were excluded based on giving incomplete or invalid responses. The remaining participants ($N = 237$) ranged 20–87 years old ($M_{age} = 54.75$, $SD = 13.46$), and comprised 119 males (50.2%), 122 educated to university level (51.5%), and 35 nonwhite participants (14.8%). Comparing sociodemographic factors between participants that returned from Study 2 to Study 3 and those that did not ($N = 243$) only indicated a significant difference in mean age $t(478) = 3.03$, $p < .01$ (nonreturning

FIGURE 5
Mediation of Financial Vulnerability on Financial Outcomes by Financial Self-Efficacy for Study 2



Note: $N = 480$. Direct effect presented in parentheses. CC = Credit Card; Emerg. Saving. = Emergency Savings. $^{*}p < .05$; $^{**}p < .01$; $^{***}p < .001$.

$M_{age} = 50.39$, $SD = 15.97$). Regarding all other factors, returning and non-returning participants did not differ significantly (all *p*s > .52).

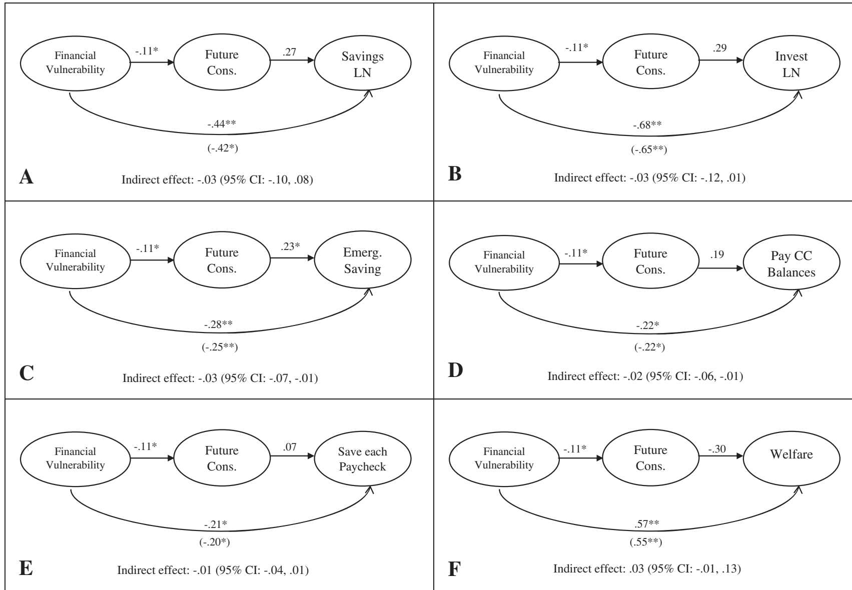
Measurement

Study 3 made several assessments regarding sociodemographic factors and financial vulnerability in line with Studies 1 and 2 and included the financial outcomes as in Study 2. In Appendix S1 available online, Table S3 provides a complete account of all scales including item wording and Table S5 describes the proportions of the sample that were categorized as at-risk according to each risk factor of financial vulnerability in Study 3.

Design and Procedure

Participants of Study 2 were re-contacted by Qualtrics to participate in Study 3. Introductory information informed participants that the survey aimed to "follow-up on the research about individual financial decisions that you participated in three months ago."

FIGURE 6
Mediation of Financial Vulnerability on Financial Outcomes by Consideration of Future Consequences for Study 2



Note: $N = 480$. Direct effect presented in parentheses. CC = Credit Card. Emerg. Saving = Emergency Savings; Future Cons. = Consideration of Future Consequences. *$p < .05$; **$p < .01$; ***$p < .001$.

Results

We first present the distribution of financial vulnerability scores. Second, we present zero-order correlations between vulnerability scores and financial outcomes. Finally, we present results on the test–retest reliability of our measure of financial vulnerability.

Distribution of Observed Scores for Financial Vulnerability

Figure 2c presents the distribution of observed scores for financial vulnerability, ranging from zero to six out of a possible maximum of twelve. The $N = 253$ returning participants were deemed to be vulnerable in 2.46 areas (SD = 1.30), a significant increase over the mean vulnerability score for these participants in Study 2 (M = 1.89, SD = 1.29): $t(236) = 6.68$, $p < .001$. On average, participants' vulnerability scores increased by .56 between Studies 2 and 3. Once again, these results demonstrate the need for an integrated measure of financial vulnerability that comprises the most

TABLE 5
Zero-Order Correlations between Financial Vulnerability and Financial Outcomes for Study 3

	1	2	3	4	5	6	7
1. Financial Vulnerability	–						
2. SavingsLN	−.36***	–					
3. InvestmentsLN	−.31***	.63***	–				
4. Have Emergency Saving	−.25***	.56***	.50***	–			
5. Pay Off Credit Card Balances Each Month	−.15*	.42***	.30***	.52***	–		
6. Save Money from Each Paycheck	−.20**	.41***	.34***	.43***	.29***	–	
7. Receive Welfare	.13*	−.06	−.04	−.33***	.02	.10	–

Note: $N = 237$. Household savings/investments log transformed for analysis.
*$p < .05$; **$p < .01$; ***$p < .001$.

pertinent risk factors instead of looking at them individually, as many participants were exposed to multiple risk factors as per the FCA's (2015) observations.

Further inspection of the differences in vulnerability scores indicated a range of −1 to +4, with 23.7% of participants' scores remaining unchanged. Participants in the top 10th percentile of the degree of change distribution saw their vulnerability score increase by 2 or more between Study 2 and Study 3, while those in the lowest 10th percentile saw their scores decrease by 1.

Nomological Validity of the Financial Vulnerability Measure

Table 5 presents zero-order correlations between financial vulnerability and the financial outcomes. As in Studies 1 and 2, a higher financial vulnerability score was significantly negatively correlated with saving and investments levels, having emergency savings, saving from each paycheck, and paying off credit card balances in full each month. As in Studies 1 and 2, higher financial vulnerability was significantly positively correlated with receiving welfare.

Test–Retest Reliability of the Financial Vulnerability Measure

To determine the test–retest reliability of our measure of financial vulnerability, we inspected the Pearson correlation coefficient between participants' vulnerability scores at time $t = 1$ (i.e., their Study 2 score), and time $t = 2$ (i.e., their Study 3 score), which indicated a highly significant correlation of moderate size between the scores: $r(237) = .51$, $p < .001$.

The moderate size of the correlation coefficient is consistent with the fact that although the risk factors of financial vulnerability—such as high debt, low income, or health issues—are anticipated to stay relatively constant in the short run, they are also likely to vary in the long run as a result of natural changes in consumers' personal circumstances. For instance, a consumer who is currently financially vulnerable because of caring responsibilities may no longer be so once these caring responsibilities are no longer required (e.g., a sick relative moves out). Overall, we conclude from Study 3 that our measure of financial vulnerability has satisfactory test–retest reliability.

GENERAL DISCUSSION

As recently noted by the FCA (2015), financial vulnerability is often variously defined across institutions, which has created difficulties in operationalizing how organizations might best assist vulnerable clients. This is despite widespread agreement that vulnerability is a pernicious issue that increases the risk of financial detriment. Experiencing major or unexpected changes in life circumstances, for instance, is a risk factor for vulnerability that significantly contributes to higher levels of unmanageable debt (FCA 2014). Thus, there is a practical need for organizations to be able to identify more vulnerable clients and recognize focal targets for support. Following the CFPB (2013) and FCA's (2015) risk factors, we included such factors in a comprehensive and formative measure of financial vulnerability, determined its nomological and predictive validity, assessed its discriminant validity, and investigated whether established psychological characteristics mediate the relationship between financial vulnerability and key financial outcomes to identify promising intervention targets.

Our measure of financial vulnerability yielded good nomological validity, evidenced through significant correlations with positive and negative financial outcomes. Supporting the measure's face validity, higher vulnerability was associated with having less savings and investments, being less likely to pay credit card balances in full each month or save/invest out of each pay check, not having recommended emergency savings, and with being more likely to have experienced arrears or being in receipt of welfare. The predictive validity of the measure was further supported by the observation that vulnerability significantly predicted various financial outcomes. The measure was also found to have discriminant validity. Finally, results from a follow-up survey validated the measure's test–retest reliability. Overall, we conclude that the risk factors of the CFPB (2013) and FCA (2015) constitute a good basis upon which to assess financial vulnerability,

and the items that comprise our integrated measure can be taken as a useful means of establishing the extent to which a consumer may be financially vulnerable.

The results of our investigation also highlighted several psychological characteristics that yielded significant mediation of the association between financial vulnerability and all positive and negative financial outcomes, namely money management skills, PSO, and financial self-efficacy. One distinction to be drawn between these characteristics is that while one represents pragmatic behaviors and capacities (money management skills), the others reflect a set of values (PSO) or judgments of self-agency regarding financial matters (financial self-efficacy). Practical financial management skills embody a fundamental set of components that, intuitively, are necessary for consumers to make confident, well-informed decisions. However, policy makers, academics, and nonprofit activists agree that the case for strictly practical financial education programs remains inconclusive with respect to their long-term efficacy (Peeters et al. 2018; Schuchardt et al. 2009). In this regard, it is also relevant to note that we did not find a significant correlation between consumers' level of financial vulnerability and their propensity to plan for money. Indeed, recent meta-analyses indicate that interventions that focus exclusively on knowledge and skills alone yield only marginal changes in financial behaviors (Fernandes, Lynch, and Netemeyer 2014; Miller et al. 2015), particularly among low-income individuals. In other words, skills-based initiatives are necessary, but by themselves seem insufficient in engendering better financial outcomes. Where financially vulnerable consumers lack such skills, it will be crucial to develop them, however, where they perhaps already exhibit otherwise good money management skills, other forms of support may be required that stress the *value* of positive saving habits and/or boost consumers' self-efficacy regarding dealing with financial matters.

To that end, our findings also elucidate several nonskills based constructs with potential widespread utility with respect to understanding financial vulnerability and offer them as a point of focus for targeted advice or policy interventions that may help mitigate its detrimental effects. In this regard, we extend the applicability of PSO to understand financial outcomes beyond the savings domain (Dholakia et al. 2016). Indeed, in Study 1, PSO mediated the relationship between financial vulnerability and almost all positive and negative financial outcomes. Our results thus highlight PSO as a value-based component that could supplement and enhance education initiatives or advice regarding a range of differently poised financial behaviors such as savings behavior or managing debt. It may be the case that the relatively short-lived and minor effects

of information- or knowledge-based interventions (Fernandes, Lynch, and Netemeyer 2014, Miller et al. 2015) could at least in part be due to such traditional approaches failing to instill in consumers a longer-term sense of value to engage in these behaviors. The fact that financial difficulty has negative impacts on temporal and attentional psychological factors (Haushofer and Fehr 2014; Mullainathan and Shafir 2013) as well as goal-directed behavior (Schwabe and Wolf 2009) may offer some explanation as to PSO's value as a mediating influence. Financially vulnerable consumers may restrict their attention to more immediate financial goals, which could be expected to be reflected in a reduction in PSO.

Similar to PSO and money management skills, financial self-efficacy was a further mediator of the relationship of financial vulnerability with several financial outcomes, supporting previous findings linking this characteristic with savings (Engelberg 2007) and investment behaviors (Dulebohn and Murray 2007), as well as the use of credit (Tokunaga 1993). More indebted individuals typically experience poorer psychological health, and higher stress levels (e.g., Gathergood 2012). We might thus assume that vulnerable consumers are likely also experiencing increased stress as they attempt to cope with their difficult financial circumstances. Financial self-efficacy therefore becomes an important consideration, as individuals with higher self-efficacy typically respond more adaptively to adverse circumstances (Park and Folkman 1997). Elsewhere, Engelberg (2007) reports that higher "economic self-efficacy" is associated with greater financial optimism and greater focus on long-term financial behaviors. We might imagine, then, that vulnerable consumers facing difficult financial situations may be less responsive to information and/or practical advice if they score low on financial self-efficacy, as the challenge of implementing such advice may be too aversive. In this regard, it is also interesting to point to the finding that financially vulnerable consumers showed lower levels of both prevention- and promotion-type regulatory focus. This finding suggests that more financially vulnerable consumers are less goal-oriented in general, which is relevant given the centrality of goal-setting to financial endeavors such as accumulating savings (Florack, Keller, and Palcu 2013; Gerhard, Gladstone, and Hoffmann 2018; Ülkümen and Cheema 2011).

Finally, a greater consideration of future consequences is a further example of a nonskills based psychological factor that influences the association of financial vulnerability with financial outcomes. Generally, financial constraint—such as that which we expect for financially vulnerable consumers—focalizes attention on short-term, more immediate demands and goals (Mullainathan and Shafir 2013), likely explaining the negative association between consideration of future consequences

and vulnerability. Financial vulnerability may yield constraints that, as such, relegate the acts of saving, or servicing consumer credit debts to lower status as one focuses on more pressing financial matters. Indeed Joireman, Sprott, and Spangenberg (2005) report that when asked to allocate a windfall gain among several options, such as consumer purchases, trips, or credit card debt, individuals scoring lower in consideration of future consequences are less likely to direct funds toward credit card debt, favoring short-term hedonic purchases instead. Relatedly, individuals scoring high in consideration of future consequences have been found to be more effective savers (Bucciol and Veronesi 2014). Taken together, these findings indicate that having awareness of financially vulnerable consumers' temporal perspective could inform policy makers and business practitioners how best to develop or encourage pre-emptive or future utility-oriented behaviors. Consumers scoring low in consideration of future consequences, for instance, may be more receptive to messages emphasizing shorter time frames or benefits instead of more psychologically distant payoffs.

GENERAL CONCLUSION

Contributions to Research

Consumer financial decision-making constitutes a consequential area of decision-making, in which individuals' current choices have important consequences for their future financial health, and, in turn, overall subjective and physical well-being (Botti and Iyengar 2006). Given that the average consumer struggles with even basic concepts in financial literacy integral to such decision-making (Klapper, Lusardi, and van Oudheusden 2015), the added difficulty of being financially vulnerable places particular strain and risk on such consumers to achieve positive financial outcomes. Consumer protection based on traditional economic analysis has focused on more-choice, better-information, and incentive-policy instruments to improve financial behavior (Lynch and Wood 2006). However, the behavior of vulnerable consumers is constrained by their circumstances, making traditional policy interventions less effective (Bertrand, Mullainathan, and Shafir 2006). Our results provide initial insights into measurable psychological characteristics that vary meaningfully in accordance with consumers' level of financial vulnerability, which is helpful to policy makers and business practitioners to identify areas where at-risk consumers can be (better) assisted.

To the best of our understanding, we are the first to embark on a systematic investigation of the relationship of an integrated measure of

financial vulnerability—based on a comprehensive set of risk factors from policy makers and government agencies such as the CFPB and FCA—with a set of key financial outcomes as identified by the Federal Reserve. Our work identifies several psychological characteristics that are important in explaining the relationship between financial vulnerability and financial outcomes, having mediating effects. In particular, we illuminate PSO and financial self-efficacy as versatile, non-skills-based constructs that can account for the association of financial vulnerability across several financial outcomes, and money management skills as a key pragmatic factor with similar widespread utility.

Implications for Practice

Identifying particular psychological constructs that are associated with consumer financial decision-making is becoming an increasingly important task in relation to how we understand consumers' financial capability. Both the CFPB (2013) and the Money Advice Service (2015) have called for increased emphasis on how consumers' mindsets impact their financial behavior. In this regard, a consumer's PSO and financial self-efficacy have particularly robust associations with financial outcomes and have important mediating roles regarding the impact of financial vulnerability. The results presented in our article are highly actionable for policy makers and business practitioners, as they indicate that they can get a lot of traction from focusing on a few key psychological characteristics of financially vulnerable consumers—such as their PSO and financial self-efficacy. Those working with financially vulnerable consumers may thus want to focus on developing and nurturing a positive PSO and instilling a sense of personal agency as a supplement to their regular advice process.

Consumers' PSO could be developed through teaching them habits that encourage consistent saving and ways to create and maintain a saving-oriented lifestyle (e.g., Dholakia et al. 2016). Ideally, programs aimed at school children would be at the heart of such initiatives, so that a positive PSO becomes ingrained early in a consumers' life. Indeed, there is emerging evidence that even short financial education programs in high schools can increase teenagers' financial knowledge, and decrease the prevalence of impulse purchases (Lührmann, Serra-Garcia, and Winter 2015). Regarding improving consumers' financial self-efficacy, advisers or policy makers are recommended to examine consumers' confidence in implementing financial tasks, and use role-modeling to build confidence

when needed, in addition to providing education focused on developing skills-based financial capability (Lown 2011).

There are several ways in which practitioners such as banks, credit unions, or pension funds can incorporate these recommendations into the design and marketing of their products. To some extent, this is already happening, given the emergence of "goal saver accounts" or other financial products that try to make a connection between a consumer's lifestyle and their savings behavior. Indeed, Karlan et al. (2016) show how reminding consumers about their savings goals increases their saving rates. To further stimulate the adoption of a positive PSO, existing products could be complemented by smartphone apps or interactive websites where consumers can demonstrate their savings efforts to their friends, thereby gaining social approval while simultaneously being reminded about their savings goals. Indeed, prior research on consumer susceptibility to interpersonal influence shows that gaining approval from relevant others is an important driver of consumer behavior, even for financial decisions (Hoffmann and Broekhuizen 2009). Finally, counselors or financial advisors should be aware of the relationship between financial self-efficacy and (vulnerable) consumers' financial outcomes. In particular, they should realize that consumers with low levels of financial self-efficacy are likely to need extra help, support, and reminders to accomplish particular tasks and achieve their financial goals (Lown 2011). In practice, this could mean that when a client with low financial self-efficacy nods their head in agreement that they will accomplish a given task, advisors or counselors may want to follow up with a reminder email, text message, or phone call to ensure completion of the task. It is important to note that treating vulnerable consumers fairly and supporting them in achieving their financial goals is not only the "right thing to do" from an ethical perspective, but also helps practitioners comply with increasingly strict guidelines from policymakers, protect themselves from future penalties from regulators, and restore trust in the financial services sector (Devlin et al. 2015).

Limitations and Future Research

As any study, our work has some limitations, which offer promising avenues for future research. First, future research could take a longer-term and/or dynamic perspective and assess how interventions by policy makers and business practitioners could influence financial vulnerability and improve consumers' financial outcomes. Relatedly, such longitudinal future research might examine the differential impact of particular components of financial vulnerability, as related to specific risk factors. For

example, the impact of changes in circumstances (e.g., death of a spouse, job loss) is perhaps likely to deteriorate over time.

Second, our selection of psychological characteristics includes those that the extant consumer literature has identified as key drivers of consumer financial decision-making. However, given constraints on questionnaire length, the selection is not exhaustive. Other psychological characteristics, such as consumers' impulsivity (Celsi et al. 2017), also appear relevant in the context of consumers' financial vulnerability and financial decision-making, and future research could examine their potential (mediating) role as well.

Third, although we followed the recommendations of the CFPB (2013) and FCA (2015) in our selection of risk factors to include in our financial vulnerability measure, one could argue that low income or high debt might be consequences instead of determinants of vulnerability. Future research might therefore experiment with alternative conceptualizations of financial vulnerability, and longitudinal studies could help clarify the direction of causality in the relationship between financial vulnerability and risk factors such as low income or high debt.

Fourth, since the data are measured rather than manipulated, it is technically possible that instead of mediating the relationship between financial vulnerability and financial outcomes, consumers' individual psychological characteristics are antecedents of financial vulnerability. However, we consider this possibility rather unlikely, as many of the risk factors of financial vulnerability are relatively "exogenous" situational factors, such as experiencing changes in circumstances (e.g., job loss, divorce), being younger or older, having caring responsibilities, or suffering from a physical disability, severe or long-term illness, or mental health issue. It is hard to imagine how such risk factors are caused by consumers' individual psychological characteristics, such as their PSO, while it is easy to imagine how such risk factors affect individual psychological characteristics. For example, each of the risk factors mentioned above, such as losing one's job, are likely to influence an individual's ability to save, which has been shown to affect their willingness to save (see Katona 1975). Additionally, as a robustness check, we revisited our data and applied a "half-longitudinal design" (see e.g., Maxwell and Cole 2007) in which we exploit the fact that we measured financial self-efficacy not only in Study 2, but also again three months later in Study 3. Accordingly, for the participants that returned from Study 2 to Study 3 we examine how their financial vulnerability as measured in Study 2 is associated with their financial outcomes as measured three months later in Study 3, and how financial self-efficacy as also measured three months later in Study 3 mediates this relationship. Doing so overcomes the

potential criticism that the psychological characteristics could cause financial vulnerability, as these characteristics are now measured *after* financial vulnerability is measured. Results from this half-longitudinal design are reported in Figure S1 in Appendix S1 available online and indicate that financial self-efficacy mediates the relationship between participants' financial vulnerability and all the financial outcomes included in Study 3, with the exception of being in receipt in welfare. The results from this robustness check provide evidence in support of the mediation results we report throughout the article and back up the reasoning presented above about why it seems unlikely that consumers' psychological characteristics are antecedents of their financial vulnerability instead of mediators of the relationship between financial vulnerability and financial outcomes.

Fifth, it would be interesting to study the relationship between financial vulnerability, psychological characteristics, and consumer financial well-being. Consumer financial well-being has two dimensions: current money management stress and expected future financial security (Netemeyer et al. 2018, 71). As such, financial well-being has been defined as the "perception of being able to sustain current and anticipated desired living standards and financial freedom" (Brüggen et al. 2017, 2). Although financially vulnerable consumers might, on average, be expected to experience lower levels of financial well-being, this relationship might be qualified by their individual psychological characteristics. For example, financial well-being might be dampened to a lesser extent for financially vulnerable consumers with a strong PSO, as saving money fits these consumers' favored lifestyle, and they might thus have fewer problems with living within their means.

Despite these limitations, our work contributes to the emerging, but still limited, literature on consumers' financial vulnerability and financial decision-making, by introducing both a comprehensive and formative measure of financial vulnerability and highlighting the important role of psychological characteristics in understanding the association of financial vulnerability with key financial outcomes. Importantly, our work has notable implications for policy makers as well as business practitioners to identify and better support financially vulnerable consumers.

SUPPORTING INFORMATION

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

APPENDIX S1. Supporting Information
TABLE S1 Scale and Variable Definitions for Study 1

TABLE S2 Scale and Variable Definitions for Study 2
TABLE S3 Scale and Variable Definitions for Study 3
TABLE S4 Proportion of Participants in Study 2 Categorized as "At-Risk" for each Risk Factor of Financial Vulnerability
TABLE S5 Proportion of Participants in Study 3 Categorized as "At-Risk" for each Risk Factor of Financial Vulnerability
FIGURE S1 Robustness Check Applying Half-Longitudinal Design for Mediation of Financial Self-Efficacy

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