

Three essays on the relationship between financial worry and financial behaviors

by

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B.S., Syracuse University, 1994
M.B.A., DePaul University, 1999

AN ABSTRACT OF A DISSERTATION

submitted in partial fulfillment of the requirements for the degree

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Department of Personal Financial Planning
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Abstract

Despite our intuitive appreciation of the power and influence of emotions, gaps remain in what we understand of its relationship with behaviors within the personal finance domain.

Financial worry is the emotion of interest for this research. This dissertation uses three studies to investigate the potential relationship between financial behaviors and two specific types of financial worry—investment and retirement worry. Each study relies on a distinct theoretical perspective which allowed for testing these emotions as either predictor or outcome variables.

Essay one used the information source framework (Beales et al., 1981) combined with the information search process model (Kuhlthau et al., 2008) as theoretical support for investigating the association between investment worry and sources chosen for financial information. The combined 2018 National Financial Capability Study (NFCS) State-by-State (NFCS-SS) and Investor Surveys (NFCS-IS) provided the data. Results from the path analysis found no significant direct paths from investment worry to external information sources. Furthermore, the study did not find statistical support for objective financial knowledge mediating the relationship between investment worry and any of the external information sources.

Essay two relied on the transactional theory of stress and coping model (Lazarus & Folkman, 1984) to explore the relationship between avoidance behaviors and retirement worry. The 2021 NFCS-SS provided the data for this study. Results from the OLS model provided evidence of an inverse relationship between avoidance behaviors and retirement worry. A multinomial regression model was then used to examine the level of retirement worry relative to avoidance behavior. Findings showed that, in general, avoidance behavior is negatively related to the level of retirement worry.

Essay three utilized prospect theory (Kahneman & Tversky, 1979) to predict the relationship between retirement worry and investment risk behavior. The combined 2018 NFCS-SS and NFCS-IS provided the data for this study. Results from the multinomial regression model showed the *strongly disagree* category of retirement worry relative to those who are neutral had a positive relationship with holding *more than half* of an investment portfolio in stock relative to those holding no stock. There were no significant relationships found between any category of retirement worry and the *less than half* category of stock ownership when compared to owning no stocks. The relationship between any level of retirement worry and the *more than half* category of stock ownership, relative to the *less than half* category, was also not significant when all other variables were held constant.

Overall, findings support increased attention to financial worries—specifically investment and retirement worry, as emotional factors that can influence the financial planning process. Financial professionals can use these insights when preparing to deliver financial information to clients, when helping clients manage their coping strategies, or when making financial recommendations. Future research can also expand our understanding of other mechanisms that may mitigate the influence of these emotions on financial outcomes.

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Dedication

This dissertation is dedicated to my family: my husband Dwayne, sons Quintin and Damien, my parents, my sisters, and niece and nephews.

Chapter 1 - Introduction

Statement of the Problem

While we may intuitively appreciate the power of emotions, gaps in our understanding of its role and influence in the personal finance domain remain. Scholarly research has established that emotions can impact decision-making (Ackert et al., 2003; Lerner et al., 2015; Tallis et al., 1991). Specifically, Lerner and her colleagues (2015) concluded that “emotions powerfully, predictably, and pervasively influence decision making” (p. 801) in their survey of research on emotion and decision-making in the behavioral sciences which spanned more than thirty years of review. Ackert and her colleagues (2003) even make the case that emotion and rational decision-making are complementary. For example, while people acting on their emotions may initially appear irrational, they argue that it may be rational for an individual experiencing anxiety to lean toward safer options when faced with alternatives.

This dissertation focused on the emotion of financial worry, a subcomponent of the broader emotion of worry. In the Diagnostic and Statistical Manual of Mental Disorders, the general construct of worry was determined to be an essential feature of generalized anxiety disorder (GAD) (Diagnostic and Statistical Manual of Mental Disorders: Rev. 3rd Ed. (DSM-III-R), 1987) (DSM-III-R; American Psychiatric Association [APA], 1987). As such, it is recognized as a separate and distinct component of the emotion of anxiety. Definitions of worry specify its focus on thoughts and images, triggered by possible future threats and negative outcomes, resulting in a form of mental problem solving (Holaway et al., 2006; Matthews & Funke, 2006; Sibrava & Borkovec, 2006). However, despite its function as a coping mechanism, Matthews and Funke (2006) highlighted risks associated with worry as an adaptive strategy. For example, some risks include excessive attention to potential threats, interference with emotional

processing, and prolonged cycles of worry. Given what we know in this context, it is important to also understand the influence emotions can have on an individual's financial decisions and preferences.

Recent U.S. public opinion polling reported increases in the levels of worry Americans experienced related to their finances. In their annual survey, Gallup Poll Social Series: Economy and Personal Finance (GPSS) found that Americans reported an increase in the level of worry for several financial categories in 2022 when compared to the prior year. For example, there was an uptick in the number of respondents who felt 'very worried' or 'moderately worried' about having enough money for retirement. More than 60% of respondents reported worry about this category (Table 1.1; Saad, 2022). These worries appear to be more prominent for middle-aged and minority adults (see Table 1.2). Findings like these are concerning because academic researchers have explained that worry is often experienced as a form of self-talk and can incubate (Sibrava & Borkovec, 2006).

Table 1.1

Reported Level of Financial Worry -- Gallup Poll Social Survey

	Total Worried (%)
Not having enough money for retirement	63
Not being able to pay medical costs of a serious illness/accident	56
Not being able to maintain the standard of living you enjoy	52
Not being able to pay medical costs for normal health care	43
Not having enough to pay your normal monthly bills	40
Not having enough money to pay for your children's college	36
Not being able to pay your rent, mortgage, or other housing costs	35
Not being able to make the minimum payments on your credit cards	22

Note. Gallup Poll Series: Economy and Personal Finance. April 1-19, 2022. Total worried was defined as ‘very worried’ and ‘moderately worried’.

Table 1.2

Retirement Worry Demographics—Gallup Poll Social Survey

	Total Worried (%)
Gender	
Male	61
Female	65
Race	
White	60
Non-white	70
Age	
18-34	63
35-54	73
55+	56

Note. Gallup Poll Series: Economy and Personal Finance. April 1-19, 2022. Total Worried was defined as ‘very worried’ and ‘moderately worried’.

Purpose

This dissertation’s primary objective was to extend previous work on the relationship between emotions and financial behaviors (Magwegwe, 2020) by investigating the relationship between two types of financial worry and financial behaviors, specifically investment and retirement worry. The primary audience for this research is financial professionals, particularly financial counselors, planners, and therapists. Empirical studies investigating the role various types of financial worry have on financial behaviors can help practitioners understand how these emotions may influence their clients’ decisions and behaviors, equipping them to identify and select strategies appropriate for managing its influence.

The dataset used for this dissertation is the National Financial Capabilities Study (NFCS). The NFCS is a national, cross-sectional study of the financial capability of American adults and consists of two surveys, the State-by-State Survey (NFCS-SS) and the Investor Survey (NFCS-IS). The sample included a subset of U.S. adults—age 18 and older. Essays one and three used the 2018 wave of the combined NFCS-SS and NFCS-IS while essay two used the 2021 wave of the NFCS-SS to supply the data for the research.

The 2018 NFCS-SS included a sample of 27,091 adults which was comprised of 500 respondents from each state and the District of Columbia. The states of Oregon and Washington were oversampled in the 2018 study (Arc Research, 2018a). The sample included a demographic mix by age, gender, marital status, education levels and employment status. Sample weights for the NFCS-SS are based on data from the American Community Survey and weighted to reflect national, regional, and state weightings in terms of age, gender, ethnicity, education, and Census Division (Arc Research, 2018a).

The sample used for the 2018 NFCS-IS is a subset of the larger 2018 NFCS-SS and included 2,003 adults—age 18 and older. The respondents had to have completed the 2018 NFCS-SS, have investments outside of their retirement accounts, and be involved in investment decision-making to qualify. This survey aimed to explore investing related topics and is weighted to be “representative of investors with non-retirement investments in terms of age and education” with the aim of representing the U.S. investor population (Arc Research, 2018b, p. 2). The combined dataset was suitable for investigating the impact of investment and retirement worries on the behaviors and preferences of interest, including several questions related to financial information source and investment risk behaviors.

The 2021 NFCS-SS included a sample of 27,118 U.S. adults which was comprised of 500 respondents from each state and the District of Columbia. The states of California and Oregon were oversampled in the 2021 study. The survey was administered from June to October 2021. The sample included a demographic mix by age, gender, marital status, education levels and employment status. Sample weights for the 2021 NFCS-SS are based on data from the American Community Survey and weighted to reflect national, regional, and state weightings in terms of age, gender, ethnicity, education, and Census Division (FGS Global, n.d.). This dataset was suitable for exploring the relationship between avoidance behaviors and retirement worry as it contained the most recently available survey data with questions related to each measure.

Description of Studies

Essay One

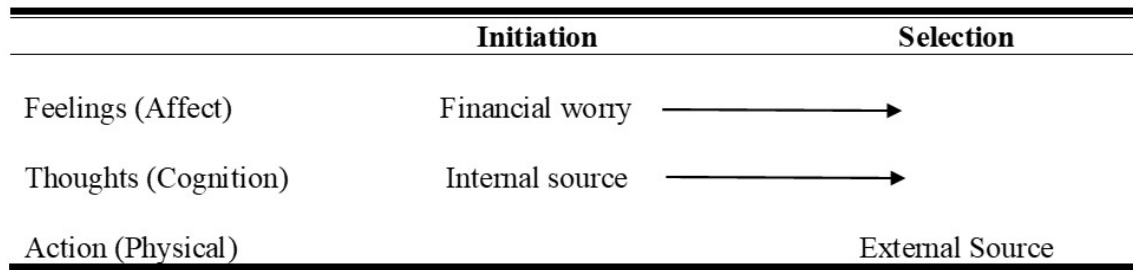
The research question for essay one asked, “is there a relationship between investment worry and the source chosen for financial information?” Scholars in the field of psychology have found that worriers require more information than non-worriers before they make a decision (Matthews & Funke, 2006; Tallis et al., 1991). This finding provides the foundation for the first essay’s investigation of the role investment worry plays on an individual’s choice of a source for financial information using the 2018 NFCS-SS and NFCS-IS dataset.

The framework outlined by Beales and his colleagues (1981) around information source types was combined with the information search model developed by Kuhlthau and her colleagues (2008) to provide theoretical support for this study. The information search model adds affect components to its six stages of an information search process. This study focused on the first two stages of the information search model, initiation and selection, to investigate the

influence of the affect, investment worry, on the sources chosen for financial information (see Figure 1.1).

Figure 1.1

Conceptual Model for Information Search for Financial Information



Note. Adapted from The [Kuhlthau](#) Model of Information Search Process.

Essay one used path analysis to test the relationship between investment worry and information sources (see Figure 1.2). Investment worry was expected to have a direct effect on each information source type. The model then links investment worry to external information sources through internal information sources. The hypotheses tested in essay one was as follows:

H₁: There is a positive relationship between investment worry and the use of internal information sources (objective financial knowledge).

H₂: There is a positive relationship between investment worry and the use of external information sources.

H_{2a}: There is a positive relationship between investment worry and the use of friends and family sources.

H_{2b}: There is a positive relationship between investment worry and the use of media and internet sources.

H_{2c}: There is a positive relationship between investment worry and the use of clubs and organization sources.

H_{2d}: There is a positive relationship between investment worry and the use of professional financial sources.

H₃: The relationship between investment worry and use of external information sources is mediated by internal information sources.

H_{3a}: The relationship between investment worry and the use of friends and family sources is mediated by objective financial knowledge.

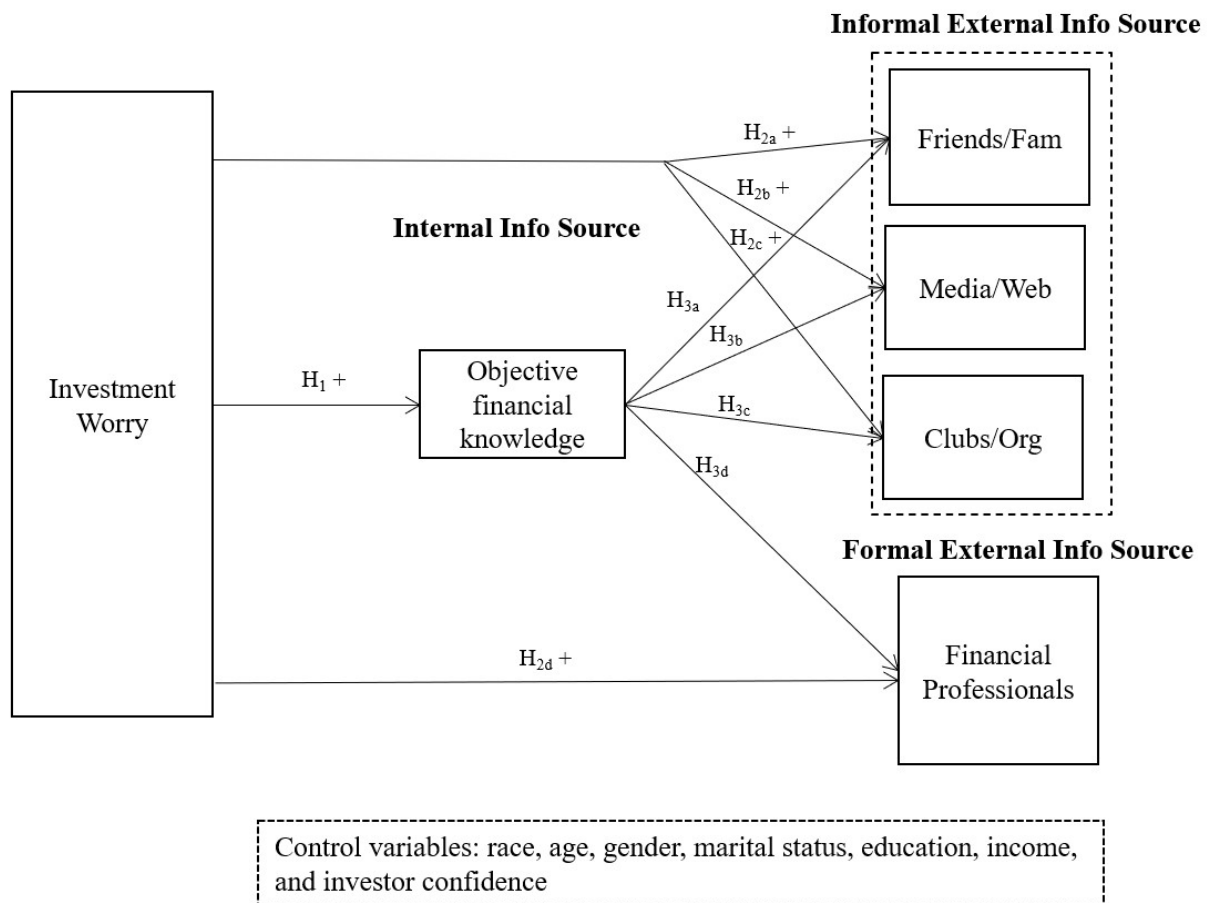
H_{3b}: The relationship between investment worry and the use of media and internet sources is mediated by objective financial knowledge.

H_{3c}: The relationship between investment worry and the use of clubs and organization sources is mediated by objective financial knowledge.

H_{3d}: The relationship between investment worry and the use of professional financial sources is mediated by objective financial knowledge.

Figure 1.2

Illustration of Path Analysis Model



Essay Two

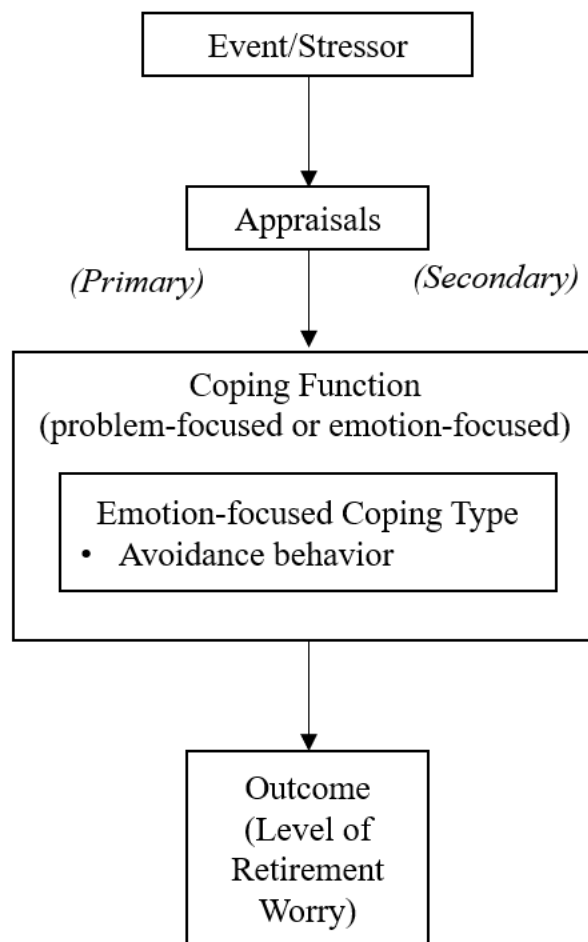
The research question for essay two asked, “is retirement worry lower for those who avoid financial information?” Worry has been characterized as an avoidance response to potential future catastrophes (Sibrava & Borkovec, 2006). However, to the author’s knowledge, empirical studies examining its relationship with financial avoidance behaviors are limited. This dissertation aims to fill that gap. In essay two, the relationship between avoidance behaviors and retirement worry was investigated using the 2021 NFCS-SS dataset.

The transactional theory of stress and coping (TTSC) provided the theoretical framework for testing if there is a difference in the level of retirement worry when an individual presents financial avoidance behaviors. TTSC outlines the two-stage process for an individual’s response

to stressors which includes a threat assessment followed by a chosen coping strategy that results in an outcome (Lazarus & Folkman, 1984). As shown in Figure 1.3, this framework provided support for operationalizing the coping strategy as an avoidance behavior and examining its relationship to the outcome of retirement worry.

Figure 1.3

Conceptual Model for Retirement Worry



Using data from the 2021 NFCS-SS, essay two used a multinomial logistic regression model to investigate the relationship between retirement worry and avoidance behavior and to test the study's hypothesis:

H₁: Levels of retirement worry are lower for those who avoid financial information.

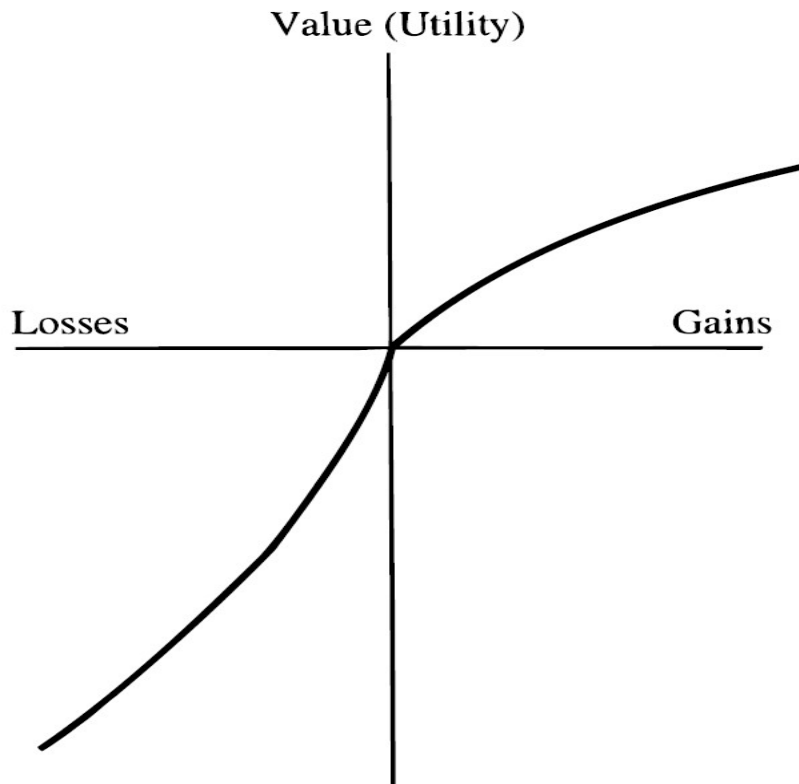
Essay three

The research question for essay three asked, “is there a relationship between retirement worry and investment risk behaviors?” Using the 2018 NFCS-SS and NFCS-IS, essay three examined the association between loss aversion and investment risk behavior. Investment risk behavior was operationalized with stock investing.

Prospect theory was used as the theoretical framework to examine the investment behavior derived by loss aversion when an individual experiences retirement worry (Figure 1.4). Loss aversion reflects a greater sensitivity to losses than to gains (Kahneman & Tversky, 1979; Klaus et al., 2020) and offers a perspective of risk preferences that has been described as more aligned with the risk decisions found in the personal finance domain (Quattlebaum, 1998).

Figure 1.4

Prospect Theory Model (Kahneman & Tversky, 1979)



Kahneman and Tversky's (1979) model for prospect theory provided support for the prediction that an individual's level of stock holdings will increase when they experience retirement worry. This reflects the theory's premise that gain and loss assessments are measured based on a reference point. This study considers current expectations for future income as the reference point. Essay three used multinomial logistic regression to test the following hypothesis:

- H_1 : When an individual anticipates losses (retirement worry), they will take on risk (invest more in stock).

Potential Implications and Summary

Understanding the relationship between worry and financial behaviors has important implications for financial professionals, including advisors, counselors, and therapists. Research supporting worry as an explanatory factor for financial behaviors, or an outcome resulting from financial decisions, would position practitioners to seek and adopt assessment tools and financial

strategies that position individuals and households for positive financial outcomes. This area of inquiry represents a gap in the literature in the personal finance domain.

It is important to understand how the emotional experience of investment worry would influence where an individual may turn for financial information. This information can be used by practitioners to strategically place helpful resources where consumers would be most likely to access or receive it. Secondly, expanding our understanding of detrimental avoidance behaviors would aid practitioners in their efforts to help individuals address their needs during the financial planning process, particularly in the retirement planning stage where consequences for under preparedness can be significant. Finally, providing financial professionals with empirical research that can inform their decisions around framing recommendations and managing biases stemming from loss aversion would better position practitioners to offset behaviors that have negative outcomes for their clients.

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Chapter 2 - The Effect of Investment Worry on Sources Chosen for Financial Information

The increased complexity of financial products and information (Fan & Chatterjee, 2017), along with recent market volatility and economic concerns that have arisen in the post-Covid environment, have been cited in recent headlines as factors driving investor worries (Hyzy, 2022; Idzelis, 2022; Klebnikov, 2022; La Monica, 2022). Financial services firms have responded by offering an abundance of financial advice, analysis, and educational materials for the public to consume (Fidelity, 2022; Hyzy, 2022; Schwab, n.d.). Additionally, easy access to trading through digital trading apps and increased access to investment tools are some of the recent trends contributing to a surge of more than 10 million new retail investors opening brokerage accounts since 2020 (Deloitte, n.d.). These dynamics have boosted the current appetite for access to real-time investment information from retail investors. Regulators and researchers have categorized the new retail investors into buckets of novice and experienced investors. Deloitte (n.d.) argues that social media plays an important role in how both groups receive and process information, increasing collective knowledge while providing a place for sharing and sharpening investment strategies.

The extant literature on information-seeking preferences and behaviors has primarily focused on the benefits of financial professionals and the characteristics of those who seek their advice. However, this study considered financial advice from professionals as just one form of financial information. Empirical findings have shown that information source preferences often differ based on demographic factors, such as age, gender, race, income, and education level (Chang, 2005; Gill & Bhattacharya, 2017; Rhine & Touissant-Comeau, 2002). Further, psychological constructs, such as personality traits, have also been found to influence

preferences for financial information sources. For example, Chatterjee and Fan (2021) identified neuroticism as a personality trait significantly associated with seeking financial advice from family and friends whereas Fan and Lim (2022) found that mental distress was negatively associated with seeking advice from family. They instead found that individuals experiencing mental distress were more likely to seek advice from professionals and social networks. Thus far, however, limited empirical research has included the role emotions play in the search for financial information. Research focused on the role psychological and emotional constructs play in directing where individuals source their financial information would be beneficial to financial professionals, such as counselors, therapists, and planners. It would add insight into how individuals cope with emotions related to their financial condition and provide support for strategies aimed at getting useful, accurate financial information to those who seek it.

The purpose of essay one was to investigate the association between the emotional construct of investment worry and the choice of financial information source. This study also considers mechanisms for why (i.e., mediators) certain external sources may be chosen. It is important to understand the ways in which people experience and respond to investment worry so practitioners can arm themselves with tools and strategies that help clients manage its influence. The following research question was explored in this essay, “is there a relationship between investment worry and the source chosen for financial information?”

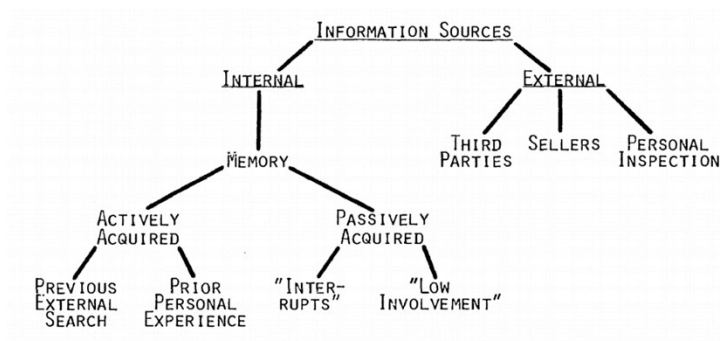
Theoretical Framework

Theoretical models and frameworks related to information search have attempted to explain information search from the perspective of economic utility, source types, and search processes. From an economic perspective, information has economic value, and this value can be measured as the amount of benefit that exceeds the expected cost of gathering the information

(Stigler, 1961). The literature on information search frameworks categorized sources of information into two types, internal and external sources as shown in Figure 2.1. Beales and his colleagues (1981) outlined information acquisition strategies from the perspective that different information gathering methods or sources may be used for different kinds of information. Internal information sources include information obtained from memory, either actively acquired in the past or passively acquired, while external information sources require actively seeking new information from outside sources. An example of passively acquired information could include gleaning information from a billboard or advertisement on a drive to work, while an example of actively acquired past information would be experience from past personal use of the item an individual seeks information about. Internal sources are often used first because it is easy to access and the cost is simply the cognitive effort required to access it (Beales et al., 1981), which aligns with Stigler's (1961) cost-benefit framework.

Figure 2.1

Information Sources (Beales et al., 2018)

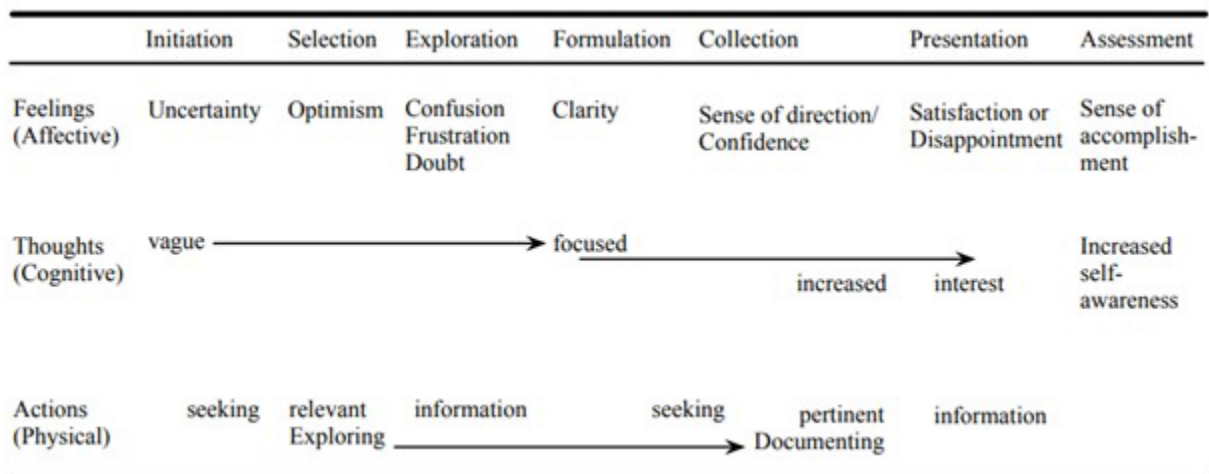


The information source framework has been extended with the information search process model which was developed in the field of library and information science (see Figure 2.2). This model includes affective, cognitive, and physical components to the search process which, according to the model, occurs in six stages: initiation, selection, exploration,

formulation, collection, and presentation (Kuhlthau et al., 2008). In the initiation stage, an individual recognizes a need for information which is accompanied by the affect, or feeling, of uncertainty. The cognitive components of this stage include thinking about the problem and connecting to prior experience or internal knowledge. From here an individual moves to the selection stage. During the selection stage, an individual would identify the approach to the search process they will take and experience a feeling of optimism in response to their readiness to begin the search. The third stage, exploration, involves finding informative, relevant information but the possibility that the new information is inconsistent or conflicts with previously held beliefs makes this stage likely to increase uncertainty, create self-doubt, or a reluctance to search further (Kuhlthau et al., 2008). In formulation, the fourth stage, cognition is more focused and confidence increases. The final two stages, the collection and presentation stages, involve identifying the pertinent information and finalizing the search.

Figure 2.2

The Kuhlthau Model of Information Search Process



Note. Source: Kuhlthau et al., 2008.

Figure 1.1 illustrates the components of this study's conceptual model. The initiation and selection stages of the information search process model were used to investigate the influence of the affect, investment worry, on the sources chosen for financial information. Cognitive thoughts provided the theoretical basis for examining the use of internal sources for financial information while the physical actions portion of the model supported the examination of external information sources. Stigler's (1961) cost-benefit framework was used to examine specific types of external financial information sources.

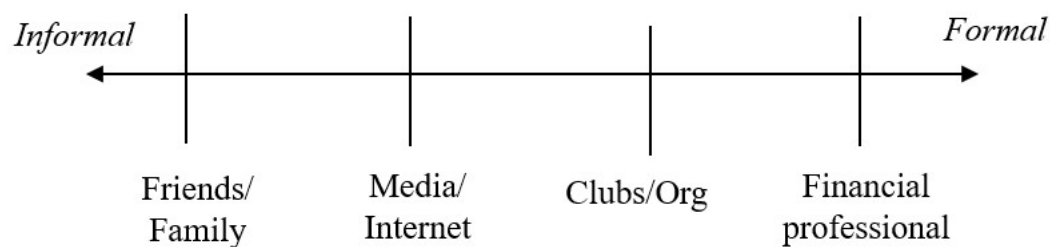
Literature Review

Following the framework outlined by Beales et al. (1981), information sources were grouped into three categories: internal, informal external, or formal external. Internal information sources are derived primarily from memories and past experiences. Beales et al. (1981) explained that memories that serve as internal information sources are most often created with passive observations, e.g., exposure to advertising or watching others. In contrast, informal and formal external information sources require the individual to actively seek out information. Informal external sources of information are generally accessible without incurring a high explicit cost. For example, traditional and social media, the internet, friends and family, and similar types of information sources would fit into this category. For this study, formal external information sources referred to information from an 'information expert'. Beales and his colleagues (1981) described an information expert as a professional who accumulates a body of knowledge more efficiently than an individual could on their own. The professional is then positioned to share their expertise when needed. However, the authors noted that an individual would incur a cost of time and money when using this source of information. Given this context, external information sources were defined on a spectrum ranging from informal (i.e.,

family/friends) to formal (i.e., financial professionals). As illustrated in Figure 2.3, the spectrum reflects internal sources as more intimate and familiar and moves through to more arm's length relationships with professional sources at the formal end of the range of external sources.

Figure 2.3

Informal-to-Formal Spectrum for External Information Sources



Factors Related to Information Sources

An early study on preferences for sources of personal financial information found differences by an individual's income, education level, and participation in the U.S. banking system. Rhine and Toussaint-Comeau (2002) examined traditionally underserved consumers—low-income and less-educated, using survey data collected in the Chicago metropolitan area and found that newspapers and magazines had the highest probability of being chosen as the preferred source of financial information. Television was the preferred source of financial information for the unbanked. However, results showed that the least likely source chosen by low-income and unbanked individuals, at that time, was radio.

New technologies have been introduced and methods of communication have changed over time, so researchers have also examined preferences for these newer delivery modes, e.g., social media and online or web-based options, to investigate their attractiveness as a source of financial information. For example, Fan and Chatterjee (2020) investigated the fintech trend of

using automated financial advisors, also referred to as robo-advisors, for investment advice. Using data from the 2015 National Financial Capability Study (NFCS), they found subjective financial and investment knowledge, along with participation in investment clubs, to be significant factors in the decision to rely on digitally delivered financial advice. With subjective financial knowledge used as a measure of internal information sources, their findings showed significant relationships between both internal and external information sources and automated investment advice. While informative, the literature has not considered emotions such as investment worry as motivators for internal information sources of any type.

Demographic factors have been examined to understand differences in the use of financial resources. Gender differences in learning styles have been offered as an explanation for the preference for the internet as a more common source of financial information for males than for females (Rhine & Toussaint-Comeau, 2002). Hanna (2011) also suggests that gender differences in the demand for advice from financial professionals may reflect overconfidence in males and their reluctance to seek help. Trust, cost-efficiency, and comfort have also been proposed to explain why women tend to get their financial information from friends and family rather than financial professionals (Chatterjee & Fan, 2021; Lachance & Tang, 2012; Loibl & Hira, 2007).

Although racial differences have been found when examining sources used for financial information, studies examining differences in the experience of investment worry by race are limited. We know from the literature that Hispanics were more likely to rely on the advice of friends and relatives (Blanchett, 2019; Rhine & Toussaint-Comeau, 2002; Rubio, 2013), whereas social reference groups were an important source of financial information for Blacks (Stevenson & Plath, 2002). Hanna (2011) and Elmerick et al. (2002) argued Blacks were more likely than

Whites with similar demographics to use a financial planner for credit and borrowing decisions. Chang (2005) found that Blacks were more likely than Whites with similar demographics to rely on paid financial professionals for saving and investment advice, theorizing that it reflects historically less exposure to investing and limited marketing or recruitment by financial firms. Studies focused on financial source preferences by race provide important information for practitioners as it can help them to identify who to target when offering their services. For example, in a study investigating racial differences in investment asset ownership patterns using data from the Survey of Consumer Finances, Stevenson and Plath (2002) concluded that to successfully market financial products and services to Blacks, marketing strategies should target sources such as print media geared specifically to their community. Research highlighted that for this group information channels differed from those of Whites. However, the literature offers little guidance on how emotions, or investment worry specifically, may influence the behaviors of different racial groups once they have been acquired as clients. Nevertheless, taken together, these findings support including the demographic measures of race, gender, and income as control variables in this study.

Preferences for Internal Information Sources

As discussed earlier, internal information sources can be retrieved from memories acquired in one of two ways, passively or from prior experiences (Beales et al., 1981). Passively acquired information may stem from a new or interesting stimulus or from what has been termed as ‘low-involvement’ learning. Low-involvement learning was described by Beales and his colleagues (1981) as information obtained without actively seeking information, for example memories created from exposure to ads or commercials. Researchers have argued that internal financial information resources would reflect an individual’s level of education and financial

knowledge (Fan & Chatterjee, 2017; Lusardi & Mitchell, 2017). Fan and Chatterjee (2017) also posited that this would influence a person's ability to filter through information and process the choices they face. This perspective has been used to support the use of objective financial knowledge and investor confidence as measures that reflect internal information sources (Fan & Chatterjee, 2017; 2020).

In this study, investor confidence was selected to model prior experiences as described in the cognitive component of the conceptual model. Researchers have argued that perceptions from past experiences can serve as antecedents to confidence (Bearden et al., 2001; Oney & Oksuzoglu-Guven, 2015; Stajkovic, 2006). While scholars have explained there is no universally accepted definition of confidence, the concept has been broadly defined to include, "an opinion, attitude, act of conduct, expectation, and a manner of behavior" (Simintiras et al., 2014, p. 427). Further, studies of consumer behavior have identified confidence as a factor used by consumers when they seek information (Bearden et al., 2001; Oney & Oksuzoglu-Guven, 2015; Simintiras et al., 2014).

In the psychology literature, researchers have identified and linked distinct memory to specific aspects of decision-making (Del Missier et al., 2013). Specifically, Del Missier and his colleagues (2013) determined that episodic memory is the memory process involved with retrieving and evaluating past experiences. Separately, scholars investigating cognition in older adults found evidence of a decrease in financial knowledge when there was a decline in semantic memory. Gamble et al. (2015), in their longitudinal study, also reported that when the participants experienced a decline in cognitive ability, they were most likely to seek help from external sources such as a spouse or financial professional.

Preferences for Informal External Information Sources

Non-professional sources of financial information, referred to in this study as ‘informal’ sources, are often a less costly, more convenient source of information that has been used differently by different demographics. For example, the internet has trended as a more common source of financial information than family and friends across age groups (Blanchett, 2019). Interestingly, when Zick et al. (2012) compared age cohorts in a study using survey data, they found that millennials were less likely than older age cohorts to seek professional financial advice during the Great Recession. They postulated this to reflect greater comfort by millennials with less formal sources of information, such as social media platforms or peer influences. Rhine and Toussaint-Comeau (2002) also found older adults to be less inclined to choose the internet as their preferred source of financial information. They identified the internet as the preferred source of financial information for employed individuals, hypothesizing that time constraints and flexibility drive the preference for this source. When used as a source of financial information, friends were relied on by those with higher incomes but lower education levels whereas the internet was used by those with lower levels of income but higher levels of education (Blanchett, 2019).

Chang (2005) explored socioeconomic status and the use of social networks, i.e., family and friends, as information sources for saving and investing information with data from the 1998 Survey of Consumer Finance. Not surprisingly, social networks were found to be a more prominent source of financial information for those with lower levels of wealth while wealthier households tended to use multiple sources. Chang (2005) suggested that social networks can be a cheaper, easily accessible resource, often more trusted than professionals whose advice may be viewed as tainted by an economic incentive to mislead or deceive them. He also proposed that

the expertise of financial professionals may be more fitting for complex financial decisions or a preference for arms-length relationships, minimizing concerns about expectations of reciprocity or privacy that may arise with friends and family.

The literature suggests that racial minorities may be more dependent on informal sources of financial information. Blacks tend to rely on social peers which include family, friends, and even community leaders such as clergy, more often than Whites for information related to financial decisions (Legette, 1994; Smith, 1997; Stevenson & Plath, 2002). Blanchett (2019) conducted an empirical study using six waves (2001 to 2016) of the Survey of Consumer Finance and found that non-White respondents were more likely to use the internet as a source of financial information. When racial minority groups were compared using three waves (2001, 2004, and 2007) of the Survey of Consumer Finances, de Rubio (2013) found that traditional media was the most common source of financial information for Black households, whereas Hispanic households relied more often on the advice of a friend or relative. While wealth, age or generational cohort, and race have been examined for its role in financial information source preferences, this study sought to consider investment worry as a factor that may also influence preferences for informal information sources.

Preferences for Formal External Information Sources

Collins (2012) identified five major roles for personal financial professionals in his review of the literature on financial advice: “1) offering information, 2) defusing biases, 3) facilitating cognition, 4) overcoming affective issues, and 5) mediating joint decision-making” (p. 308). However, fragmented regulation of the many titles and designations used by professionals in the financial services marketplace, including titles ranging from financial advisor and investment advisor to financial planner and financial counselor, has sometimes led to

confusion by consumers (Macfarlan & Zick, 2020; Tharp, 2020). For this study, the general term ‘financial professional’ was used as a broad term that captures the many titles currently in use. Financial professionals were categorized as formal external sources of financial information due to their specialized expertise and cost.

The demand for professional financial advice has been studied extensively in the literature (Cheng et al., 2019; Hanna, 2011; Robb et al., 2012). Using data from the 1998 to 2007 Survey of Consumer Finances, Hanna (2011) documented an increase in the demand for financial planning services over that period. Robb et al. (2012) identified objective and subjective financial knowledge and confidence in money management skills as factors positively related to seeking professional advice. The empirical findings of Cheng and his fellow researchers (2019) supported the premise that the advice provided by financial professionals are a normal good whose demand decreases as income falls. In that study, they used data from the National Longitudinal Survey of Youth to explore who hired or fired their financial professional during the Great Recession.

Scholars have also investigated who uses financial professionals for advice. Elmerick et al. (2002) found that the type of information needed, e.g., debt or credit counseling versus saving and investing information, was the primary driver of this decision. While net worth was identified as more important than income in driving demand for financial planning services, the exact components of net worth, i.e., home value, size of investment portfolio, investment asset mix, etc., were not studied. Cummings and James’ (2014) study investigated decisions by older adults to either seek or terminate the services of a financial advisor. The longitudinal study allowed for a focus on the timing of the decision to begin or end a relationship with the financial professional. Their findings identified widowhood and increases in income and net worth among

the factors positively related to seeking the advice of a financial professional. Finke et al. (2011) also found wealth to be the strongest predictor of the demand for paid financial advice. When examining the characteristics associated with the types of information and advice sought, they found middle-aged adults prefer the most comprehensive financial planning advice, the youngest prefer not to pay for financial advice and information and the oldest prefer to consult with professionals for information when needed. In an Australian study of men who became unemployed, du Plessis and her colleagues (2010) found that a lack of knowledge about professional sources of financial information and perceived costs were barriers to getting professional financial information, as well as shame and embarrassment around financial matters.

Demographic characteristics such as gender, age, marital and employment status, and education levels have been found to have significant associations with using professionals for financial information (Finke et al., 2011; Glenn & Heckman, 2020; Hanna, 2011; Letkiewicz et al., 2016; Rhine & Toussaint-Comeau, 2002). Hanna (2011) used cross-sectional data and found using a financial planner peaked at age 42, in addition to identifying race, gender, and net worth as factors related to seeking the advice of a financial planner. Not surprisingly, wealth measures such as income and assets have also been found to be positively associated with using professional sources for financial information (Chang, 2005; Chatterjee & Fan, 2021; Letkiewicz et al., 2016).

Investment Worry and Information Search

Affect has been shown to influence who individuals reach out to for financial advice. Using data from the Mature Market Survey, Kim and Kim (2010) found that media was the most popular source of information for retirement planning among financially stressed individuals,

followed by professional advice. However, Fan and Lim (2022) found that those experiencing mental distress were positively associated with using financial professionals and social networks while showing a negative association with relying on family for financial advice. Using the National Financial Well-Being Survey, the authors also explored the role cognitive ability plays in the decision to seek advice from professionals. Interestingly, they found family to be the most prominent source of financial advice among advice seekers and the cognitive factors of memory and objective numeracy to be positively associated with this source of financial information.

In addition to expected concerns around individual investment performance, headlines have highlighted a laundry list of investor worries that include inflation, rising interest rates, market volatility, economic growth, and the potential for an economic recession (Hyzy, 2022; Idzelis, 2022; Klebnikov, 2022; La Monica, 2022). Media coverage of investor worries has reported that recent performance has been so volatile that it has scared investors away from investing in the market (Reinicke, 2022). According to a study by Allianz Life (2022, April 27), titled the *2022 Q1 Quarterly Market Perceptions Study*, the percentage of investors reported to be too worried about market volatility to invest is at its highest level since 2019 (43%). The survey was given to a nationally representative sample of 1,002 adults. Financial services firms provide an abundance of publicly available advice columns, podcasts, and research materials for clients and potential investors to peruse (Fidelity, 2022; Hyzy, 2022; Schwab, n.d.). However, to the author's knowledge, there is limited empirical research reported in the literature that has investigated investor worries as a factor that drives individuals to access this information from the information sources that offer it.

Hypotheses

Essay one's research question asked, "is there a relationship between investment worry and the source chosen for financial information?" Based on the framework outlined by Beales et al. (1981), internal and external information sources were tested for their relationship with the construct of investment worry. The Kuhlthau model of the information search process predicts that affect and cognition are present in the initiation stage of the search process. In this stage, the affective component reflects the uncertainty created by the recognition of a need for information while the cognitive component includes accessing internal knowledge or prior experiences. This model supported investigating the following hypothesis:

H₁: There is a positive relationship between investment worry and the use of internal information sources (objective financial knowledge).

The selection stage of the Kuhlthau model involves actively pursuing information based on the individual's needs. The current study modeled this as external information sources. Based on the literature, both formal and informal external sources have been used by individuals experiencing financial stressors; therefore, the following hypotheses were investigated:

H₂: There is a positive relationship between investment worry and the use of external information sources.

H_{2a}: There is a positive relationship between investment worry and the use of friends and family sources.

H_{2b}: There is a positive relationship between investment worry and the use of media and internet sources.

H_{2c}: There is a positive relationship between investment worry and the use of clubs and organization sources.

H_{2d}: There is a positive relationship between investment worry and the use of professional financial sources.

Prior research supports the prediction that financial knowledge is a factor related to the choice for informal and formal external financial information sources. For example, print media has been found to be a top choice for financial information among those with low levels of financial literacy (Rhine & Touissant-Comeau, 2002). Other scholars have identified both positive (Robb et al., 2012) and negative (Hanna, 2011) associations between investor confidence and seeking paid professional advice. Although investor confidence is not a specific type of information source, it is a resource that can be accessed internally and potentially influence the decision around where to seek out financial information. It was for this reason, and because of the inclusion of this measure for the internal information source construct in prior studies (Fan, 2021), that investor confidence was included in the model but not included in the hypothesized relationships tested. Therefore, the final hypotheses state:

H₃: The relationship between investment worry and the use of external information sources is mediated by internal information sources.

H_{3a}: The relationship between investment worry and the use of friends and family sources is mediated by objective financial knowledge.

H_{3b}: The relationship between investment worry and the use of media and internet sources is mediated by objective financial knowledge.

H_{3c}: The relationship between investment worry and the use of clubs and organization sources is mediated by objective financial knowledge.

H_{3d}: The relationship between investment worry and the use of professional financial sources is mediated by objective financial knowledge.

Methods

Data

To examine the relationship between investment worry and the sources chosen for financial information, cross-sectional data from the 2018 National Financial Capability Study's State-by-State survey (NFCS-SS) and Investor survey supplement (NFCS-IS) was used. The 2018 NFCS-SS included a sample of 27,091 adults which was comprised of 500 respondents from each state and the District of Columbia. The states of Oregon and Washington were oversampled in the 2018 study (Arc Research, 2018a). The sample included a demographic mix by age, gender, marital status, education levels and employment status. Sample weights for the 2018 NFCS-SS are based on data from the American Community Survey and weighted to reflect national, regional, and state weightings in terms of age, gender, ethnicity, education, and Census Division (Arc Research, 2018a).

The sample used for the NFCS-IS portion is a subset of the larger 2018 NFCS-SS sample and included 2,003 adults—age 18 and older. The respondents had to have completed the 2018 NFCS-SS, have investments outside of their retirement accounts and be involved in investment decision-making to qualify. This survey aimed to explore investing related topics and appears to be generalizable to the investing population of U.S. investors (Arc Research, 2018b). Data compiled from the NFCS-IS is weighted to be “representative of investors with non-retirement investments in terms of age and education” with the aim of representing the U.S. investor population (Arc Research, 2018b, p.2). The combined dataset was suitable for investigating the impact of investment worry on information sources as it provided access to a national sample of

investors with several questions that allowed for the operationalization of investment worry and each category of information source.

Dependent Variable

Information source was the dependent variable for this study. Information sources were grouped into the following categories: internal information source, informal external information source, and formal external information source. Consistent with prior research, internal information sources were operationalized with measures of objective financial knowledge (Fan, 2021; Fan & Chatterjee, 2017, 2020; Table 2.1). Objective financial knowledge reflects the cognitive component of the conceptual model tested in this study. It was measured with a dummy variable comprised of six financial literacy questions used in previous research to gauge basic financial knowledge (Lusardi & Mitchell, 2007; Fan & Chatterjee, 2020; Table 2.2). The questions assessed knowledge of concepts such as compounding interest, bond pricing, and portfolio diversification. The correct answer to each question was assigned a value of 1, with all other responses assigned a value of 0. Then, the six responses were summed to create a composite objective financial knowledge score. The objective financial knowledge variable was coded on a scale ranging from (0) *very low* to (6) *very high*.

Table 2.1

Measurement of Internal Information Sources

Variable	Measurement Question	Response
Objective financial knowledge	Composite measure of six financial literacy questions	See Table 2.2

Table 2.2

Measurement of Objective Financial Knowledge

Measurement Question	Responses
	Recoded to binary
Suppose you had \$100 in a savings account and the interest rate was 2% per year. After 5 years, how much do you think you would have in the account if you left the money to grow?	(1) <i>More than \$102,</i> (0) <i>Exactly \$102, or Less than \$102</i>
Imagine that the interest rate on your savings account was 1% per year and inflation was 2% per year. After 1 year, how much would you be able to buy with the money in this account?	(1) <i>Less than today,</i> (0) <i>More than today, or Exactly the same</i>
If interest rates rise, what will typically happen to bond prices?	(1) <i>They will fall,</i> (0) <i>They will rise, or They will stay the same</i>
Suppose you owe \$1,000 on a loan and the interest rate you are charged is 20% per year compounded annually. If you didn't pay anything off, at this interest rate, how many years would it take for the amount you owe to double?	(1) <i>At least 2 years but less than 5 years,</i> (0) <i>Less than 2 years, or At least 5 years but less than 10 years, or At least 10 years</i>
	Dichotomous variable
A 15-year mortgage typically requires higher monthly payments than a 30-year mortgage, but the total interest paid over the life of the loan will be less.	(1) <i>True</i> (0) <i>False</i>
	Reverse coded

Buying a single company's stock usually provides a safer return than a stock mutual fund.	(1) <i>False</i> (0) <i>True</i>
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External sources were measured with the prompt asking respondents, *which of the following information sources do you use when making an investment decision?* Each external source was coded with a dichotomous response of (1) *yes*, or (0) *no*. The full listing of the source assigned to each category was summarized in Table 2.3.

Table 2.3

Measurement of External Information Sources

Variable	Measurement Question	Response
<i>Informal External Information Sources</i>		
Friends/Family	Friends, colleagues, or family members	(1) <i>Yes</i> or (0) <i>No</i>
Media/Internet	Information from the company you are investing in (e.g., annual reports, company websites)	(1) <i>Yes</i> or (0) <i>No</i>
	Information from brokerage firms, mutual fund companies, or other financial services companies (e.g., research reports, brochures, newsletters, seminars, websites)	(1) <i>Yes</i> or (0) <i>No</i>
	The media (i.e., TV, radio, newspapers, magazines, online news sources, and financial information sources)	(1) <i>Yes</i> or (0) <i>No</i>
Clubs/Organizations	Investment clubs or investor membership organizations	(1) <i>Yes</i> or (0) <i>No</i>

Formal External Information Sources

Professionals	Stockbrokers	(1) <i>Yes</i> or (0) <i>No</i>
	Financial advisors other than stockbrokers	(1) <i>Yes</i> or (0) <i>No</i>

Independent Variables

Investment worry. The key independent variable was investment worry and was operationalized with the survey question asking respondents, “*over the next 12 months, how well do you expect your portfolio of investments to perform?*” As shown in Table 2.4, responses were categorized as (1) *worse than the market as a whole*, (0) *about the same as the rest of the market as a whole*, or (-1) *better than the market as a whole*. This measure sought to reflect investor worries as identified in surveys exploring investor sentiment. For example, in the *2022 Q1 Quarterly Market Perceptions Study*, Allianz Life (2022, April 27) reported that 56% of respondents were worried about a big market crash which was the highest level of worry reported than any time in the prior year. In the following survey, the *2022 2Q Quarterly Market Perceptions Study*, an increased percentage of respondents reported keeping more money than they should out of the market (65%), up from 54% in 2020 (Allianz Life, 2022 July 25). Investment worry was used to measure the affective component of the Kuhlthau model of the information search process.

Table 2.4*Measurement of Investment Worry*

Variable	Measurement
Investment worry	(1) <i>worse than the market as a whole</i> , (0) <i>about the same as the rest of the market as a whole</i> , or (-1) <i>better than the market as a whole</i>

Demographic and control variables. The demographic variables of age, gender, race, education, and marital status have been previously established as explanatory variables for predicting the source of financial information chosen and were included in the model. Similarly, investor confidence has been used as a measure to predict the use of external information search sources, so it was also included as a control variable in the model. A summary of control variables is shown in Table 2.5.

Table 2.5

Measurement of Control Variables

Variable	Measurement Question	Responses	Literature cited
Age	What is your age?	(0) <i>Younger than 50</i> ; (1) <i>50 or older</i>	Hanna, 2011; Kim & Kim, 2010; Lim & Lee, 2021; Rhine & Toussaint-Comeau, 2002; Zick et al., 2012
Gender	What is your gender?	(1) <i>male</i> ; (2) <i>female</i>	Chatterjee & Fan, 2021; Hanna, 2011; Loibl & Hira, 2007; Rhine & Toussaint-Comeau, 2002
Race	Which of the following best describes your race or ethnicity?	(1) White/Caucasian; (0) non-White/Caucasian	Blanchett, 2019; Elmerick et al., 2002; Hanna, 2011; Rhine & Toussaint-Comeau, 2002; Rubio, 2013; Stevenson & Plath, 2002
Education	What is the highest level of	(1) <i>less than</i>	Kim & Kim, 2010;

	education that you completed?	<i>bachelor's</i> (0) <i>bachelor's or higher</i>	Rhine & Toussaint-Comeau, 2002
Marital status	What is your marital status?	(1) <i>married</i> ; (0) <i>not married</i>	Kim & Kim, 2010
Income	What is your approximate household income, including wages, tips, investment income, public assistance, income from retirement plans, etc.?	(1) <i>less than \$100K</i> ; (0) <i>\$100K or more</i>	Blanchett, 2019; Chang, 2005; Cummings & James, 2014
Investor confidence	How would you assess your overall knowledge about investing?	7-point Likert type scale, (1) <i>very low</i> to (7) <i>very high</i>	Fan, 2021; Fan & Chatterjee, 2020; Robb et al., 2012

Analysis

A path analytic model was used to examine hypothesized relationships between investment worry and internal and external information sources. Figure 1.2 displays the hypothesized model. Path analysis is a structural equation model for observed variables and this statistical technique was chosen because it allows for the testing of simultaneous regressions (Muthén & Muthén, 2017). Stata/SE statistical software, version 17, was used for data coding and a descriptive sample analysis (StataCorp, 2021). The path analysis was then conducted using Mplus statistical software, version 8.8, to examine model fit along with the direct and indirect effects in the model (Muthén & Muthén, 2017). Criteria used to assess model fit is shown in Table 2.6. It should be noted that scholars have questioned the appropriateness of widely used cutoff values for models not reliant on continuous data analyzed using maximum likelihood estimation (Shi & Maydeu-Olivares, 2020; Xia & Yang, 2019). As a result, this study considered

multiple model fit indices which were used as a tool for model improvement alongside theory to support the model since alternative guidelines deemed appropriate for non-continuous data have not yet been identified and tested.

Table 2.6

Suggested Values for Path Model Fit Indices

Index	Suggested Values	
Chi-square	Not significant. Sensitive to sample size.	Kline, 2016
RMSEA	Excellent fit < .01, good fit < .05, mediocre fit < .08, poor fit < .10	Kenny, 2020; MacCallum et al., 1996
90% Confidence Interval for RMSEA	90% confidence interval for RMSEA lower bound close to zero. Upper bound < .05 to pass not-close-fit test. Upper bound < .10 to pass poor-fit test.	Kline, 2016
CFI	Good fit > .95, marginal fit .90 - .95, poor fit < .90	Enete, 2020; Hu & Bentler, 1999; Shi & Maydeu-Olivares, 2020
TLI	Good fit > .95, marginal fit .90 - .95, poor fit < .90	Enete, 2020; Hu & Bentler, 1999
SRMR	Good fit < .08, poor fit > .10	Hu & Bentler, 1999; Kline, 2016

Note. RMSEA = root mean square error of approximation; CI = confidence interval; CFI = comparative fit index; TLI = Tucker-Lewis index; SRMR = standardized root mean square residual.

The analytic method used in Mplus was mean and variance adjusted weighted least squares (WLSMV). This is a probit-based analysis and is necessary due to the presence of dichotomous and categorical indicators (Kline, 2016; Muthén & Muthén, 2017; Wang & Wang, 2012). For testing indirect paths, bootstrapping was used to create confidence intervals. Bootstrapping is a nonparametric resampling procedure and is the recommended approach to test indirect paths and mediation (Briggs, 2006; Preacher & Hayes, 2004; Shrout & Bolger, 2002). To adjust for standard errors, results were bootstrapped with 2,000 iterations and then interpreted based on a 95% confidence interval.

Three models were examined in this study as recommended by researchers who have outlined an approach for testing mediational hypotheses (Baron & Kenny, 1986; Kenny, 2021). First, model one examined the direct relationship between external information sources and investment worry. Model two then included only internal information sources—the potential mediator in the full model, demographic covariates, and investment worry to test for a direct effect between investment worry and the potential mediator. Finally, model three was the full path model which included both internal and external information sources, demographic covariates, and the control variable to test for relationships between the variables and to test for the mediating role of the internal source.

An analysis of missing values was conducted to identify patterns in observed data and determine if the missing values followed a pattern or appeared to be missing at random. Missing data mechanisms are generally categorized as missing completely at random (MCAR), missing at random (MAR), or not missing at random (NMAR; Acock, 2005; Little & Rubin, 2019). Little and Rubin (2019) explain that MCAR describes an assumption that the missing value of a particular variable is not dependent on observed or unobserved data values of that variable

whereas if missingness depends on components of observed values of the variable but not unobserved values, it is deemed MAR. Conversely, if missingness is dependent on unobserved values of the variable, it is considered NMAR. Testing the MAR or NMAR assumption is difficult without information from unobserved data (Baraldi & Enders, 2010; Magwegwe, 2020). Frequency measures showed missing values of greater than 10% for some questions used to measure internal information sources, specifically three of the six questions assessing objective financial knowledge. Given the focus on measuring the respondents' level of financial knowledge, only correct answers were scored as (1). Missing values were considered incorrect responses and coded as (0), eliminating missing values for this measure.

Missing data patterns were investigated by creating dummy variables coded as (1) for *missing* values and (0) for *not missing* and using logistic regression to examine the relationship between the dummy variable and the other variables included in the model (Acock, 2005; Little & Rubin, 2019; Schlomer et al., 2010). Except for age, there were no other significant relationships between the dummy variable and the independent variables in the model. This indicates that missing values in the model's key variables are likely MCAR or NMAR and provided support for using listwise deletion to handle missing data for the remaining dataset. Therefore, missing values were removed from the dataset prior to running the path analysis.

Table 2.7 illustrates missing values for each of the study's variables.

Table 2.7

Missing Data Analysis (N = 2,003)

	n	Missing	% Missing
Endogenous Variables			
<i>Internal Information Sources</i>			

Objective financial knowledge*	2,003	0	0.00
Q1 Compound interest	1,895	108	5.39
Q2 Inflation	1,848	155	7.74
Q3 Bond prices	1,601	402	20.07
Q4 Rule of 72	1,709	294	14.68
Q5 Amortization	1,895	108	5.39
Q6 Diversification	1,619	384	19.17
<i>Informal External Information Sources</i>			
Media/Internet	2,003	0	0.00
Company reports and websites	1,923	80	3.99
Research reports, seminars, etc.	1,905	98	4.89
TV/radio, print and online news sources, etc.	1,927	76	3.79
Clubs/Organizations	1,936	67	3.34
Friends/Family	1,924	79	3.94
<i>Formal External Information Sources</i>			
Financial Professional	2,003	0	0.00
Stockbrokers	1,917	86	4.29
Financial advisors other than stockbrokers	1,932	71	3.54
Exogenous Variables			
Investment worry	1,898	105	5.24
Control Variables			
Race	2,003	0	0.00
Age	2,003	0	0.00

Gender	2,003	0	0.00
Marital status	2,003	0	0.00
Education	2,003	0	0.00
Income	2,003	0	0.00
Investor confidence	1,989	14	0.70

Note. *Missing values were coded as wrong answer.

Results

Descriptive Statistics

The full sample consisted of 2,003 U.S. adults with an average age of 57. Most of the weighted sample was married (63.50%), male (61.29%) and white (75.82%), with a bachelor's degree or higher (79.37%). Household income was categorized into five groups, with the average income in the \$75,000 to \$99,999 group. A large majority of the sample reported expectations of investment performance better than (30.57%) or the same as (66.11%) the market. A summary of both weighted and unweighted descriptive statistics for categorical variables is provided in Table 2.8.

Table 2.8

Sample Characteristics of Categorical Variables (n = 1,815)

	n	% (unweighted)	% (weighted)
<i>Investment worry</i>			
Worse than the market	62	3.42	3.32
Same as the market	1,214	66.89	66.11
Better than the market	539	29.70	30.57
Control variables			
<i>Age</i>			

Younger than 50	543	29.92	31.78
50 and older	1,272	70.08	68.22
<i>Gender</i>			
Male	1,050	57.85	61.29
Female	765	42.15	38.71
<i>Race</i>			
White/Caucasian	1,498	82.53	75.82
Non-White	317	17.47	24.18
<i>Marital status</i>			
Married	1,165	64.19	63.50
Not married	650	35.81	36.50
<i>Education</i>			
Less than BS	296	16.31	20.63
Bachelor's degree or higher	1,519	83.69	79.37
<i>Income</i>			
Less than \$100K	840	46.28	48.10
\$100K or more	975	53.72	51.90

Table 2.9 and 2.10 include the descriptive statistics for the study's continuous and binary variables, respectively. The weighted mean scores for objective financial knowledge and investor confidence were 4.12 and 4.89, respectively. Objective financial knowledge was measured on 6-point Likert-type scale, whereas investor confidence was measured on a 7-point scale. Media/internet (82.71%) and financial professionals (67.91%) were the most reported external information sources.

Table 2.9

Sample Characteristics for Continuous Variables

	Unweighted	Weighted
--	------------	----------

	n	Mean	SD	n	Mean	SD	Min	Max
Objective financial knowledge	1,815	4.18	1.42	1,815	4.12	1.45	0	6
Investor confidence	1,815	4.83	1.32	1,815	4.89	1.31	1	7

Table 2.10

Sample Characteristics for Binary Variables (n = 1,815)

	Unweighted				Weighted			
	Yes	%	No	%	Yes	%	No	%
<i>Informal External Source</i>								
Media/Internet	1,500	82.64	315	17.36	1,501	82.71	314	17.29
Clubs/Org	218	12.01	1,597	87.99	234	12.88	1,581	87.12
Friends/Family	706	38.90	1,109	61.10	705	38.82	1,110	61.18
<i>Formal External Source</i>								
Professionals	1,239	68.26	576	31.74	1,233	67.91	582	32.09

Correlations

Correlations for the study's endogenous variables are reported in Table 2.11. Tetrachoric correlation coefficients were used to examine the relationships between external information sources due to their binary responses (Kline, 2016). Amongst the external information sources, formal sources were only positively correlated with clubs/organizations ($r = 0.25$, $p < 0.001$), an informal information source, characterized as an arm's length but not quite formal, source of information. Each of the informal sources showed low positive correlations with each other.

Table 2.11

Tetrachoric Correlation—External Information Sources (n = 1,815)

Variables	1	2	3	4
1.Media/Internet	1.00			
2.Clubs/Organizations	0.40***	1.00		
3.Friends/Family	0.25***	0.34***	1.00	
4.Financial professionals	-0.02	0.25***	0.02	1.00

Note. * $p < .05$, ** $p < .01$, *** $p < .001$.

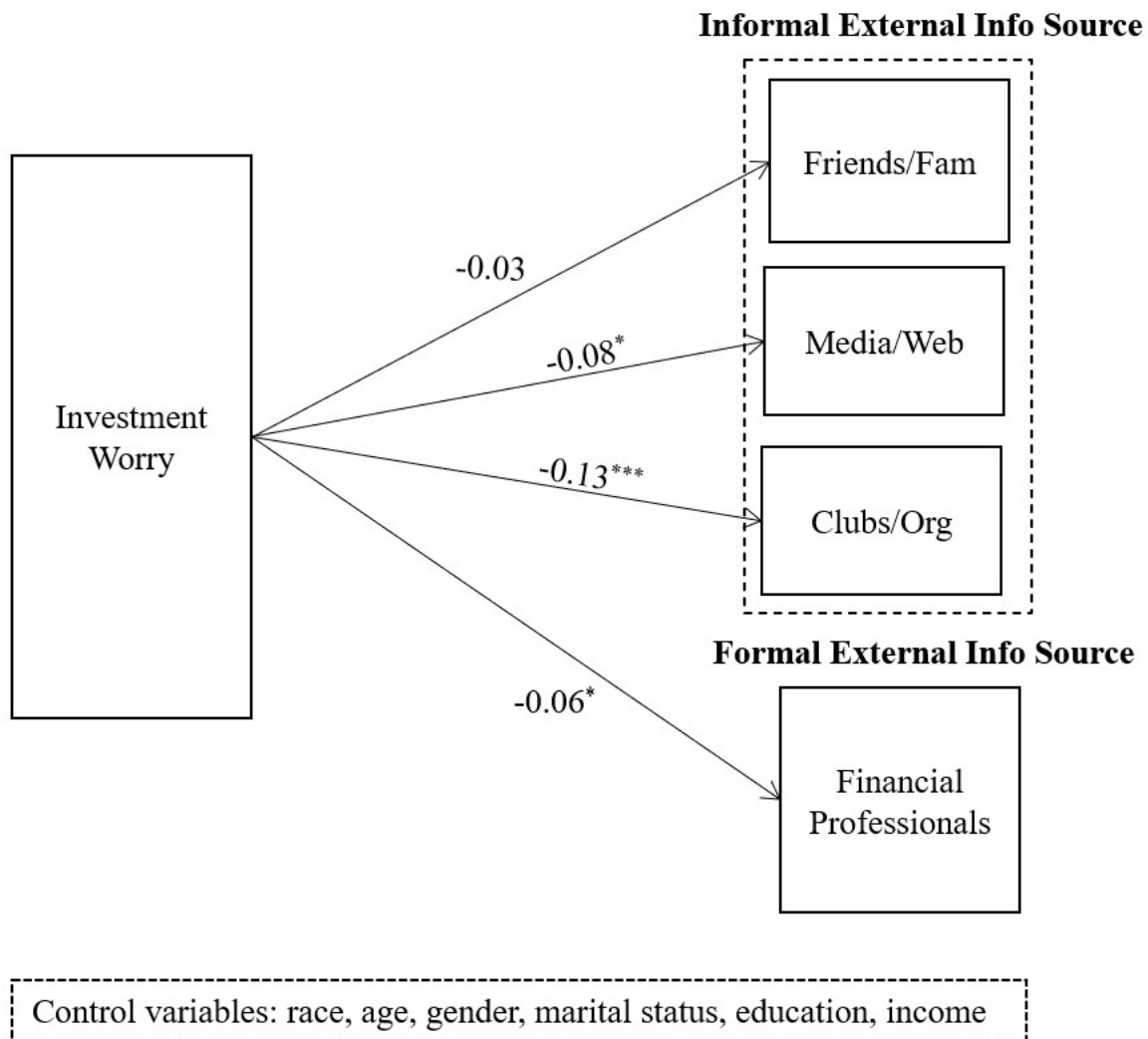
Path Analysis

Path analysis was used to test the relationships between investment worry and external information sources, as well as to test for the mediating role of internal information sources. In addition to theoretical predictions of accessing internal information once affect is triggered, the consideration of an internal source's role as a mediator to external sources was supported by descriptions of mediators as often internal and psychological in nature (Baron & Kenny, 1986).

As outlined in Baron and Kenny (1986), models one and two were initially examined to establish that investment worry affects the choice for the external information sources (model one) and that it also affects the choice for internal information sources (model two). The authors explained that these relationships should be established before testing for mediation. As illustrated in Figure 2.4, model one showed inverse relationships between investment worry and all the external information sources except family/friends which was not significant. Media/internet ($\beta = -0.08, p < 0.05$), clubs/organizations ($\beta = -0.13, p < 0.001$), and financial professionals ($\beta = -0.06, p < 0.05$) were each inversely related to investment worry when internal sources were not included in the model. Model two showed no significant relationship with objective financial knowledge, as shown in Figure 2.5.

Figure 2.4

Standardized Path Results for External Information Source Only Model

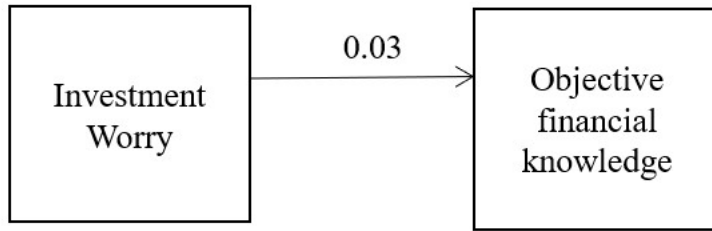


Note. $n = 1,815$; $\chi^2[23] = 654.15, p < .001$, CFI = 0.31, TLI = 0.00, RMSEA = 0.12, SRMR = 0.12; * $p < .05$, ** $p < .01$, *** $p < .001$.

Figure 2.5

Standardized Path Results for Internal Information Source Only Model

Internal Info Source



Control variables: race, age, gender, marital status, education, income, and investor confidence

Note. $n = 1,815$; $\chi^2[42] = 564.35, p < .001, CFI = 0.47, TLI = 0.28, RMSEA = 0.08, SRMR = .07$;

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

The full model was a just-identified model which suggests the model perfectly fits the data (Kline, 2016). Model fit statistics were chi-square ($\chi^2 = 757.32, p < .001$, comparative fit index (CFI) and Tucker-Lewis index (TLI) = 1.00, and a standardized root mean squared residual (SRMR) and root mean-squared error of approximation (RMSEA) = 0.00. Model fit indices are shown in Table 2.12.

Table 2.12

Model Fit Indices

Index	Value	Fit	Suggested Cutoff Values
Chi-square(df)	0.00(50), $p < .001$	Poor fit	Not significant
RMSEA	0.00	Excellent fit	Excellent fit $< .01$, good fit $< .05$, mediocre fit $< .08$, poor fit $< .10$
90% CI for RMSEA	(0.00, 0.00)	Pass not-close-fit test	90% confidence interval for RMSEA lower bound close to

			zero. Upper bound < .05 to pass not-close-fit test. Upper bound < .10 to pass poor-fit test.
CFI	1.00	Good fit	Good fit > .95, marginal fit .90 - .95, poor fit < .90
TLI	1.00	Good fit	Good fit > .95, marginal fit .90 - .95, poor fit < .90
SRMR	0.00	Good fit	Good fit < .08, poor fit > .10

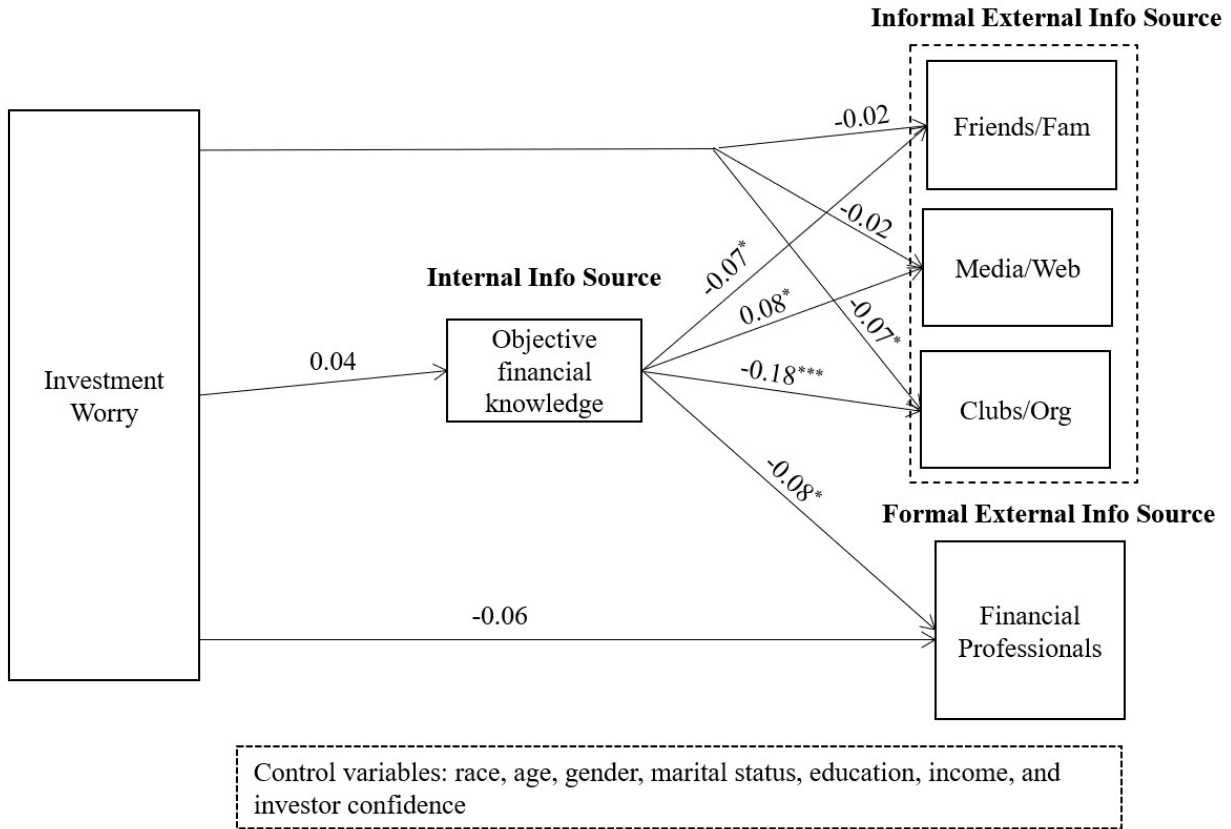
Note. RMSEA = root mean square error of approximation; CI = confidence interval; CFI = comparative fit index; TLI = Tucker-Lewis index; SRMR = standardized root mean square residual.

Figure 2.6 illustrates results for the full conceptualized model showing standardized beta coefficients. Paths to the demographic covariates and control variable were omitted from the illustration for the sake of brevity but they were included in the model. Theory predicted that once an individual experiences an affect related to the need for information, they would access their internal information sources first, then turn to external sources. Thus, the hypotheses tested in this study focused on specific types of information sources.

The path from investment worry to objective financial knowledge was not significant in the full model and therefore did not support H₁. However, the direct path from investment worry to clubs/organizations showed these measures to be significant but inversely related ($\beta = -0.07, p < 0.05$) which did not support the direction predicted in H_{2c}. No other direct paths between investment worry and the remaining external information sources were significant so results provided no evidence to support H_{2a}, H_{2b}, or H_{2d}.

Figure 2.6

Standardized Coefficients for Direct Paths in the Full Path Model



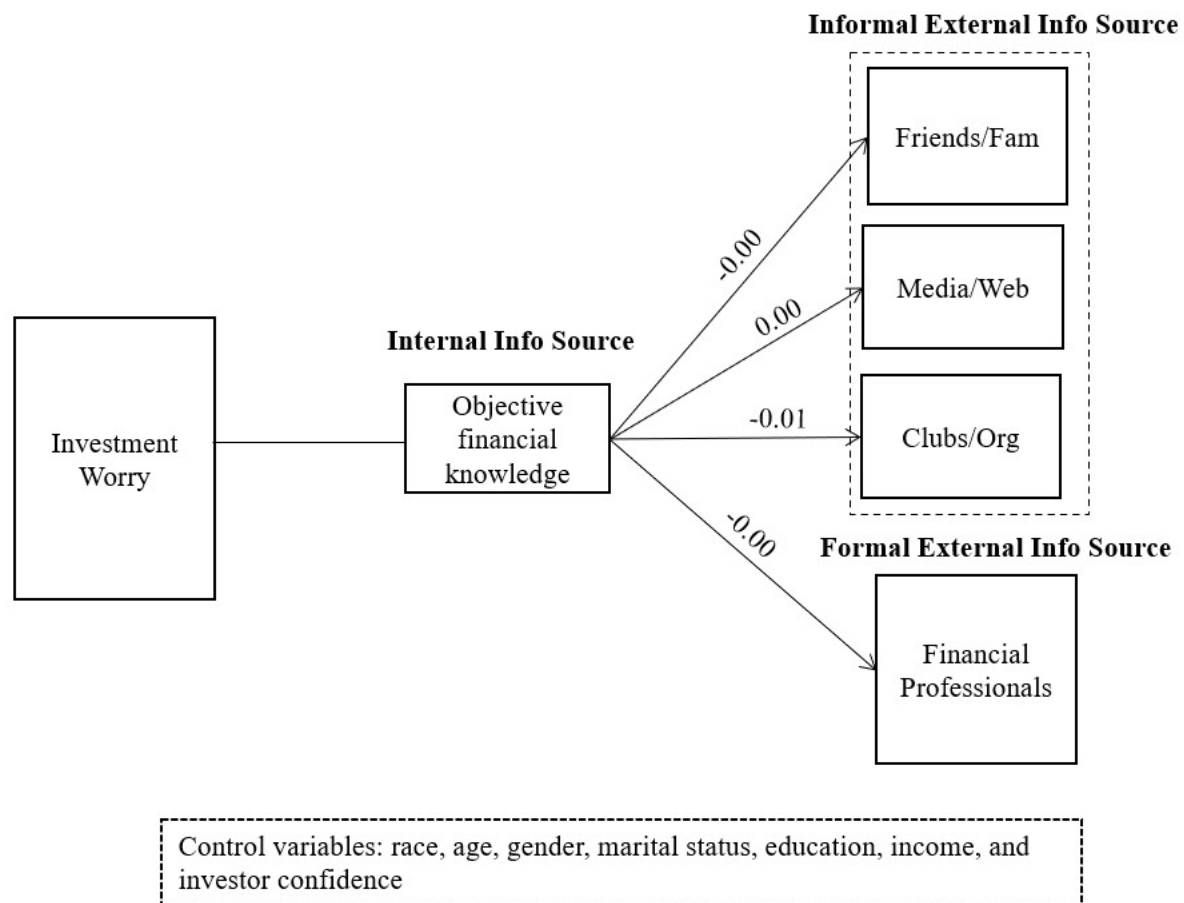
Note. $n = 1,815$; $\chi^2[50] = 757.32$, $p < .001$, $RMSEA = 0.00$, $CFI = 1.00$, $TLI = 1.00$, $SRMR = 0.00$; * $p < .05$, ** $p < .01$, *** $p < .001$.

Although relationships between internal and external sources were not hypothesized, results showed interesting relationships. Direct paths from objective financial knowledge to external information sources showed mixed relationships. Objective financial knowledge was inversely related to financial professionals ($\beta = -0.08$, $p < 0.05$), as well as family/friends ($\beta = -0.07$, $p < 0.05$) and clubs/organizations ($\beta = -0.18$, $p < 0.001$). Yet, this measure of internal information source was positively related to media/internet ($\beta = 0.10$, $p < 0.01$). As mentioned, this relationship was outside the scope of this study's focus on the relationship between investment worry and these information sources, however these findings suggest that future

examination of attributes related to the emotions associated with the information search process may explain the direction of the relationships found and would expand our understanding of the role emotions play in sourcing financial information.

Figure 2.7

Standardized Coefficients for Indirect Paths in the Full Path Model



Note. $n = 1,815$; $\chi^2[50] = 757.32, p < .001$, $RMSEA = 0.00$, $CFI = 1.00$, $TLI = 1.00$, $SRMR = 0.00$; * $p < .05$, ** $p < .01$, *** $p < .001$.

Standardized coefficients for indirect paths are illustrated in Figure 2.7. The indirect paths through objective financial knowledge to external information sources were not significant

and therefore did not support H₃ (a – d). Hypothesis three posited a positive relationship between investment worry and external information sources through objective financial knowledge. Total, direct, and indirect effects for each structural path are shown in Table 2.13.

Table 2.13

Standardized Estimates for Path Analysis (n = 1,815)

Structural Path	Total Effect (95% CI)	Direct Effect (95% CI)	Indirect Effect (95% CI)
<i>Direct Paths</i>			
IW -> MI	-0.02(-0.09/0.05)	-0.02(-0.09/0.05)	-0.00(0.00/0.01)
IW -> CO	-0.08*(-0.14/0.00)	-0.07*(-0.14/0.00)	-0.01(-0.02/0.00)
IW -> FF	-0.02(-0.08/0.04)	-0.02(-0.08/0.04)	-0.00(-0.01/0.00)
IW -> FP	-0.06(-0.13/0.01)	-0.06(-0.11/0.01)	-0.00(-0.02/0.00)
<i>Indirect Paths</i>			
IW -> OK -> MI			0.00(0.00/0.01)
IW -> OK -> CO			-0.01(-0.02/0.00)
IW -> OK -> FF			-0.00(-0.01/0.00)
IW -> OK -> FP			-0.00(-0.01/0.00)

Note. IW-investment worry, MI-media/internet, CO-clubs/org, FF-family/friends, FP-financial professionals, OK-objective financial knowledge; $\chi^2[50] = 757.32, p < .001, RMSEA = 0.00, CFI = 1.00, TLI = 1.00, SRMR = 0.00$; * $p < .05$, ** $p < .01$, *** $p < .001$.

Discussion

The purpose of essay one was to investigate the association between investment worry and sources chosen for financial information. The information source framework outlined by Beales and his colleagues (1981), along with the information search process (Kuhlthau et al.,

2008), provided the theoretical framework for testing each of the hypotheses outlined in the paper. Results of the path analysis show that investment worry can directly influence the choice for some types of financial information sources, after controlling for a variety of demographic factors. However, the significant path found showed an inverse relationship. This was an unexpected finding but may reflect a characteristic of some information sources that make them less attractive when an individual is experiencing investment worry. For example, turning to clubs/organizations may feel like a public announcement of a person's financial situation which could make this source unattractive when a person is experiencing the emotion of investment worry. To investigate relationships with specific types of information sources, information sources were operationalized as internal and external information sources.

Information Source Types

Internal information sources. This analysis did not support H_1 which predicted a positive relationship between investment worry and internal information sources. The study's theoretical framework posited that once an individual becomes aware of the need for information, during the initiation stage of the information search process, they will experience an affect and access internal information sources (Kuhlthau et al., 2008). Nevertheless, the lack of significance found between the objective financial knowledge measure of internal information source and investment worry is consistent with previous research. For example, Britt and her colleagues (2016) found no significant relationship between objective financial knowledge and financial stress amongst a sample of U.S. college students. Much like investment worry, financial stress represents a negative affect related to an individual's financial condition or expected future condition so findings that mirror those results are not surprising.

Informal external information sources. This analysis did not support H₂ (a - d).

Although the path between investment worry and clubs/organizations was significant, the inverse direction was not predicted. The inverse relationship with the clubs/organization type of external source was contrary to research from Fan & Chatterjee (2020) who found investment clubs to be a significant factor in using robo-advisors. Robo-advisors could be interpreted as occupying a position to the left of formal information sources on the spectrum previously described for categorizing external information sources. Although it may be paid advice, it is likely not as customized or comprehensive as that received by other financial professionals.

No significant direct relationships were identified between investment worry and friends/family, media/internet, or financial professionals. Nor were the indirect paths through objective financial knowledge significant which also failed to support H₃ (a – c). This finding was unexpected since previous studies have identified preferences for informal sources of information, such as media to be the most common information source among the financially stressed (Kim & Kim, 2010).

Formal external information sources. This analysis did not support H_{2d} nor H_{3d} as formal external information sources, i.e., financial professionals, showed no significant direct or indirect paths to investment worry. This finding is consistent with prior literature that identified emotions, such as shame and embarrassment as a barrier to accessing professional financial advice (duPlessis et al., 2010).

Table 2.14

Summary of Hypotheses Tested

Hypothesis Tested

H ₁	Investment worry (+) Internal sources (objective financial knowledge)	Not supported
H _{2a}	Investment worry (+) FF	Not supported
H _{2b}	Investment worry (+) MI	Not supported
H _{2c}	Investment worry (+) CO	Not supported
H _{2d}	Investment worry (+) FP	Not supported
H _{3a}	Investment worry → Objective financial knowledge → FF	Not supported
H _{3b}	Investment worry → Objective financial knowledge → MI	Not supported
H _{3c}	Investment worry → Objective financial knowledge → CO	Not supported
H _{3d}	Investment worry → Objective financial knowledge → FP	Not supported

Note. FF-family/friends, MI-Media/Internet, CO-clubs/org, FP-financial professionals.

Limitations

Several limitations of this study should be noted. First, cross-sectional data was used which does not allow for an assessment of changes over time or under various conditions in preferences for financial information sources, the key endogenous variable in the study. For example, investor confidence was used to reflect internally retrieved information but the influence of past experiences on its development suggests that it can be changed with newly acquired experiences (Oney & Oksuzoglu-Guven, 2015). Hence, scholars have argued that this measure may not be stable over time.

Additionally, this study closely followed the theoretical framework outlined by Kuhlthau et al. (2008) which predicted that the affect triggered by the recognition of a need for information is followed by accessing internal information sources, then seeking external sources. This

sequencing drove the decision to focus on the mediating role of internal information sources versus considering internal information sources as moderators of investment worry. Next, the path model used for analysis can only establish relationships between the variables included in the model, thus it does not establish causation. Further, the measures used to operationalize the key variables in the study did not perfectly align with the timeframe proposed in the theory. Investment worry was measured with a question that asked about their current beliefs about future investment performance while the question used to operationalize financial information sources also asked about current behaviors. This limits the ability to make predictions related to which variable came first.

As previously discussed, external financial information sources were considered on a spectrum ranging from informal to formal. However, categorizing the sources as informal or formal was subjective and relied on descriptions found in prior research. For example, financial professionals have been described as a higher cost, often a more comprehensive and personalized source of financial expertise (Cheng et al., 2019; Fan, 2021; Finke et al., 2011). This information source was considered formal for this study and all others considered informal. Nevertheless, information sources may straddle categories or may not precisely fit into the categories assigned, which represents a limitation of the data.

Missing data that was removed using listwise deletion could bias the sample. While it is not uncommon for survey data to have missing values that are not MCAR, missing values that are not MCAR risks providing sample data that is affected by some form of bias. Finally, only a small portion of the sample reported investment worry which limits the ability to generalize the findings. The self-reported scale used to measure investment worry also may not reflect the respondent's true level of investment worry, given the risk of reporting what they may have

wanted the interviewer to believe. This may introduce a response bias, such as social desirability bias, to the sample data.

Implications and Conclusion

Essay one adds to the growing body of knowledge focused on examining the motivators for using financial professionals and the characteristics of users of different financial information sources (Blanchett, 2019; Cheng et al., 2019; Cummings & James, 2014; Fan & Chatterjee, 2017; Gamble et al., 2015; Glenn & Heckman, 2020; Robb et al., 2012). This study extends the literature beyond its focus on the benefits of professional advice and the characteristics of those who seek it. For example, prior studies have not considered antecedents to retrieving internal information sources as scholars have primarily concentrated on internal information sources as predictors of behaviors and the use of external information sources (Fan, 2021; Fan & Chatterjee, 2017, 2020). As results show, emotions appear to be associated with the source an individual accesses for financial information, in some cases, which can have important implications for parties with financial information to share.

Empirical research that investigates the relationship between investment worry and preferences for where to source financial information is informative for practitioners. The results can aid financial professionals in decisions around the strategic placement of helpful financial information where consumers would be most likely to access and receive it. This study also provides insight into who individuals may or may not turn to when looking to cope with emotions related to their financial condition. An understanding of how individuals respond to investment worry positions practitioners, such as financial planners and counselors, to develop tools that can help clients manage its influence.

In summary, essay one is the first study to explore the relationship between investment worry and financial information sources. While some results aligned with expectations for significant relationships between investment worry and external sources, the direct inverse relationships were unexpected. The mixed findings from this study support the need for further research examining the role of emotions in financial decision-making. For example, a comparison of the influence of positive and negative emotions on information source preferences would be informative for practitioners to help predict when client behaviors may change or when information strategies may need to be adjusted.

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Chapter 3 - Information Avoidance and Retirement Worry

Former U.S. president Ronald Reagan has been quoted as saying, information is the oxygen of the modern age (Rule, 1989). Yet, surprisingly, people sometimes avoid information even when it is free, relevant, and readily accessible. This behavior has been observed and studied extensively in the fields of psychology, public health, and medicine (Golman & Loewenstein, 2015) with the communication and information sciences domain showing interest as well (Sweeny et al., 2010). However, very little has been published regarding its impact on financial decisions, behaviors, and outcomes despite their importance to overall well-being.

The demand for information and its usefulness is well documented. Curiosity, the pursuit of knowledge and insight, and increased economic utility have all been cited for their motivating effect on seeking information (Golman & Loewenstein, 2015). Nevertheless, the usefulness of information can be offset by reactions that trigger avoidance responses. Scholars have hypothesized several motivations for information avoidance, ranging from a resistance to changing beliefs or behaviors to dodging unpleasant emotions (Sweeny et al., 2010). Soroya and her colleagues (2021) have also explained that information avoidance involves ignoring some information to prevent an overload that may reduce the likelihood of receiving relevant information. This can happen because information overload prevents the processing of new information and may trigger negative psychological responses such as stress, depressive symptoms, and information avoidance (Soroya et al., 2021). The authors explain that avoidance behaviors can take many forms, including inattention, physical avoidance, or biased interpretation. Some of these behaviors are easily recognizable, e.g., a refusal to monitor weight to avoid admitting to a need for a change in diet or not checking account balances to avoid adjusting spending habits. These response types have been colloquially referred to as the ‘ostrich

effect’ (Golman & Loewenstein, 2015; Sicherman et al., 2016). Despite the tale that it buries its head in the sand to avoid danger, an African proverb reminds us that ‘even the ostrich, with its long neck and sharp eyes, cannot see what will happen in the future’ (Aardema, 1996). This adage lays the groundwork for considering the impact of avoidance behaviors in the personal finance domain.

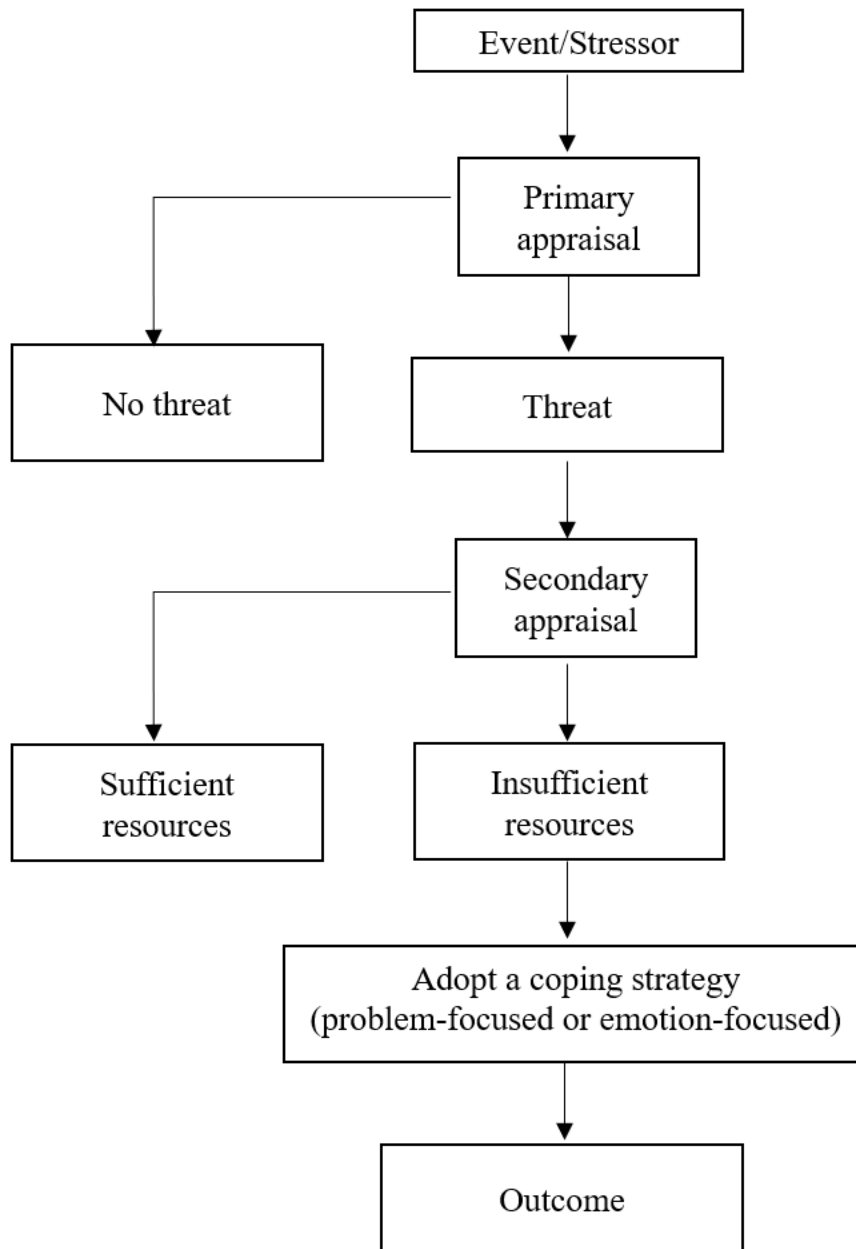
Since not all avoided information is bad, for example, the ending of a movie or the gender of an unborn child, it is helpful for financial professionals to distinguish between pleasurable avoidance behaviors and those that pose a detriment to financial outcomes. This study seeks to expand our understanding of potentially detrimental avoidance behaviors by examining its relationship with the emotion of retirement worry. The research question for essay two asked, “how is retirement worry associated with avoiding financial information?”

Theoretical Framework

The transactional theory of stress and coping (TTSC) was used as the theoretical model for exploring the use of avoidance behaviors to cope with financial stressors and its relationship to the emotion of retirement worry (see Figure 3.1). TTSC posits that we go through a two-stage appraisal process when determining a response to a stressor (Lazarus & Folkman, 1984). In the initial stage, primary appraisal, an individual assesses the stressor for its level of threat and if determined to be a threat the individual moves to the next stage. It is in the secondary appraisal stage that an individual considers their resources to determine if they are sufficient to deal with the threat.

Figure 3.1

Transactional Theory of Stress and Coping (Lazarus & Folkman, 1984)



TTSC explains that the cognitive appraisals described in the two-stage appraisal process influence an individual's response to the perceived threat and the individual's emotional state when dealing the threat (Lazarus & Folkman, 1984). In this theoretical model, once an assessment of threat is made, an individual would select a coping strategy. Coping has been defined as thoughts and behaviors that people use to handle situations perceived as threats that

exceed their resources or ability to handle (Folkman & Moskowitz, 2004; Lazarus & Folkman, 1984). Further, Folkman and Moskowski (2004) underscore the point that coping does not happen in isolation, rather it is part of a dynamic process that involves the individual, their environment, and the relationship between the two.

Lazarus and Folkman (1984) have explained that coping strategies can be problem-focused or emotion-focused. According to the authors, problem-focused coping aims to manage or fix the problem or stressor whereas emotion-focused coping attempts to address the emotional response to the problem or stressor. They argue that many stages of problem-focused coping strategies mirror that of problem solving, i.e., identifying alternative solutions to the problem and weighing the cost-benefit of each before choosing an option. However, problem-focused coping strategies differ from problem-solving's attention on the external environment and includes strategies directed inwardly or at one's self. Examples of these inward strategies would include adopting new behaviors or learning new skills.

Emotion-focused coping is most likely to be chosen when an individual determines that nothing can be done to change the threat they may face (Lazarus & Folkman, 1984). Emotion-focused strategies can take the form of avoidance or distracting behaviors, such as drugs or alcohol, and may help an individual circumvent the emotional repercussions of an event (Folkman & Moskowitz, 2004; Lazarus & Folkman, 1984). This study will focus on the emotion-focused coping strategy of avoidance.

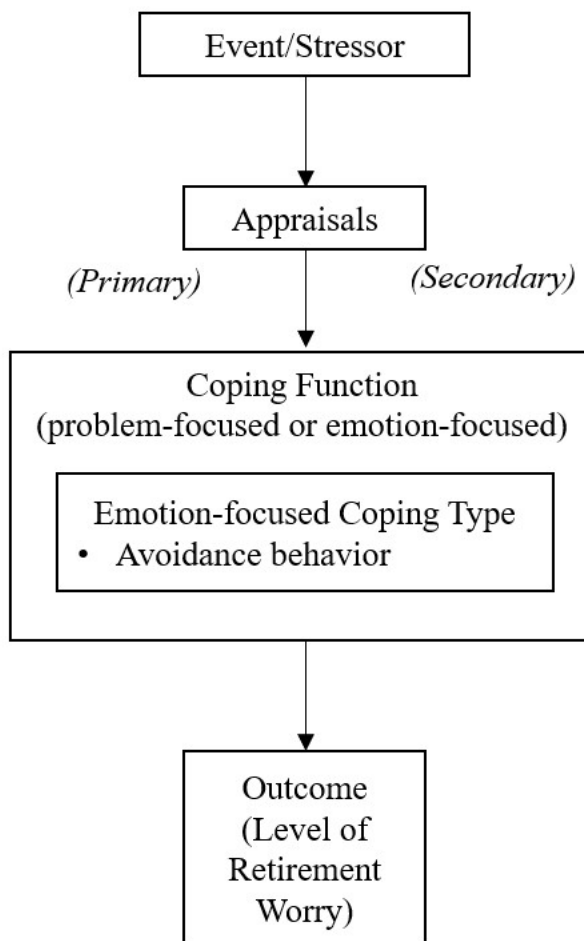
Resolving a threat can also create emotional responses, making emotions a vital part of the coping process. Folkman and Moskowitz (2004) explain that positive emotions tend to result from successful resolutions while uncertain or unfavorable resolutions tend to result in negative

emotions. This supports the conceptual model shown in Figure 3.2 and the hypothesis that avoidance coping strategies will result in lower levels of retirement worry.

H₁: Levels of retirement worry are lower for those who avoid financial information.

Figure 3.2

Conceptual Model of Transactional Theory of Stress and Coping



Literature Review

Personal financial decisions are complex and may be influenced by nonfinancial tendencies, for example avoidance behaviors like avoiding bad news or preserving an image (Exley & Kessler, 2021). Yet, to the author's knowledge, empirical studies in the personal

finance domain regarding financial information acquisition and avoidance behaviors in the U.S. are limited. Outside of the U.S., studies have connected financial socialization experiences with information acquisition behaviors. In a cross-sectional study of Malaysian young adults, Sharif and his colleagues (2020) provided empirical evidence that actively seeking financial information enhances financial literacy among young women. They found that young adults tended to mirror their parents' information seeking behaviors, e.g., watching financial programs, and theorized that the young adults may have become aware of their parents' financial worries and sought financial information to support them.

Avoidance Behavior

Active information avoidance has been described as ignoring relevant information and can take many forms, including inattention, biased interpretation of information, or physical avoidance (Golman et al., 2017; Soroya et al., 2021; Sweeny et al., 2010). This study focused on inattention as its form of information avoidance. Experimental studies have provided evidence of individuals adjusting their attention, or the information they collect, based on incentives found in their environment (Andries & Haddad, 2020; Caplin & Dean, 2015). Scholars have characterized information acquisition and avoidance as active or passive (Golman et al., 2017; Sharif et al., 2020; Sweeny et al., 2010). Specifically, active avoidance behaviors involve intentionally avoiding information that is free and relevant to the outcome (Golman et al., 2017). An example would include being inattentive to information such as a bank balance when it is expected to be negative.

Other scholars have also considered reasons why individuals might choose to avoid information. In an experimental study for the National Bureau of Economic Research, Exley and Kessler (2021) tested whether individuals avoid information because of self-image concerns,

specifically related to selfishness. The study included two settings, the classic setting in which participants could determine the payoff for themselves and another participant under conditions that allow the participant, or decision-maker, to avoid information and consider their own self-image. In the second setting, image concerns about selfishness could not influence the decision because the payoffs go to two other participants rather than themselves. The choices available to the participants, as well as the timing and content of the information provided to the participants were held constant in both settings. Information avoidance in the classic setting due to self-image concerns was the option found to be significant (Exley & Kessler, 2021). After adding additional treatments, other reasons were found to be drivers for avoiding information in the study—an aversion to making decisions regarding tradeoffs between people, a desire to avoid bad news, laziness, inattention, and confusion.

While actively avoiding information can deprive people of information relevant to decisions they need to make (Golman et al., 2017; Soroya et al., 2021), avoiding information should not be assumed to be irrational in all cases. Information is a source of utility and there are circumstances where individuals could derive utility from avoiding information, e.g., avoiding genetic testing for a hereditary disease so one can enjoy life before symptoms or finding out the gender of a child (Golman et al., 2017). This study did not consider positive outcome conditions, rather it focused on avoidance behaviors that place individuals in a position to miss relevant financial information.

Avoidance Behavior in Personal Finance

The concept of attention, and the intentional lack thereof—in other words avoidance, has drawn interest from researchers looking to understand investor behavior. In an examination of investor attention to portfolio holdings, Sicherman and his colleagues (2016) described attention

as the demand for information. The authors noted that the benefit provided by information would need to overcome the costs associated with the attention needed to acquire it. This includes time, opportunity costs, and information-processing costs. For this study, attention was interpreted as actively considering information.

The literature on investor attention has generally shown that inattention was increased in volatile market conditions for loss averse investors (Andries and Haddad, 2020; Karlsson et al., 2009; Sicherman et al., 2016). Andries and Haddad (2020) argued that increased levels of risk make information costs feel higher, so investors do not seek information about their portfolios as often during periods of higher volatility. Similarly, Alvarez and his colleagues (2012) examined the frequency of portfolio observations, trading behavior and risk preferences in Italian households and found that the presence of observation costs reduced the frequency of information gathering. News media coverage also influenced attention to investment portfolios while investors displaying ostrich behavior, or the tendency to avoid information, were inclined to trade less often after market downturns (Andries & Haddad, 2020; Sicherman et al., 2016). In summary, scholars have posited that down markets result in different information cost assessments by risk tolerant and loss averse investors. Risk tolerant investors tend to hold riskier assets so more information is considered valuable in volatile markets. In contrast, loss averse investors' view information costs as higher in down markets which explains the tendency toward ostrich behavior for these investors. (Alvarez et al., 2012; Sicherman et al., 2016).

Using panel data, Sicherman and his colleagues (2016) found evidence of hedonic utility from attention to, or avoidance of, information about their investment portfolios. The researchers concluded that the attention response to volatility was a stable personality trait with the level of attention to, and strength of information avoidance, greater in males and wealthier investors.

They also found a negative correlation between attention and volatility, which they labeled a ‘volatility ostrich effect’. Support for the ostrich effect was also found in studies of both U.S. and Scandinavian investors as both groups of investors monitored their portfolios more often in rising markets (Karlsson et al., 2009). Karlsson and his fellow researchers (2009) offered a definition of the ostrich effect in a finance context and described it as, “avoiding exposing oneself to information that one fears will cause psychological discomfort” (p. 96). They argued that acquiring and focusing attention on information increases the psychological impact of the information. Further, scholars have reasoned that the abundance of information available digitally or through traditional media, also referred to as information overload, can create stress, anxiety, and tension, resulting in difficulties in memorizing and remembering, and even poor decisions by consumers (Lee & Cho, 2005). While these findings provided evidence for the construct of attention influencing trading and investment behaviors, the current study will add to the literature on the demand for financial information by exploring emotional factors that are impacted by a decrease in demand for information, in other words information avoidance. In the personal finance domain, information-seeking and information avoidance behaviors are observed in decision-making beyond trading and investing and the decision-making process includes emotional factors. For example, financial information is informative in the context of estate planning and wealth transfer decisions. Death can evoke emotions that could stymie conversations and preventive coping strategies on this topic. Avoidance behaviors in this context risks delaying decisions that may have a long-term impact on a family’s future.

Avoidance Behavior – Other Domains

Golman et al. (2017) conducted a review of the literature that focused on situations in which people actively avoid information, specifically considering information that is free and

relevant to the decision being made. Their findings revealed active information avoidance has been studied in various domains including education and medicine and can have personal and economic consequences within the decision-making process. For example, teachers and students who avoid feedback or criticism could miss opportunities to improve their performance. The researchers explained that active information avoidance needed to meet two conditions to be included in their analysis: 1) the individual must know the information is available to them, and 2) the individual must have free access to the information. Their review identified five specific strategies for actively avoiding information discussed in the literature—physical avoidance, inattention, biased interpretation of information, forgetting, and self-handicapping. Golman et al. (2017) also considered reasons for avoiding information and categorized them into two broad categories, hedonic motivations such as regret aversion or optimism maintenance, and those driven by strategic considerations—done because they believe it will influence future behavior. Strategic considerations centered on the struggle between present and future desires—for example, to enjoy the cake today, you avoid information containing the calorie and sugar content of the cake.

The construct of information avoidance has also been studied extensively in the health care disciplines where scholars were interested in what may drive an individual toward information avoidance. An experimental study examined the issue of information avoidance where subjects of the study could pay to avoid being tested for herpes simplex virus type-1 and the more stigmatized herpes simplex virus type-2. Results showed that subjects were three times more likely to avoid testing for the more negative outcome, suggesting that more adverse outcomes can lead to information avoidance (Ganguly & Tasoff, 2017).

In summary, a review of the literature highlighted the absence of studies interested in the avoidance construct's impact on emotional factors and responses, particularly in the context of personal finance. This essay's focus on the influence of information avoidance on retirement worry, a potential source of anxiety and information overload for individuals not experienced or comfortable with financial decisions, aimed to fill that gap.

Avoidance Behavior and Retirement Worry

According to Gutierrez and Hershey (2013), individuals with high levels of worry about retirement planning face greater difficulties processing financial and retirement concepts than those without emotional barriers. The researchers explored how retirement-related fears and worries would affect the processing of retirement-related information in an experimental study involving working adults. They concluded that ongoing negative thoughts about one's finances, or financial worries, can disrupt how information is processed. In another study of U.S. adults that used data from the Survey of Consumer Finances and the Health and Retirement Study, Owen and Wu (2007) found that individuals worried more about the adequacy of their retirement income after an adverse financial shock. They attributed part of this response to general pessimism after experiencing unexpected financial shocks rather than changes in income or net worth.

Inaction and procrastination, which can be interpreted as a form of avoidance, have also been found in studies examining retirement savings behaviors (Lusardi, 1999; Madrian & Shea, 2001; Owen & Wu, 2007). Madrian and Shea's (2001) study showed that 401(K) participants from a large Fortune 500 company were unlikely to change automatic contribution rates or default allocations set by their employer. In early research on retirement behaviors, Lusardi (1999) found evidence for procrastination around retirement savings, particularly among low

wealth households. She reported as much as one-third of older adults (age 51-61) sampled from the Health and Retirement Study as not thinking about retirement.

Hypothesis

TTSC predicts that when the two-stage cognitive appraisal process results in the determination of a threat, an individual adopts a coping strategy (Lazarus & Folkman, 1984). Based on prior literature, this study operationalized the coping type as avoidance behavior which reflects an emotion-focused coping strategy most fitting when faced with a threat that cannot be changed. Emotion-focused coping strategies have been described as helpful for navigating the emotional repercussions of a threat (Folkman & Moskowitz, 2004; Lazarus & Folkman, 1984). This model supported exploring the following hypothesis:

H₁: Levels of retirement worry are lower for those who avoid financial information.

Methodology

Data

This study utilized the 2021 National Financial Capability Study (NFCS). The NFCS is a triennial, nationally representative, cross-sectional study commissioned by the FINRA Investor Education Foundation to benchmark key indicators of financial capability. The 2021 NFCS included two surveys, the State-by-State Survey (NFCS-SS) and the Investor Survey (NFCS-IS), however this study only used data provided by the 2021 NFCS-SS. The 2021 NFCS-SS was administered to 27,118 U.S. adults via an online survey conducted from June to October 2021 (FGS Global, n.d; FINRA Investor Education Foundation, 2022). Respondents to the 2021 NFCS-SS included approximately 500 individuals from each state, and the District of Columbia (FINRA Investor Education Foundation, n.d.). California and Oregon were oversampled.

Findings were weighted to be nationally representative based on age, gender, ethnicity, education, and Census Division (FGS Global, n.d.). The 2021 NFCS-SS was selected because it provided the most recently available, nationally representative data on U.S. adults' financial behaviors and perceptions and included two questions that directly measured retirement worry and avoidance behavior.

Retired respondents were excluded from this study's sample. The focus on adults in the pre-retirement stage of the life cycle reflects the measure for the key variable in the study. Broadly, the construct of worry has been defined to reflect its focus on future threats and negative outcomes (Holaway et al., 2006; Matthews & Funke, 2006; Sibrava & Borkovec, 2006), so retirement worry is best captured in individuals before they have retired. The pre-retirement stage has been cited as the period when individuals worry about running out of money during retirement or having enough to retire (Hill, 2016; Skarborn & Nicki, 2000). Also, the types of worry older adults report have been found to differ from younger adults, for example health and functional independence later in life are greater concerns for older adults (Sibrava & Borkovec, 2006). This research supported limiting the sample by excluding retired respondents.

Dependent variable

Retirement worry was the dependent variable for this study. It was operationalized with a single survey question asking respondents to score their response on a 5-point Likert-type scale to the following statement, "*I am concerned that the money I have or will save won't last*". Responses were coded as an ordinal measure ranging from (1) *does not describe me at all* to (5) *describes me completely* (see Table 3.1).

Table 3.1

Measurement of Retirement Worry

Variable	Measurement
Retirement worry	5-point ordinal measure with higher scores indicating higher levels of worry

Independent variables

Avoidance behavior. The key independent variable was avoidance behavior. Responses were coded as a binary (1) *yes* or (0) *no* in response to the question, “*have you ever tried to figure out how much you need to save for retirement?*”. This question was only posed to respondents who had not yet retired. Prior research has identified inaction and procrastination as avoidance-type behaviors that can have a negative effect on retirement savings (Lusardi, 1999; Madrian & Shea, 2001) which provided support for the use of this question to measure avoidance behavior (see Table 3.2).

Table 3.2

Measurement of Avoidance Behavior

Variable	Measurement Question	Responses
Avoidance behavior	Have you ever tried to figure out how much you need to save for retirement?	1 if yes; 0 if no

Demographic and control variables. The demographic variables of age, marital status, sex, race, education, and income have been previously established as explanatory variables associated with avoidance behaviors and were included as control variables in this study (see Table 3.3).

Table 3.3

Measurement of Control Variables

Variable	Measurement Question	Responses	Literature cited
Age	What is your age?	(1) 18 to 24; (2) 25 to 34; (3) 35 to 44; (4) 45 to 54; (5) 55 to 64; (6) 65 plus	Golman et al., 2017; Lusardi, 1999
Marital status	What is your marital status?	(1) married; (2) single; (3) separated; (4) divorced; (5) widowed	Lusardi, 1999
Race	Which of the following best describes your race or ethnicity?	(1) White; (2) Non-White	Lusardi, 1999; Madrian & Shea, 2001; Owen & Wu, 2007
Sex	Do you describe yourself as a man, a woman, or in some other way?	(1) man; (2) woman;	Lusardi, 1999; Sharif et al., 2020; Sicherman et al., 2016
Education	What was the highest level of education that you completed?	(1) less than HS; (2) HS grad; (3) GED; (4) some college; (5) associates; (6) bachelor's; (7) graduate	Lusardi, 1999; Owen & Wu, 2007
Income	What is your approximate	(1) Less than \$25K;	Andries & Haddad,

annual income, including	(2) \$25k to no more	2020
wages, tips, investment income,	than \$50;	
public assistance, income from	(3) \$50K to no more	
retirement plans, etc.?	than \$100K;	
	(4) \$100K to no	
	more than \$200k;	
	(5) \$200K to no	
	more than \$300k;	
	(6) \$300k plus	

Analysis

Ordinary least squares (OLS) regression was used to explore the relationship between retirement worry and avoidance behavior. OLS regression is typically recommended when testing for relationships with continuous outcome variables (Allison, 2012). An important assumption of this statistical technique is that there is a linear relationship between the key independent and dependent variables. Although the dependent variable in this study, retirement worry, was not a truly continuous variable, a correlation analysis supported the expectation of a linear association between retirement worry and avoidance behavior. Statistical analyses were carried out using Stata/SE statistical software, version 17 (StataCorp, 2021).

Correlation analysis and variance inflation factors (VIF) were used to test for correlation and possible multicollinearity among the variables in the model. All correlation coefficients showed low levels of correlation with the dependent variable, retirement worry, at significance levels of $p < 0.001$ (Cohen, 1992). Gender ($r = 0.12, p < .001$) and marital status ($r = 0.16, p < .001$) were the only variables positively correlated with retirement worry. Spearman's rank order correlation was used due to the ordinal nature of the dependent variable (Kline, 2016). Measures of VIF were below 10 which supports no evidence of multicollinearity among independent

variables, as suggested by Cohen and Cohen (1983). Correlation coefficients for all variables are shown in Appendix A.

A multinomial logistic regression model was also used to assess the relative risk of various categories of retirement worry compared to experiencing no retirement worry for those practicing avoidance behavior. Multinomial logistic regression was selected because of the five categories of retirement worry tested and its suitability for examining relationships with categorical outcome variables (Allison, 2012). Despite the initial appearance of an ordered nature to the categories considered for retirement worry, the data failed to meet the proportional odds assumption necessary for an ordered logistic regression model to be deemed appropriate. The proportional odds assumption states that the relationship between each pair of outcome categories is the same which allows for the ordered logistic model's predicted probabilities to be similar to the observed proportions (Cornell Statistical Consulting Unit, 2020; UCLA Statistical Methods and Data Analytics, n.d.b). This assumption was tested using the Brant test which dichotomizes the ordinal dependent variable in various ways before running a series of logistic regressions (Williams, 2012). Statisticians explain that a significant test statistic is evidence of a failure to meet the proportional odds assumption (UCLA Statistical Methods and Data Analytics, n.d.b). The test statistic for the dependent variable was significant at the $p < .01$ level.

The full sample included 27,118 U.S. adults aged 18 and older, however the analytic sample was reduced because retirees were excluded which resulted in a sample size of 21,263. Additionally, some variables had fewer responses due to the structure of the NFCS survey, e.g., routing respondents to applicable questions or respondent preferences. Respondents were also given the option to choose responses of *prefer not to say* or *don't know* to survey questions. For this study, those responses were treated as missing values given the challenge of inferring an

accurate response. Missing values for binary *yes/no* variables were coded as *no* and any remaining missing values were excluded from the final dataset. This approach was consistent with the treatment of missing values in the NFCS dataset by other researchers (Allgood & Walstad, 2016; Magwegwe, 2020) and resulted in a final sample size of 20,689. Table 3.4 illustrates missing values for each of the study's variables.

Table 3.4

Missing Data Analysis (n = 21,263)

Dependent Variable	n	Missing	% Missing
Retirement worry	21,263	574	2.70
Independent Variables			
Avoidance behavior	19,909	1,354	6.37
Control Variables			
Age	21,263	0	0.00
Gender	21,263	0	0.00
Marital status	21,263	0	0.00
Income	21,263	0	0.00
Education	20,908	355	1.67

Note. A response of *prefer not to say* and *don't know* was coded as missing.

Results

Descriptive Statistics

A summary of both weighted and unweighted descriptive statistics for categorical variables is provided in Table 3.5. The weighted analytic sample of 20,689 U.S. adults included

slightly more women (50.31%) than men (49.69%) and most were unmarried (56.04%). A majority of the weighted sample had an education level below a bachelor's degree (68.38%). The average age of the sample was included in the 35-to-44 age category. Household income was categorized into six groups, with the average income in the \$25,000 to \$49,999 group. More than forty percent of the weighted sample reported high levels of retirement worry (47.57%), and approximately one-third practiced avoidance behaviors (38.83%).

Table 3.5

Sample Characteristics of Categorical Variables (n = 20,689)

	n	% (unweighted)	% (weighted)
<i>Practice Avoidance Behavior</i>			
Yes	8,328	40.25	38.83
No	12,361	59.75	61.17
<i>Retirement Worry</i>			
Does not describe me at all	2,282	11.03	11.24
Describes me very little	3,104	15.00	14.98
Describes me somewhat	5,447	26.33	26.21
Describes me very well	4,371	21.13	21.16
Describes me completely	5,485	26.51	26.41
<i>Control Variables</i>			
<i>Age</i>			
18 to 24	2,910	14.07	15.85
25 to 34	4,559	22.04	21.96

35 to 44	4,399	21.26	20.12
45 to 54	4,316	20.86	20.01
55 to 64	3,393	16.40	16.70
65 and older	1,112	5.37	5.37
Gender			
Male	9,584	46.32	49.69
Female	11,105	53.68	50.31
Race			
White	14,776	71.42	59.46
Non-white	5,913	28.58	40.54
Education			
Less than HS	1,240	5.99	6.82
HS graduate/GED	6,141	29.68	31.82
Some college/Associates	5,890	28.47	29.74
Bachelor's	4,768	23.05	21.26
Graduate	2,319	11.21	10.36
Marital status			
Married	9,591	46.36	43.96
Single	8,188	39.58	42.40
Separated/divorced	2,466	11.92	11.57
Widowed/widower	444	2.15	2.07
Income			
Less than \$25K	5,000	24.17	25.78

\$25K to \$49,999	4,970	24.02	24.37
\$50K to \$99,999	6,341	30.65	30.02
\$100K plus	4,378	21.16	19.83

Regression Results

Results of the OLS regression analysis can be found in Table 3.6. In this model, avoidance behaviors were inversely related to retirement worry ($b = -0.14, \beta = -0.05, p < 0.001$). In addition, several demographic covariates were positively related to retirement worry, including each of the age and income categories when compared to their base categories. Interestingly, non-White ($b = -0.15, \beta = -0.05, p < 0.001$) and male ($b = -0.18, \beta = -0.07, p < 0.001$) respondents were inversely related to retirement worry when compared to White and female respondents, respectively, suggesting a difference in how racial groups and genders experience retirement worry. Respondents who were separated or divorced ($b = 0.25, \beta = 0.06, p < 0.001$) were the only non-married category with a significant and positive relationship to retirement worry when compared to those who were married. Of the education categories, only those with a bachelor's degree ($b = -0.09, \beta = -0.03, p < 0.05$) showed a significant negative relationship with retirement worry when compared to those with less than a high school diploma, suggesting education may have a positive effect on retirement worry.

Table 3.6

OLS Regression Model of Predictors of Retirement Worry--weighted ($n = 20,358$)

	Coefficient	SE	β	p -value
Avoidance behavior	-0.14	0.02	-0.05	0.00
Age (ref 65 and older)				

18 – 24	0.32	0.05	0.09	0.00
25 – 34	0.54	0.04	0.17	0.00
35 – 44	0.60	0.04	0.18	0.00
45 – 54	0.58	0.04	0.18	0.00
55 – 64	0.32	0.04	0.09	0.00
Gender (<i>ref Female</i>)				
Male	-0.18	0.02	-0.07	0.00
Race (<i>ref White</i>)				
Non-White	-0.15	0.02	-0.05	0.00
Education (<i>ref less than HS</i>)				
HS grad/GED	-0.04	0.04	-0.01	0.26
Some college/Associates	0.01	0.04	0.00	0.73
Bachelor's	-0.09	0.04	-0.03	0.03
Graduate	-0.02	0.04	-0.00	0.68
Marital status (<i>ref Married</i>)				
Single	0.03	0.02	0.01	0.13
Separated/Divorced	0.25	0.03	0.06	0.00
Widowed	0.09	0.06	0.01	0.16
Income (<i>ref \$100K or more</i>)				
Less than \$25K	0.88	0.03	0.29	0.00
\$25K - \$49,999K	0.71	0.03	0.23	0.00
\$50K - \$99,999K	0.38	0.03	0.13	0.00

Note. $X^2(18, 20339) = 133.37, p < .001$; adjusted r-squared = 0.10.

As a robustness check, a multinomial regression model was also tested with the dependent variable—retirement worry, as a categorical variable. This was done to investigate the relationship between avoidance behavior and different categories of retirement worry. Table 3.7 displays relative risk ratios for the key variables estimated by the model. Relative risk ratios (RRR) describe the exponentiated coefficients derived from a multinomial logistic model. Despite their similarity to odds ratios, statisticians have explained that relative risk ratios are more appropriate when model results are stated relative to a base category (Gutierrez, 2005; UCLA Institute for Digital Research and Education, n.d.a). In this model, RRR were appropriate because the model results were stated relative to a base category of retirement worry. The results represent a respondent’s RRR of experiencing retirement worry at *very little*, *somewhat*, *very well*, and *completely* levels, relative to the neutral *not at all* level.

Results of the key variable model showed that a respondent who practiced avoidance behaviors was more likely to report no retirement worry than all but the *very little* level of retirement worry. If a respondent increased their avoidance behavior, there were more likely to report no retirement worry relative to the *somewhat* (RRR = 0.70, 95% CI = 0.63, 0.77, $p < 0.001$), *very well* (RRR = 0.55, 95% CI = 0.50, 0.61, $p < 0.001$), and *completely* (RRR = 0.47 95% CI = 0.42, 0.52, $p < 0.001$) levels of retirement worry.

Table 3.7

Multinomial Regression Model of Retirement Worry—Key Variables Only (n = 20,689)

	Describes me...			
	Very Little RRR (95% CI)	Somewhat RRR (95%CI)	Very Well RRR (95% CI)	Completely RRR (95% CI)
Avoidance behavior	1.04(0.94, 1.16)	0.70*** (0.63, 0.77)	0.55*** (0.50, 0.61)	0.47*** (0.42, 0.52)

-2LL	-32080.87
χ^2	440.84
Pseudo r-sq	0.01

Note. RRR-relative risk ratio; reference group for DV = *describes me not at all*; * $p < .05$, ** $p < .01$, *** $p < .001$

Results from the full model are illustrated in Table 3.8. When demographic covariates were added to the full model, the higher levels of retirement worry remained significantly related to avoidance behavior. If a respondent increased their avoidance behavior, there were more likely to report no retirement worry relative to the *somewhat* (RRR = 0.84, 95% CI = 0.76, 0.94, $p < 0.001$), *very well* (RRR = 0.78, 95% CI = 0.69, 0.87, $p < 0.001$), and *completely* (RRR = 0.77, 95% CI = 0.69, 0.85, $p < 0.001$) levels of retirement worry. These findings appear to support the premise that avoidance behaviors are successful at reducing retirement worry and essay two's hypothesis that individuals who practice avoidance behaviors experience lower levels of retirement worry.

For the demographic covariates included in the model, all age categories were significantly related to each of the retirement worry categories when compared to their reference groups. Interestingly, each of the age groups showed a higher relative risk of reporting retirement worry than reporting no retirement worry across each level of worry. Gender and race measures also showed significant relationships in the model. However, males and non-White respondents had a higher risk of reporting no retirement worry compared to the highest three of the four worry categories. Males were more likely to report no retirement worry relative to the *somewhat* (RRR = 0.82, 95% CI = 0.74, 0.91, $p < 0.001$), *very well* (RRR = 0.76, 95% CI = 0.68, 0.85, $p < 0.001$), and *completely* (RRR = 0.63, 95% CI = 0.57, 0.70, $p < 0.001$) levels of retirement worry compared to females. Similarly, non-White respondents were more likely to report no retirement

worry relative to the *somewhat* (RRR = 0.83, 95% CI = 0.75, 0.92, $p < 0.001$), *very well* (RRR = 0.77, 95% CI = 0.69, 0.86, $p < 0.001$), and *completely* (RRR = 0.68, 95% CI = 0.61, 0.76, $p < 0.001$) levels of retirement worry when compared to White respondents. Respondents who were separated or divorced showed significant relationships in three of the four highest retirement worry categories when compared to those who were married. Respondents who were separated or divorced and practiced avoidance behaviors had a 1.29 greater risk of experiencing a *somewhat* (RRR = 1.29, 95% CI = 1.06, 1.57, $p < 0.01$) level of retirement worry, a 1.49 greater risk of experiencing a *very well* (RRR = 1.49, 95% CI = 1.22, 1.81, $p < 0.001$) level of retirement worry, and a 1.84 greater risk of experiencing a *completely* (RRR = 1.84, 95% CI = 1.52, 2.22, $p < 0.001$) level of retirement worry when compared to no worry. Widows had a higher risk of reporting no retirement worry compared to the *somewhat* (RRR = 0.70, 95% CI = 0.49, 1.00, $p = 0.05$) level of retirement worry. The single marital status and the education measures were not significant in the model.

Table 3.8

Multinomial Regression Model of Predictors of Retirement Worry

	Describes me...							
	Very Little		Somewhat		Very Well		Completely	
	RRR (95% CI)	<i>p</i> - value	RRR (95%CI)	<i>p</i> - value	RRR (95% CI)	<i>p</i> - value	RRR (95% CI)	<i>p</i> - value
Avoidance behavior	1.07(0.95, 1.20)	0.26	0.84(0.76, 0.94)	0.00	0.78(0.69, 0.87)	0.00	0.77(0.69, 0.85)	0.00
Age (ref 65 or older)								
18 to 24	1.51(1.17, 1.94)	0.00	2.05(1.62, 2.61)	0.00	2.88(2.22, 3.75)	0.00	2.03(1.56, 2.62)	0.00

25 to 34	1.42(1.13, 1.79)	0.00	2.43(1.95, 3.03)	0.00	3.48(2.72, 4.44)	0.00	3.48(2.74, 4.42)	0.00
35 to 44	1.36(1.08, 1.70)	0.01	2.14(1.72, 2.65)	0.00	3.30(2.59, 4.20)	0.00	3.87(3.07, 4.90)	0.00
45 to 54	1.51(1.21, 1.90)	0.00	2.44(1.96, 3.02)	0.00	3.31(2.60, 4.22)	0.00	3.97(3.15, 5.02)	0.00
55 to 64	1.36(1.09, 1.70)	0.01	1.92(1.55, 2.37)	0.00	1.93(1.51, 2.46)	0.00	2.20(1.74, 2.77)	0.00
Gender (<i>ref Female</i>)								
Male	0.92(0.83, 1.03)	0.16	0.82(0.74, 0.91)	0.00	0.76(0.68, 0.85)	0.00	0.63(0.57, 0.70)	0.00
Race (<i>ref White</i>)								
non-White	0.91(0.82, 1.02)	0.13	0.83(0.75, 0.92)	0.00	0.77(0.69, 0.86)	0.00	0.68(0.61, 0.76)	0.00
Education (<i>ref Less than HS</i>)								
HS grad/GED	0.93(0.72, 1.19)	0.55	0.94(0.75, 1.18)	0.60	0.83(0.66, 1.05)	0.12	0.90(0.72, 1.13)	0.36
Some college/ Associates	1.04(0.80, 1.33)	0.79	1.08(0.86, 1.35)	0.51	1.04(0.82, 1.31)	0.76	1.06(0.85, 1.33)	0.62
BS	1.12(0.87, 1.46)	0.37	0.96(0.76, 1.21)	0.72	0.93(0.73, 1.19)	0.58	0.85(0.67, 1.07)	0.16
Graduate	0.93(0.71, 1.24)	0.63	0.91(0.71, 1.18)	0.48	0.88(0.68, 1.15)	0.34	0.96(0.74, 1.24)	0.75
Marital status (<i>ref Married</i>)								
Single	1.02(0.89, 1.18)	0.74	1.04(0.91, 1.18)	0.58	1.09(0.96, 1.25)	0.19	1.07(0.94, 1.23)	0.30
Separated/ Divorced	1.08(0.87, 1.35)	0.48	1.29(1.06, 1.57)	0.01	1.49(1.22, 1.81)	0.00	1.84(1.52, 2.23)	0.00
Widowed	0.92(0.63, 1.35)	0.67	0.70(0.49, 1.00)	0.05	0.98(0.68, 1.42)	0.93	1.09(0.77, 1.54)	0.61
Income (<i>ref \$100K or more</i>)								

< \$25K	1.02(0.84, 1.24)	0.84	1.97(1.65, 2.35)	0.00	3.53(2.93, 4.25)	0.00	6.77(5.63, 8.15)	0.00
\$25K - \$49,999K	1.29(1.08, 1.54)	0.01	2.06(1.75, 2.42)	0.00	3.28(2.75, 3.89)	0.00	5.08(4.28, 6.04)	0.00
\$50K - \$99,999K	1.42(1.23, 1.63)	0.00	1.82(1.59, 2.08)	0.00	2.44(2.11, 2.83)	0.00	2.50(2.15, 2.90)	0.00
-2 LL	-30549.27							
χ^2	2425.80							
Nagelkerke R ²	0.04							

Note. n = 20,358; RRR-relative risk ratio; reference group for DV = *describes me not at all*; * $p < .05$, ** $p < .01$, *** $p < .001$.

Discussion

The purpose of essay two was to investigate the relationship between avoidance behaviors and retirement worry. The transactional theory of stress and coping (Lazarus & Folkman, 1984) provided the theoretical framework for predicting that avoidance coping strategies will result in lower levels of retirement worry. Using data from the 2021 NFCS-SS, two models were specified. The first model tested the linear relationship between the emotion of retirement worry and avoidance behaviors using OLS regression. Results showed an inverse linear relationship between avoidance behaviors and retirement worry which supports the study's hypothesis and is in line with findings from prior studies showing that attention to information increases the psychological impact of the information (Karlsson et al., 2009).

The study's second model considered the probability of avoidance behaviors relative to various levels of retirement worry. Findings from the full multinomial regression model mirrored the linear relationship found in the OLS model. As avoidance behaviors increase, respondents were less likely to report three of the four higher levels of retirement worry, *very little*,

somewhat, and *completely*, than reporting *no* retirement worry when demographic controls were added.

Limitations

This study has several limitations. First, cross-sectional data was used which does not allow for an assessment of changes in retirement worry or avoidance behaviors over time, the key outcome and predictor variables in the model. Next, while this study focused on the influence avoidance behavior had on retirement worry, it is possible that retirement worry could trigger avoidance practices. In a recent study investigating preparation for the Covid-19 pandemic, Soroya and her fellow researchers (2021) found that Finnish adults who experienced information anxiety, or felt there was too much to deal with, tended to avoid information about the pandemic. Their findings showed that avoidance behaviors can stem from information anxiety and information overload. In other words, this negative affect was a predictor of avoiding information. The current study did not evaluate potential triggers of avoidance behaviors, of which retirement worry may be one, representing a limitation of the study.

The multivariate analysis used in this study can only establish relationships between the variables included in the model, it does not establish causation. Further, missing data that was removed using listwise deletion could also bias the sample. While it is not uncommon for survey data to have missing values that are not MCAR, missing values that are not MCAR risks providing sample data that is affected by some form of bias. Lastly, despite the significant relationships found between the key variables, the multinomial model showed low explanatory power for variance in the dependent variable. The Nagelkerke r-squared value was 0.04, indicating the model only explained 4% of the variance in retirement worry.

Implications and Conclusion

Essay two provides important implications for financial professionals working to help clients manage behavioral biases. Results from this study have identified an empirically significant link between avoidance behaviors, e.g., calculating the amount of savings needed, and the emotion of retirement worry. These findings could help financial professionals identify potential triggers of retirement worry as clients tend to turn to professionals for help with managing these types of emotions. The results also provide support for financial professionals to prompt their clients to pay attention to financial information when it is helpful for the decision-making process. Findings from this study show that avoidance behaviors may be successful at reducing worry to levels perceived as tolerable although not sufficient to completely eliminate it.

Results were consistent with prior research indicating a negative correlation between attention and investment volatility (Sicherman et al., 2016) which suggested that attention declines with negative outcomes. Similarly, research examining attention and trading and investment behaviors found an inverse relationship between avoidance behaviors and trading frequency during market downturns (Andries & Haddad, 2020). This study adds to the literature on avoidance behaviors and broadens it into the personal finance domain, expanding our understanding of its role on emotions related to financial outcomes. Exploring emotional factors that are impacted by a decrease in the demand for information extends the literature related to information search as well.

In summary, essay two provides the first examination of the relationship between avoidance behaviors and retirement worry. Results from the multinomial regression model supported expectations for a negative association between the two measures at high levels of retirement worry. This study contributes to the growing field of literature that explores the

impact avoidance behaviors have on emotions, behaviors, and outcomes while also extending the study of its influence into the personal finance domain.

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Chapter 4 - The Influence of Retirement Worry on Risk Behavior

Risk assessments, or considerations of the likelihood of a loss, are a core component of most financial decisions. Financial risks often include a wide range of exposures such as investment risks, longevity risks, or the risks associated with loss of income. Consequently, understanding antecedents and influences of these risks are key to arriving at successful outcomes in the personal finance domain. Essay three examined the appetite for the financial risk of investment losses in individuals experiencing the emotion of retirement worry.

In this study, risk preferences were viewed as a spectrum ranging from risk aversion to risk seeking as the extreme ends of the same continuum. The risk averse end of the range was the focus of this research, with an emphasis on biases stemming from loss aversion as predicted by prospect theory. While scholars have used loss aversion interchangeably with risk aversion, the penchant for loss aversion is distinct. Risk aversion describes a risk choice when weighing gains and losses with equal value, whereas loss aversion refers to the bias toward accepting more risk in order to avoid losses (Kahneman & Tversky, 1979). Individuals make their decisions based on the value of the potential gain or loss rather than the outcome. In the personal finance discipline, empirical studies investigating biases created by loss aversion may help financial professionals to better understand risk decisions made by individuals. For example, biases stemming from loss aversion may add insight into the recent appetite for investing in speculative, nontraditional digital assets such as cryptocurrencies despite the volatile nature of their valuations (Tzanetos, 2022). This distinction is also essential for financial professionals because they have the choice to frame financial information and recommendations either positively or negatively, and that decision can influence the resulting behavior (Buland et al., 2022). For example, Buland and his colleagues (2022) have recommended framing the choice to spend more today as a loss to one's

future self or framing automatic retirement contributions as building wealth rather than a reduction in spending. These types of framing strategies may counter biases resulting from loss aversion that could lead to suboptimal financial decisions.

Loss aversion has been studied in the personal finance domain with interests in a range of diverse perspectives such as how it should be measured as a construct distinct from risk aversion (Guillemette et al., 2015) to its role in the decision to work with financial professionals (Cheng et al., 2019). It has also been considered in the context of investment decisions, e.g., retirement preparedness (Buland et al., 2022). Loss aversion has been viewed as a fluid preference, influenced by prior financial outcomes and cognitive load (Guillemette et al., 2015). However, this essay aimed to understand the role retirement worry plays in this dynamic.

Scholars have argued that emotions play a central role in decision-making around risk and risk-taking behaviors likely by triggering an automatic response (Loewenstein et al., 2001; Shiv et al., 2005). For example, Cheng and colleagues (2019) have posited that investors make emotional decisions in response to a loss of wealth which in turn influences the decision to seek help from a financial professional or to fire them. Others have also postulated that affect, or emotions, can lead to behaviors that are counter to what the individual recognizes as an appropriate response (Loewenstein et al., 2001). Emotions, such as financial worry, have only been empirically examined with a limited number of tangible outcomes, for example retirement preparedness (Litwin & Meir, 2012; Magwegwe, 2020). So, this study aimed to extend this work by investigating retirement worry as a factor that influences risk behaviors. Retirement worry was empirically tested for its relationship with stock investing which was used to reflect risk-seeking behavior. Findings from this research would provide financial professionals with data to properly frame or nudge their clients most effectively toward positive financial outcomes.

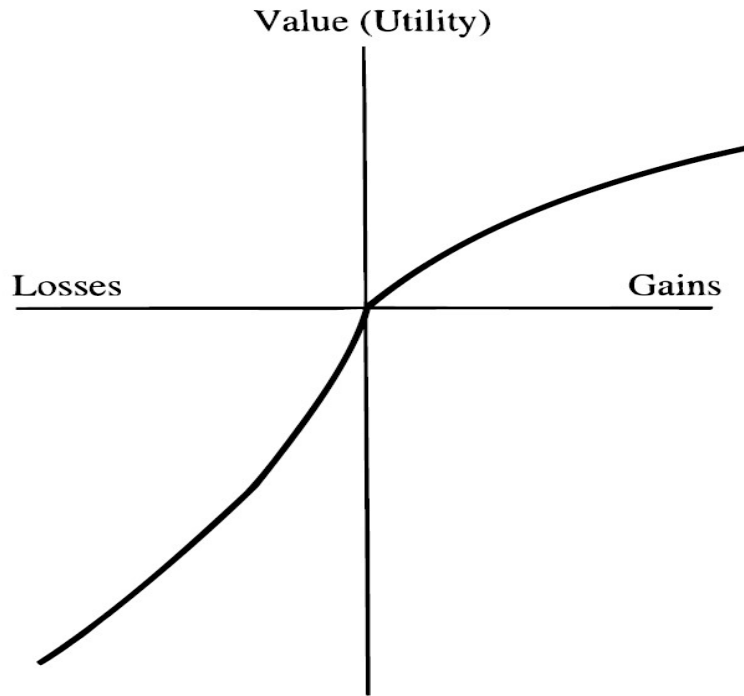
Further, the findings are expected to add empirical evidence supporting the need to include emotions in assessments of loss aversion in clients and aid the profession as it reduces its reliance on heuristics.

Theoretical Framework

In 1979, psychologists Daniel Kahneman and Amos Tversky developed prospect theory as a descriptive model of decision making under risk (Barberis, 2013; Kahneman & Tversky, 1979). Psychologists and economists have argued that people make decisions based on an estimation of the consequences of their choice options (Chavas, 2004; Loewenstein et al., 2001). However, prospect theory represents a departure from the economic assumption of rational choice found in expected utility theory. Tversky and Kahneman (1991) make the case that choice depends on a reference level. As shown in Figure 4.1, they illustrated choice under uncertainty with a value function defining gains and losses relative to a reference point. The model shows that the value function is steeper in the negative area than in the positive area which reflects the concept of loss aversion. The illustration of the bias created from loss aversion can be described as showing risk averse preferences in the concave region of gains and risk seeking preferences in the convex region of losses (Barberis, 2013).

Figure 4.1

Prospect Theory Model (Kahneman & Tversky, 1979)



Prospect theory has been applied to studies concerned with individual asset pricing and overall market performance, as well as the trading of financial assets over time (Barberis, 2013) which supported the use of this theoretical framework to investigate stock investing by individuals experiencing retirement worry. Based on prospect theory, retirement worry was tested for its influence on loss aversion. The following research question was considered, “is there a relationship between retirement worry and investment risk behaviors?”

Literature Review

Risk Preferences and Loss Aversion

Risk preference was initially examined from a cognitive lens and studied under conditions of certainty or known probabilities, i.e., lotteries and gambling scenarios (Volz & Gigerenzer, 2012) and under the assumption of rational decision-making (Chavas, 2004; von Neumann & Morgenstern, 1944). However, Kahneman and Tversky (1979) offered a critique of

economists' view of decision-making under risk using the framework of expected utility. They argued that individuals tend to overweight outcomes that are certain which leads to risk aversion in choices with certain gains and risk seeking behaviors when losses are expected. Stated differently, they explained that certainty increases aversion to losses and the attractiveness of gains. This began the focus on loss aversion in decision-making under risk as a framework for a greater sensitivity to losses than to gains as distinct from an aversion to uncertainty (Klaus et al., 2020). Early literature in the personal finance domain recognized that risk was actually a reference to loss aversion (Quattlebaum, 1988).

Guillemette and his colleagues (2015) explored measurements of loss aversion using risk assessment questions. They argued that loss aversion can be measured by comparing choices to uncertain gains and losses, as well as by comparing physiological arousal to gains and losses. However, the researchers also asserted that loss aversion is not a stable preference and can be changed by prior monetary outcomes and cognitive load. Scholars have also argued that loss aversion is increased in the presence of prior losses, a dynamic referred to as a 'house money effect' (Guillemette et al., 2015; Thaler & Johnson, 1990).

Studies have found that the way in which losses are framed can influence the perception of the loss and ultimately impact loss aversion (Buland et al., 2022; James, 2012; Sokol-Hessner et al., 2009, 2013). Framing is a mental process, often used when developing a shortcut strategy in the decision-making process, that can be influenced by available information, past experiences, and emotions (Buland et al., 2022). In a journal article directed to an audience of financial advisors, Buland and his colleagues (2022) posited that framing can be a useful tool that influences how individuals assess a situation and make decisions or it can lead to biases. They explained that framing biases are created by presenting objectively equivalent information

or options as a gain or loss to the individual, resulting in a decision that is based on how the information is presented rather than the information itself.

Early experimental studies tested scenarios, such as stock market performance and investment decisions, which have shown that the framing of loss experiences can influence loss aversion and risk-taking behaviors (James, 2012; Sokol-Hessner et al., 2009, 2013; Thaler et al., 1997). Using skin conductance to measure responses in a neuroimaging study, Sokol-Hessner and his colleagues (2009) found that individuals were more aroused per dollar to losses than they were to gains which is consistent with predictions from prospect theory. Responses were also affected by the perspective taken toward the loss. For example, framing the loss in the context of a broader portfolio showing mixed performance would lessen the impact of loss outcomes. The researchers argued that their results provide evidence of the power of framing to influence assessments of value and choice.

Similarly, in an experimental study investigating the decision to choose or change financial advisors, James (2012) tested a sample of U.S. adult women who were asked to play an advisor-intermediated stock market game. The author used fMRI neuroimaging to monitor participant responses to market return scenarios and found greater levels of brain activation in areas associated with error detection and number comparisons just before changing advisors. He also identified similarities between the decision to stop chasing losses in a gambling context and the decision to stop using a financial advisor. In both cases, an individual experienced a negative outcome, or loss. However, the level of optimism around future outcomes dictated whether or not the individual would continue the gambling behavior or working with the financial advisor. This behavior has been termed ‘loss chasing’ and describes heuristics driven by a reinterpretation

of losses (James, 2012). For example, an investor might reinterpret investment losses as a buying opportunity or a good time to purchase a stock for less rather than a signal to exit the market.

Retirement Worry and Risk Behavior

American adults have repeatedly expressed worry about having enough income in retirement to support themselves throughout their retirement years (Hill, 2016; Transamerica Center for Retirement Studies, 2020). Pfau (2018) argued that these feelings could be explained by a lack of adjustment in the investment plan to account for the change in risk preferences as one nears retirement. Approaching retirement should result in a shift from a wealth accumulation strategy to retirement income planning which would create the conditions for this type of worry (Hershey et al., 2010). In a Canadian study, Skarborn and Nicki (2000) examined worry between age cohorts, pre- and post-retirees, and found a significantly higher level of worry in pre-retirees than their retired peers. These results align with the premise that the period approaching retirement is primed for retirement worry stemming from concerns around sufficient income to continue their lifestyle after the working years. Relatedly, a Transamerica survey explored the plight of U.S. retirees during the Covid-19 pandemic and reported that a reduction in, or the elimination of, social security benefits was this populations' greatest financial fear (Transamerica Center for Retirement Studies, 2020). An Allianz survey also reported that 60% of baby boomers feared running out of money in retirement more than they feared death (Hill, 2016). Pearson (2022) labeled these fears as retirement insecurity, which was defined as "an individual's fear of running out of money during retirement" (p. 61). Research has connected retirement insecurity with future retirement income concerns (Hershey et al., 2010; Pearson, 2022) so this study includes retirement insecurity, retirement income concerns, and retirement fears in its interpretation of retirement worry.

Scholars have identified age, or stage of life cycle, and marital status as factors affecting the allocation of retirement assets. Early work by Benartzi and Thaler (2007) also considered the role of heuristics and biases in retirement savings behavior, concluding that factors such as the framing of portfolio choices and the number of equity fund offerings were correlated with equity allocations. Yilmazer and Lyons (2010) found married women who controlled the family's financial resources were less likely to invest their retirement assets in risky assets. Arano and Terry (2010) examined retirement asset allocation in their study of risk aversion differences between men and women. They tested this relationship against the backdrop of the assumption that investors have a lower proportion of their investment assets in risky investments as they approach retirement. Findings did not support women holding a smaller proportion of their retirement assets in stocks, but the authors did find significant differences in risk aversion between married and single households. In a study of pre-retirees, Tran (2022) considered racial and ethnic differences in a construct termed 'retirement involvement' which was defined and measured as the perceived relevance of retirement planning and one's feelings toward it. The author did not find differences in attitudes by racial groups, but perceived relevance was found to be higher for women of color and older age groups.

The construct of retirement worry was assumed to occupy the loss region of the value function used to model loss aversion. The model shows the bias toward loss aversion as measured relative to a reference point (Barberis, 2013; Tversky & Kahneman, 1991). Tversky and Kahneman (1991) have described prospect theory's reference point as the status quo. When investigating risk behaviors and retirement savings, researchers have followed this guidance and modeled the reference point as stock purchase price (Knoll, 2010; Odean, 1998), current level of wealth (Arkes et al., 2008), and current income (Fisher, 2013; Fisher & Montalto, 2011). This

study adopted a similar approach with the reference point in the conceptual model reflecting current expectations for future income. Retirement worry was modeled to reflect a concern that future income will not be sufficient to meet the expected future income needs, thus occupying the loss region of the model.

Hypotheses

Based on prior literature and prospect theory's prediction that individuals will take on risks to avoid losses, the convexity explained by prospect theory in the loss region of the theoretical model supports the hypothesis that an individual experiencing retirement worry would become risk-seeking (Kahneman & Tversky, 1979; Thaler et al., 1997). Risk-seeking investment behavior was operationalized as purchasing stocks, so the following hypothesis was tested:

- H₁: When an individual anticipates losses (retirement worry), they will take on risk (invest more in stock).

Methodology

Data

The 2018 National Financial Capability Study's State-by-State Survey (NFCS-SS) and Investor Survey supplement (NFCS-IS) were used to examine the relationship between retirement worry and investment risk behaviors. The 2018 NFCS-SS is a cross-sectional dataset that included a sample of 27,091 adults which was comprised of 500 respondents from each state and the District of Columbia. The states of Oregon and Washington were oversampled in the 2018 study (Arc Research, 2018a). The sample used for the NFCS-IS portion is a subset of the larger 2018 NFCS-SS sample and included 2,003 adults—age 18 and older. The respondents had to have completed the 2018 NFCS-SS, have investments outside of their retirement accounts and

be involved in investment decision-making to qualify. This survey aimed to explore investing related topics and appears to be generalizable to the investing population of U.S. investors (Arc Research, 2018b). The combined dataset was suitable for investigating the impact of retirement worry on investment risk behavior as it provided access to a national sample of investors with questions related to investment risk.

This study's sample was restricted to respondents aged 50 and older to reflect the emphasis on retirement worry and its relationship with investment risk behaviors. Worry and concerns around having enough money to retire, or running out of money during retirement, has been often cited by this age cohort (Hill, 2016; Skarborn & Nicki, 2000), so limiting the examination of investment risk behaviors to this demographic would minimize the influence of factors related to risk taking in younger adults on the model.

Dependent Variable

The dependent variable for this analysis was investment risk behavior (Table 4.1). Investing in stock was used to operationalize investment risk-taking. Stock investing was measured by a single question taken from the 2018 NFCS-IS survey, "*how much of your non-retirement portfolio is invested in stocks or mutual funds that contain stocks?*". Responses were coded as a categorical variable with each measure representing the portion of investment portfolio invested in stock. The item was coded (1) *more than half*, or (2) *less than half*, or (3) *none*.

Table 4.1

Measurement of Investment Risk Behavior

Variable	Measurement Question	Response
Stock investing	How much of your non-retirement	1- <i>More than half</i> ,

portfolio is invested in stocks or mutual funds that contain stocks?	2-Less than half, 3-None
--	-----------------------------

Independent Variable

Retirement worry. Retirement worry was measured as a continuous variable using the 2018 NFCS-SS survey question asking respondents to rank their agreement with the following statement, “*I worry about running out of money in retirement.*” (Table 4.2). Responses were ranked on a scale of 1 (*strongly disagree*) to 7 (*strongly agree*).

Table 4.2

Measurement of Retirement Worry

Variable	Measurement
Retirement worry	7-point ordinal measure with higher scores indicating higher levels of worry

Demographic and control variables. Prior research has established that demographic variables influence investment patterns and risk preferences, so the following control variables were used in this analysis: age, gender, race/ethnicity, education, marital status, and income (see Table 4.3).

Table 4.3

Measurement of Control Variables

Variable	Measurement Question	Responses	Literature Cited
Age	What is your age?	Continuous; Restricted to age 50 and older	Ameriks & Zeldes, 2004; Chavali & Mohanraj, 2016;

			Fan et al., 2022; Tran, 2022
Gender	What is your gender?	(1) <i>male</i> ; (2) <i>female</i>	Arano et al., 2010; Chavali & Mohanraj, 2016; Fan et al., 2022; Grable & Rabbani, 2014; Hariharan et al., 2000; Rabbani et al., 2021; Tran, 2022
Race	Which of the following best describes your race or ethnicity?	(1) <i>White/Caucasian</i> , (2) <i>Black/African American</i> , (3) <i>Hispanic/Latino(a)</i> , (4) <i>Asian</i> , (5) <i>Other</i>	Fan et al., 2022; Rabbani et al., 2021; Tran, 2022
Education	What was the highest level of education that you completed?	(1) <i>Did not complete HS</i> , (2) <i>HS graduate/GED</i> , (3) <i>Some college/Associates</i> , (4) <i>Bachelor's</i> , (5) <i>Graduate</i>	Ameriks & Zeldes, 2004; Fan et al., 2022; Hariharan et al., 2000; Rabbani et al., 2021
Marital status	What is your marital status?	(1) <i>Married</i> , (2) <i>Single</i> , (3) <i>Separated/Divorced</i> , (4) <i>Widowed/Widower</i>	Arano et al., 2010; Hariharan et al., 2000; Yilmazer & Lyons, 2010
Income	What is your approximate annual income, including wages, tips,	(1) <i>Less than \$25K</i> , (2) <i>\$25k to no more than \$50</i> , (3) <i>\$50K to no more than \$100K</i> ,	Ameriks & Zeldes, 2004; Fan et al., 2022

investment income,	(4) \$100K to no more than
public assistance,	\$200K,
income from	(5) \$200K to no more than
retirement plans, etc.?	\$300K,
	(6) \$300K plus

Analysis

Multinomial logistic regression was used to investigate the effect of retirement worry on investment risk behavior. Specifically, the model assessed the relative risk of having *more than half* or *less than half* of an investment portfolio invested in stocks compared with having *none* of an investment portfolio invested in stocks for those experiencing retirement worry. This statistical technique is appropriate for dependent variables with two or more categories (Allison, 2012). The use of categories for the outcome measure reflected the data available for measuring investment risk behavior. Statistical analyses were carried out using Stata/SE statistical software, version 17 (StataCorp, 2021).

Frequency measures and missing data patterns were examined for each variable included in the regression model to check for missing data. Missing data mechanisms are generally categorized as missing completely at random (MCAR), missing at random (MAR), or not missing at random (NMAR; Acock, 2005; Little & Rubin, 2002). Little and Rubin (2002) explain that MCAR describes an assumption that the missing values of a particular variable is not dependent on observed or unobserved data values of that variable whereas if missingness depends on components of observed values of the variable but not unobserved values, it is deemed MAR. Conversely, if missingness is dependent on unobserved values of the variable, it is considered NMAR. Testing the MAR or NMAR assumption is difficult without information from unobserved data (Baraldi & Enders, 2010; Magwegwe, 2020).

An analysis of missing values showed that less than 1% of responses were missing for the key independent variables of the study, however more than 10% percent of responses were missing for the dependent variable (11.27%). Although missing data levels of 15 to 20% are not uncommon in psychological studies (Dong & Peng, 2013), further analysis was conducted to identify the pattern of missingness. Dummy variables were created with values of (1) *missing* and (0) *not missing*, as suggested by Schlomer, Bauman, and Card (2010). Logistic regression was then used to examine the relationship between the dummy variable and the other variables included in the model (Acock, 2005; Scholmer et al., 2010). According to Schlomer and his colleagues (2010), data is deemed to be MCAR or NMAR if the dummy variable is not related to any other variables. However, significant associations between the dummy variables and other variables in the model would suggest that the data are MAR or NMAR. There were no significant relationships between the dummy variable and the independent variables tested, indicating the data were MCAR or NMAR. This finding provided support for using listwise deletion to address missing values. Listwise deletion removes cases with missing values, creating a dataset with only complete cases (Baraldi & Enders, 2010; Schlomer et al., 2010). Researchers have argued that listwise deletion produces unbiased estimates under all missing data mechanisms if the missingness does not depend on the dependent variable (Allison, 2001; Magwegwe, 2020). Table 4.4 illustrates missing values for each of the study's variables.

Table 4.4

Missing Data Analysis (n = 1,428)

<i>Dependent Variable</i>	n	Missing	% Missing
Investment risk behavior—stock ownership	1,267	161	11.27

<i>Independent Variable</i>			
Retirement worry	1,422	6	0.42
<i>Control Variables</i>			
Age	1,428	0	0.00
Gender	1,428	0	0.00
Race/ethnicity	1,428	0	0.00
Education	1,428	0	0.00
Marital status	1,428	0	0.00
Income	1,428	0	0.00

Results

Descriptive Statistics

The sample was limited to U.S. adults aged 50 and older, resulting in an analytic sample of 1,263 U.S. adults after adjusting for missing values. Most of the weighted sample was white (83.95%), married (67.09%), and male (60.29%), with a majority having some level of college education level (78.29%). Household income was categorized into five groups, with the average income in the \$75,000 to \$99,999 group. A slight majority of the weighted sample reported holding more than half of their investment portfolios in stock (58.91%) while 31.66% reported experiencing some level of retirement worry. A summary of both weighted and unweighted descriptive statistics for categorical variables is provided in Table 4.5.

Table 4.5

Sample Characteristics of Categorical Variables (n = 1,263)

	n	% (unweighted)	% (weighted)
<i>Investment risk behavior—Own stock</i>			
More than half	753	52.73	58.91
Less than half	442	30.95	35.33
None	72	5.04	5.77
<i>Retirement worry</i>			
Strongly disagree	305	24.15	24.38
Slightly disagree	225	17.81	17.41
Disagree	156	12.35	12.03
Neither agree nor disagree	190	15.04	14.27
Agree	169	13.38	13.40
Slightly agree	124	9.82	10.41
Strongly agree	94	7.44	8.09
<i>Gender</i>			
Male	744	58.91	60.29
Female	519	41.09	39.71
<i>Race/Ethnicity</i>			
White	1,119	88.60	83.95
Non-White	144	11.40	16.05
<i>Education</i>			
Less than HS	5	0.40	0.41
HS graduate/GED	210	16.63	21.31
Some college/Associates	326	25.81	27.80

Bachelor's	395	31.27	27.84
Graduate	327	25.89	22.65
<i>Marital status</i>			
Married	842	66.67	67.09
Single	145	11.48	11.68
Separated/divorced	175	13.86	13.93
Widowed/widower	101	8.00	7.30
<i>Income</i>			
Less than \$25K	64	5.07	5.65
\$25K to \$49,999	234	18.53	19.71
\$50K to \$74,999	269	21.30	21.14
\$75K to \$99,999	248	19.64	19.29
\$100K plus	448	35.47	34.21

Multinomial Logistic Regression Results

Multinomial logistic regression was used to examine the relationship between retirement worry and three categories of investment risk behaviors. Table 4.6 shows the relative risk ratios for the key variables estimated by the model. The model's chi-square was 112.31 and significant at the $p < .001$ level. Nagelkerke r-squared was 0.06, interpreted as 6% of the variance in risk behavior was explained by the model.

Table 4.6

Multinomial Regression Model of Investment Risk Behavior—weighted (n = 1,263)

	More than half v. None		Less than half v. None		More than half v. Less than half	
	RRR (95% CI)	<i>p</i> - value	RRR (95%CI)	<i>p</i> - value	RRR (95% CI)	<i>p</i> - value
Retirement worry						
Strongly disagree	2.20 (0.81, 5.99)	0.12	2.04 (0.74, 5.63)	0.17	1.08 (0.67, 1.73)	0.75
Slightly disagree	1.26 (0.48, 3.35)	0.64	1.20 (0.44, 3.23)	0.73	1.06 (0.64, 1.75)	0.83
Disagree	2.27 (0.67, 7.73)	0.19	1.97 (0.56, 6.89)	0.29	1.15 (0.67, 1.97)	0.61
Agree	2.00 (0.55, 7.31)	0.29	3.21 (0.87, 11.85)	0.08	0.62 (0.37, 1.04)	0.07
Slightly agree	0.97 (0.31, 3.01)	0.96	0.89 (0.28, 2.87)	0.85	1.09 (0.61, 1.95)	0.78
Strongly agree	1.41 (0.48, 4.15)	0.54	0.73 (0.23, 2.27)	0.59	1.93 (0.98, 3.83)	0.06
Age	0.98 (0.94, 1.02)	0.27	0.99 (0.96, 1.03)	0.75	0.96 (0.97, 1.00)	0.13
Gender (<i>ref Male</i>)						
Female	0.76 (0.42, 1.36)	0.35	1.15 (0.63, 2.11)	0.64	0.65 (0.49, 0.88)	0.00
Race (<i>ref White</i>)						
non-White	1.59 (0.59, 4.25)	0.36	1.84 (0.69, 4.88)	0.22	0.86 (0.56, 1.33)	0.51
Education (<i>ref BS</i>)						
Less than HS	0.34 (0.02, 6.32)	0.47	0.34 (0.02, 6.04)	0.46	0.99 (0.07, 14.84)	1.00
HS grad/GED	0.25 (0.11, 0.57)	0.00	0.26 (0.11, 0.61)	0.00	0.95 (0.63, 1.45)	0.82

Some college/ Associates	0.95 (0.38, 2.37)	0.92	0.98 (0.39, 2.51)	0.97	0.97 (0.66, 1.42)	0.87
Graduate	0.95 (0.37, 2.42)	0.91	0.81 (0.31, 2.11)	0.67	1.17 (0.80, 1.72)	0.42
Marital status (<i>ref Married</i>)						
Single	2.28 (0.65, 7.93)	0.20	1.17 (0.33, 4.19)	0.81	1.95 (1.16, 3.28)	0.01
Separated/ Divorced	1.43 (0.55, 3.68)	0.46	1.23 (0.46, 3.29)	0.67	1.16 (0.74, 1.80)	0.52
Widowed	1.71 (0.65, 4.51)	0.28	1.71 (0.64, 4.58)	0.29	1.00 (0.58, 1.74)	0.99
Income (<i>ref \$100K or more</i>)						
< \$25K	0.16 (0.04, 0.63)	0.00	0.22 (0.05, 0.91)	0.04	0.71 (0.34, 1.51)	0.38
\$25K - \$49,999K	0.31 (0.10, 0.92)	0.03	0.47 (0.15, 1.44)	0.19	0.65 (0.42, 1.01)	0.06
\$50K - \$74,999K	0.61 (0.20, 1.84)	0.38	0.74 (0.24, 2.28)	0.60	0.82 (0.54, 1.24)	0.35
\$75K - \$100,000K	0.29 (0.11, 0.76)	0.01	0.33 (0.13, 0.88)	0.03	0.88 (0.59, 1.31)	0.52
-2 LL	-949.88					
Wald χ^2	112.31					
Nagelkerke R ²	0.06					

The multinomial logistic regression analysis provided the relative risk ratio (RRR) for holding stocks in *more than half* or *less than half* of an investment portfolio relative to holding no stock investments. It also examined holding stocks in *more than half* of an investment

portfolio relative to holding *less than half*. Relative risk ratios are calculated by exponentiating the multinomial logit coefficients (Gutierrez, 2005). Although somewhat similar to odds ratios, statisticians have explained that relative risk ratios are appropriate when model results are stated relative to a base category (Gutierrez, 2005; UCLA Institute for Digital Research and Education, n.d.).

The study's initial findings did not support the hypothesis that U.S. adults, age 50 and older, who experience retirement worry were more likely to invest in stocks. The initial model explored the relationship between retirement worry, as a continuous measure, and each category of stock ownership but no significant relationships were found between the key measures (results are shown in Appendix B). From there, retirement worry was tested as a categorical measure in the model with the different levels of stock ownership to capture the potential non-linear relationship. No significant relationships were found between any level of stock ownership and retirement worry when compared to owning no stocks at the $p < .05$ significance level for this sample.

Despite the lack of significance in the key variables, findings for the demographic covariates showed that high school graduates were more likely to not hold stock in an investment portfolio when compared to those with a bachelor's degree. The relative risk of holding *more than half* of an investment portfolio in stock relative to holding no stock would be expected to decrease by a factor of 0.25 for high school graduates (RRR = 0.25, CI = 0.11, 0.57, $p < .001$) relative to those with a bachelor's degree when the other variables are held constant. Similarly, the same demographic group (RRR = 0.26, CI = 0.11, 0.61, $p < .001$) showed that for holding *less than half* of an investment portfolio in stock relative to holding no stock, the relative risk is expected to decrease by a factor of 0.26. Relative to those with income above \$100,000,

respondents with income below \$50,000 and with income between \$75,000 and \$100,000 were also more likely to not hold stock in an investment portfolio. A one unit increase in income for respondents with income below \$25,000 (RRR = 0.16, CI = 0.04, 0.63, $p < .001$), between \$25,000 and \$50,000 (RRR = 0.31, CI = 0.10, 0.92, $p < .05$), and for those with income between \$75,000 and \$100,000 (RRR = 0.29, CI = 0.11, 0.76, $p < .05$), would result in a decrease by a factor of 0.16, 0.31, and 0.29, respectively, when compared to those with income above \$100,000. Single respondents (RRR = 1.95, CI = 1.16, 3.28, $p < .05$) were more likely to hold *more than half* of an investment portfolio in stock than to hold *less than half* when compared to married respondents. The relative risk is expected to increase by a factor of 1.95.

As a robustness check, the model was run without restricting the sample age to those older than 50. This was done to investigate the influence of age on the asset allocation decision. This sample was first examined in a model with retirement worry as a continuous measure, but no significant relationships were found in the key measures (results shown in Appendix C). The full sample was then tested in a model with retirement worry as a categorical measure. Summary results for key variables are illustrated in Table 4.7. In the full sample, the relative risk of holding *more than half* of an investment portfolio in stock relative to holding no stock would be expected to increase by a factor of 2.74 for those in the *strongly disagree* category of retirement worry (RRR = 2.74, CI = 1.15, 6.52, $p < .05$) relative to those who are neutral when all other variables are held constant. There were no significant relationships found between the *less than half* category of stock ownership and any category of retirement worry when compared to owning no stocks at the $p < .05$ significance level. Neither was significance found in the relationship between the *more than half* category of stock ownership and any level of retirement worry,

relative to the *less than half* category when all other variables are held constant. Full results, including all covariates, are shown in Appendix D.

Significant relationships were identified among demographic covariates, particularly education, income, and gender. When compared to respondents who hold no stocks in an investment portfolio, high school graduates were less likely to hold either *more than half* (RRR = 0.18, CI = 0.08, 0.37, $p < .001$) or *less than half* (RRR = 0.21, CI = 0.10, 0.44, $p < .001$) of an investment portfolio in stocks relative to respondents with a bachelor's degree. The relative risk of holding *more than half* of an investment portfolio in stock would be expected to decrease by a factor of 0.18, while the relative risk of holding *less than half* relative to holding no stock would decrease by a factor of 0.21 for those with a high school diploma or GED when compared to respondents with a bachelor's degree. Results for respondents with less than a high school diploma (RRR = 0.09, CI = 0.01, 0.61, $p < .05$) showed that the relative risk of holding *more than half* of an investment portfolio in stock relative to holding no stock is expected to decrease by a factor of 0.09 compared to those with a bachelor's degree. Respondents with a graduate degree (RRR = 1.42, CI = 1.03, 1.96, $p < .05$) were more likely to hold *more than half* of an investment portfolio in stocks relative to holding *less than half* when compared to those with a bachelor's degree. The relative risk of holding *more than half* relative to holding *less than half* of an investment portfolio in stocks would increase by a factor of 1.42 for those with a graduate degree when compared to respondents with a bachelor's degree.

For the income categories, respondents with income in the \$75K to \$100K category were less likely to hold *more than half* (RRR = 0.36, CI = 0.15, 0.84, $p < .05$) and *less than half* (RRR = 0.36, CI = 0.15, 0.86, $p < .05$) of an investment portfolio in stocks relative to holding no stocks, when compared to respondents with income above \$100K. Those with income of less

than \$25,000 were also less likely to hold *less than half* (RRR = 0.50, CI = 0.14, 1.74, $p < .05$) of an investment portfolio in stocks relative to holding no stocks compared to those with income greater than \$100K.

Lastly, females were less likely to hold *more than half* (RRR = 0.67, CI = 0.53, 0.85, $p < .001$) of an investment portfolio in stocks relative to holding *less than half* when compared to males. The relative risk of holding *more than half* relative to holding *less than half* of an investment portfolio in stocks would decrease by a factor of 0.67 for females when compared to males. There were no significant relationships when compared to holding no stocks in an investment portfolio.

Table 4.7

Multinomial Regression for Full Sample—weighted (n = 1,777)

	More than half v. None		Less than half v. None		More than half v. Less than half	
	RRR (95% CI)	<i>p</i> - value	RRR (95%CI)	<i>p</i> - value	RRR (95% CI)	<i>p</i> - value
Retirement worry						
Strongly disagree	2.74 (1.15, 6.52)	0.02	2.36 (0.97, 5.73)	0.17	1.16 (0.78, 1.73)	0.47
Slightly disagree	1.33 (0.58, 3.05)	0.50	1.26 (0.54, 2.94)	0.73	1.06 (0.69, 1.63)	0.80
Disagree	1.85 (0.69, 4.94)	0.22	1.35 (0.50, 3.69)	0.29	1.37 (0.86, 2.16)	0.18
Agree	1.90 (0.74, 4.89)	0.18	2.28 (0.87, 5.93)	0.08	0.83 (0.55, 1.26)	0.39
Slightly agree	1.80 (0.63, 5.14)	0.27	1.82 (0.63, 5.27)	0.85	0.99 (0.63, 1.57)	0.98
Strongly agree	1.49	0.37	1.25	0.59	1.19	0.46

(0.62, 3.61)

(0.51, 3.10)

(0.75, 1.90)

Discussion

The purpose of essay three was to examine the relationship between the financial risk of investment losses and the emotion of retirement worry. Prospect theory (Kahneman & Tversky, 1979) provided the theoretical framework for predicting that individuals experiencing retirement worry would become risk seeking and show increased investment risk behaviors. Using data from the 2018 NFCS-SS and NFCS-IS, a multinomial logistic regression model was used to test this relationship. Results for the restricted sample of U.S. adults aged 50 and older did not support the study's hypothesis which stated that individuals who experience retirement worry are more likely to invest in stock. Interestingly, results from the full sample analysis provided evidence of the inverse of what was predicted by the model. Respondents in the *strongly disagree* category of retirement worry, relative to those who were neutral, were more likely to hold *more than half* of an investment portfolio in stock relative to holding no stock in the portfolio. This suggests that individuals reporting no retirement worry were more likely to demonstrate a higher level of investment risk behavior. This finding is counter to the loss aversion bias prospect theory predicts. The significance found in the relationship between the key variables tested in the model when younger respondents were included was also unexpected since prior studies have found higher levels of retirement worry among pre-retirees (Skarborn & Nicki, 2000).

Taken together, the results are in line with prior studies whose findings contradict prospect theory's prediction for risk behavior (Lerner & Keltner, 2001; Loewenstein et al., 2001). For example, economist Richard Thaler and his colleagues (1997) tested loss aversion in an experimental study and found that when the experience of loss is eliminated, the preference

for holding stocks increased. Other scholars have examined the role of emotions in decision-making and concluded that anticipatory emotions, such as fear, worry and trait anxiety, play a crucial role in risk aversion. Eisenberg, Baron, and Seligman (1998) found trait anxiety to be positively correlated with risk aversion in a choice experiment with pairs of risky and less risky options. In the study, the risky option was evaluated both as the default, requiring no action, as well as the option that required action. Lerner and Keltner (2001) found fearful people tend to show risk averse preferences. Loewenstein and his colleagues (2001) developed a model of risky choice, which they called the risk-as-feelings hypothesis, that examines the role of anticipatory emotions during the decision-making process. They posited that emotions could lead to behaviors that individuals recognize as not in their best interest and can diverge from cognitive assessments.

Limitations

Several limitations of this study should be noted. First, essay three used cross-sectional data which does not allow for an assessment of changes over time in investment risk behavior or retirement worry, the key outcome and predictor variables in the study. Additionally, the current model assumed that retirement worry preceded investment risk behavior. However, a limitation of this study is that the multivariate analysis used can only establish relationships between the variables included in the model. It does not establish causal pathways so we cannot make inferences around retirement worry causing the allocation decisions. Future research could use longitudinal data to measure investment risk behaviors in periods following reported retirement worry to better capture the timing sequence assumed in the model. Next, missing data that was removed using listwise deletion could bias the sample. While it is not uncommon for survey data

to have missing values that are not MCAR, missing values that are not MCAR risks producing sample data that is affected by some form of bias.

The explanatory power of both the initial model, which sampled respondents aged 50 and older, and the full sample model was low. Nagelkerke r-squared values of 0.06 and 0.04, respectively, suggest that there are other factors not included in the model that may have a sizable influence on investment risk behavior. The final points to note regarding limitations of the study relate to the measurement of the key variables. The question used to measure the outcome variable, investment risk behavior, did not capture the exact amount of stock holdings in the respondents' investment portfolio. This limited the study's ability to examine the influence of retirement worry on a more granular level. Further, the measures used to operationalize the key variables in the study did not perfectly align with the timeframe proposed in the theory. Investment risk behavior was measured with a question that asked about current stock holdings or current behaviors and concerns while the question used to operationalize retirement worry also asked the respondents for their current beliefs about the sufficiency of their retirement savings. This limits the ability to assume that retirement worry precedes investment risk behaviors. Also, the self-reported scale used to measure retirement worry may not reflect the respondent's true level of retirement worry, as there is the risk that respondents reported what they may have wanted the interviewer to believe. This would introduce a response bias, such as social desirability bias, to the sample data.

Implications and Conclusion

Results from essay three have several implications for financial professionals. First, the study's findings provide practitioners with empirical research supporting the influence of emotions on risk decisions which can lead to biases during the decision-making process.

Behavioral biases cannot be eliminated but their influence can be managed or mitigated. Scholars have argued that financial planners and other professionals should help clients overcome the behavioral bias of loss aversion and make rational investment decisions (Browning & Finke, 2015; Guillemette et al., 2015). Understanding antecedents to risk behaviors helps to assist clients with matching their risk decisions with their risk preferences. This study's results provide financial planners, advisors, and other financial professionals with insight into the risk decisions of clients and can be used to inform their approach to framing recommendations and managing biases stemming from loss aversion. Results from this study can also be used to support the inclusion of emotional assessments during evaluations of loss aversion in clients. Neuroimaging research has found that loss aversion can be reduced with strategies that regulate emotions (Shiv et al., 2005; Sokol-Hessner et al., 2013) so identifying its presence is key.

In summary, essay three provides the first examination of the relationship between the emotion of retirement worry and investment risk behaviors. Although there was no statistical support for a significant relationship between retirement worry and investment risk in the sample of respondents aged 50 and older, the full sample's results offer interesting insight. An inverse relationship between stock holdings and retirement worry among the sample of U.S. adults aged 18 and older indicates there is still much we do not yet understand about the role emotions play in asset allocation and other risk decisions. This finding was not predicted by theory but was consistent with prior research that found negative emotions can have varying effect on risk perception (Lerner & Keltner, 2001). Therefore, essay three contributes to the growing body of knowledge investigating the influence of emotions on risk preferences and behaviors.

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Chapter 5 - Conclusion

The purpose of this dissertation was to explore the relationship between the emotion of financial worry and financial behaviors. While the general construct of worry has been studied in other domains, e.g., psychology (Lerner et al., 2015), the motivation of this dissertation was to understand the relationship between specific types of financial worry and financial decisions and behaviors, as well as to explore in what way financial behaviors may predict the emotion. This study accomplished its objective with three distinct, but related, essays using nationally representative datasets. Three primary questions were investigated. First, essay one asked, is there a relationship between investment worry and the source chosen for financial information? Essay two asked, is retirement worry lower for those who avoid financial information? Lastly, essay three asked, is there a relationship between retirement worry and investment risk behaviors? Data from the National Financial Capability Study (NFCS) was used for each essay.

Overall, results from the three studies conducted were not as expected. Few statistically significant associations were found between investment worry and external financial information sources. The inverse relationship that was found between investment worry and clubs/organizations may suggest that individuals experiencing this type of worry turn away from information sources that involve disclosing their financial condition or concerns in group settings.

In the examination of retirement worry, support was found for a relationship between avoidance behaviors and retirement worry which was predicted. Retirement worry as a predictor of investment risk behavior was also expected but only supported in a full sample of U.S. adults. This result could suggest that retirement worry in younger U.S. adult age cohorts may have a

greater influence on risk behaviors than for the older counterparts. In summary, investment and retirement worries were found to add small but significant explanatory power to models of financial behaviors. The unexpected findings around the direction of the relationships tested suggests further research is needed to better understand the role emotions play in financial decision-making.

Chapter Summaries

Essay One

Essay one explored the influence of investment worry on sources chosen for financial information. Using the 2018 NFCS State-by-State Survey (NFCS-SS) and the NFCS Investor Survey (NFCS-IS), a path analysis was conducted to examine the relationship between investment worry and each type of information source, as well as the mediating role of internal information sources. Information sources were categorized as internal, informal external, and formal external sources.

While the study did not find evidence to support the hypothesized relationships, there were interesting findings around the direction of the significant relationships found. The inverse relationship between investment worry and clubs/organization was unexpected. Objective financial knowledge was also inversely related to several external information sources, with media/internet as the only positive relationship found between the measures. These results support the need for further research to delve deeper into other factors that may help to explain the direction of the relationships found between the emotion of investment worry and financial information sources.

Essay Two

Essay two investigated the relationship between avoidance behaviors and retirement worry. This study used data from the 2021 NFCS-SS. Both an OLS regression model and a multinomial logistic regression model were used to examine this relationship after controlling for demographic characteristics. Results from the OLS regression model provided evidence of an inverse relationship with retirement worry and supports the study's hypothesis that individuals who practice avoidance behaviors experience lower levels of retirement worry. Further, in the multinomial regression model which examined the relationship between avoidance behaviors and various levels of retirement worry, results showed avoidance behaviors associated with higher likelihoods of reporting no retirement worry relative to the higher levels of retirement worry. This finding also supports the prediction that individuals who practice avoidance behaviors experience lower levels of retirement worry. These results provide empirical evidence of the effect adverse financial behaviors can have on emotions such as retirement worry and positions financial practitioners to offset its influence.

Essay Three

Essay three provided the first examination of the relationship between the emotion of retirement worry and investment risk behaviors by exploring the influence retirement worry has on investment risk behaviors after controlling for demographic factors. This study used data from the 2018 NFCS-SS and NFCS-IS. Multinomial logistic regression was conducted to consider the relationship between retirement worry and stock holdings within an investment portfolio. In the sample of adults aged 50 and older, no significant relationship between retirement worry and investment risk was found. However, there was a significant inverse relationship between the measures in the full sample of U.S. adults aged 18 and older. This finding was not predicted by

theory but was consistent with prior research that found negative emotions can have different effects on risk perception (Lerner & Keltner, 2001).

Implications

This dissertation hopes to add to the growing body of literature focused on providing evidence for the relationship between emotions and financial behaviors (Magwegwe, 2020; Fan & Lim, 2022). Results of these analyses have important implications for practitioners interested in emotional influences on financial behaviors, as well as the effect adverse financial behaviors may have on emotional states. Specifically, if the experience of retirement worry or investment worry were related to suboptimal financial decisions, then financial professionals should treat these emotions as an important input into the assessment process when compiling information to be used for recommendations and guidance.

Findings from this dissertation provide empirical evidence of a significant relationship between both avoidance and investment risk behaviors and retirement worry. When used as a coping strategy, avoidance behaviors are associated with lower levels of retirement worry which can serve as a motivator for a practitioner's clients to adopt this strategy. Relatedly, retirement worry can predict investment risk behaviors so practitioners must not underestimate the role this emotion may play in personal financial decision-making.

The similarly negative financial emotion of investment worry was found to add explanatory power when predicting a choice for financial information. Empirical evidence of inverse relationships between investment worry and specific sources of financial information informs practitioners of where to avoid placing information targeted to individuals experiencing this emotion. This insight should play a role in the strategic decisions practitioners make when

targeting potential clients or identifying the most effective method of reaching current clients to provide information critical to important financial decisions.

Future Research

The unexpected findings from this study, particularly results relating to the direction of the relationships tested, suggests further research is needed to better understand the role emotions play in financial decision-making. For example, future research could expand upon this study by considering a wider range of avoidance behaviors to gather more insights into how each relates to retirement worry. Comparing different age groups, e.g., young adults, middle age, and retirees, would also help us understand the impact avoidance behaviors may have on emotions related to financial conditions at various stages of life. Studies that include more detailed financial data, including income and net worth measures, would allow for a more granular assessment of the influence retirement and investment worry have on financial behaviors. Longitudinal studies would also allow researchers to examine changes in emotional states and financial behaviors over time and conditions. Causal techniques would help researchers identify emotional factors that may lead to negative financial behaviors and outcomes, as well as identifying emotional responses to an individual's financial situation. For example, randomized experimental studies would allow researchers to investigate emotional responses to financial behaviors and stimuli such as information sources, against a control group to explore causal relationships (Babbie, 2009; Hill, 2015) and support strategies for minimizing negative financial outcomes. Identification strategies, such as the instrumental variables technique, could also be used with observational data to infer causation (Angrist et al., 1996; Holland. 1986). Instrumental variables are exogenous variables selected for their association with a model's independent variable, although they should have no theoretical association with the model's dependent variable. They

are typically added to the first stage of a two-stage least squares model and used to derive a predicted probability of the independent variable which is then used in stage two of the model to estimate a causal relationship (Pokropek, 2016).

While investment worry and retirement worry are specific types of financial worries expected to be most prevalent for clients of financial practitioners, future research should evaluate other types of worry for its impact on financial outcomes. Nonfinancial worries, e.g., health and job security concerns, may be important influencers of financial decisions and behaviors as well.

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<https://doi.org/10.1186/s40536-016-0018-2>

Appendix A - Spearman's Rank Order Correlation (Ch. 3)

Table A.5.1

Spearman's Rank Order Correlation

Variables	1	2	3	4	5	6	7	8
1.Retirement worry	1.00							
2.Avoidance behavior	-0.16***	1.00						
3.Age	-0.08***	0.13***	1.00					
4.Gender	0.12***	-0.12***	-0.00	1.00				
5.Race	-0.02***	-0.02*	-0.17***	0.00	1.00			
6.Education	-0.11***	0.19***	-0.03***	-0.09***	-0.04***	1.00		
7.Marital status	0.16***	-0.18***	-0.12***	0.05***	0.09***	-0.10***	1.00	
8.Income	-0.29***	0.32***	0.19***	-0.15***	-0.10***	0.31***	-0.43***	1.00

Note. n = 20,689; * $p < .05$, ** $p < .01$, *** $p < .001$

Appendix B - Multinomial Model—Restricted Weighted Sample

(Ch. 4)

Table B.5.2

Multinomial Regression Model for Restricted Sample—weighted

	More than half v. None		Less than half v. None		More than half v. Less than half	
	RRR (95% CI)	p- value	RRR (95%CI)	p- value	RRR (95% CI)	p- value
Retirement worry	0.92 (0.78, 1.08)	0.29	0.91 (0.77, 1.07)	0.27	1.00 (0.93, 1.08)	0.90
Age (<i>ref</i> 65+)	0.98 (0.94, 1.01)	0.20	0.99 (0.95, 1.03)	0.60	0.96 (0.97, 1.00)	0.12
Gender (<i>ref</i> Male)						
Female	0.78 (0.43, 1.39)	0.39	1.17 (0.65, 2.12)	0.60	0.66 (0.50, 0.88)	0.01
Race (<i>ref</i> White)						
non-White	1.56 (0.59, 4.13)	0.37	1.74 (0.66, 4.61)	0.26	0.89 (0.58, 1.37)	0.61
Education (<i>ref</i> BS)						
Less than HS	0.28 (0.02, 5.22)	0.40	0.26 (0.01, 4.63)	0.36	1.10 (0.07, 16.57)	0.94
HS grad/GED	0.24 (0.10, 0.56)	0.00	0.26 (0.11, 0.60)	0.00	0.94 (0.62, 1.43)	0.79
Some college/ Associates	0.95 (0.38, 2.36)	0.91	1.02 (0.40, 2.60)	0.97	0.93 (0.64, 1.35)	0.69
Graduate	0.98 (0.39, 2.47)	0.97	0.84 (0.33, 2.15)	0.72	1.17 (0.80, 1.71)	0.42
Marital status (<i>ref</i> Married)						
Single	2.21 (0.65, 7.50)	0.20	1.16 (0.34, 4.03)	0.81	1.90 (1.14, 3.16)	0.01
Separated/ Divorced	1.29 (0.53, 3.13)	0.58	1.08 (0.43, 2.70)	0.87	1.19 (0.77, 1.85)	0.43
Widowed	1.84	0.22	1.76	0.27	1.04	0.88

	(0.69, 4.89)		(0.65, 4.77)		(0.60, 1.81)	
Income (<i>ref \$100K or more</i>)						
< \$25K	0.17 (0.04, 0.67)	0.01	0.22 (0.05, 0.91)	0.04	0.77 (0.36, 1.64)	0.50
\$25K - \$49,999K	0.31 (0.11, 0.92)	0.04	0.47 (0.15, 1.43)	0.19	0.66 (0.42, 1.01)	0.06
\$50K - \$74,999K	0.60 (0.20, 1.79)	0.36	0.69 (0.23, 2.11)	0.52	0.86 (0.57, 1.30)	0.48
\$75K - \$100,000K	0.29 (0.12, 0.76)	0.01	0.32 (0.12, 0.86)	0.02	0.91 (0.61, 1.35)	0.63
-2 LL	-961.09					
Wald X^2	98.77					
Nagelkerke R^2	0.05					
<i>Note.</i> n = 1,263						

Appendix C - Multinomial Model—Full Weighted Sample (Ch. 4)

Table C.5.3

Multinomial Regression Model for Full Sample—weighted

	More than half v. None		Less than half v. None		More than half v. Less than half	
	RRR (95% CI)	<i>p</i> - value	RRR (95%CI)	<i>p</i> - value	RRR (95% CI)	<i>p</i> - value
Retirement worry	0.95 (0.83, 1.08)	0.42	0.97 (0.85, 1.10)	0.64	0.98 (0.92, 1.04)	0.48
Age (<i>ref</i> 65+)	0.99 (0.98, 1.01)	0.36	0.99 (0.97, 1.01)	0.37	1.00 (0.99, 1.01)	0.98
Gender (<i>ref</i> Male)						
Female	0.74 (0.44, 1.24)	0.25	1.09 (0.64, 1.85)	0.75	0.68 (0.53, 0.86)	0.00
Race (<i>ref</i> White)						
non-White	1.39 (0.72, 2.71)	0.33	1.61 (0.82, 3.14)	0.17	0.86 (0.64, 1.18)	0.36
Education (<i>ref</i> BS)						
Less than HS	0.08 (0.01, 0.54)	0.01	0.07 (0.01, 0.59)	0.01	1.05 (0.16, 6.81)	0.96
HS grad/GED	0.18 (0.08, 0.37)	0.00	0.21 (0.10, 0.45)	0.00	0.84 (0.59, 1.20)	0.34
Some college/ Associates	0.59 (0.28, 1.25)	0.17	0.63 (0.30, 1.36)	0.24	0.93 (0.69, 1.26)	0.64
Graduate	1.06 (0.46, 2.47)	0.89	0.75 (0.32, 1.78)	0.52	1.41 (1.03, 1.94)	0.03
Marital status (<i>ref</i> Married)						
Single	0.72 (0.36, 1.43)	0.35	0.60 (0.30, 1.22)	0.16	1.19 (0.84, 1.68)	0.33
Separated/ Divorced	0.89 (0.43, 1.86)	0.76	0.83 (0.39, 1.78)	0.64	1.07 (0.72, 1.59)	0.73
Widowed	1.44 (0.54, 3.84)	0.47	1.67 (0.63, 4.47)	0.31	0.86 (0.51, 1.44)	0.56
Income (<i>ref</i> \$100K or more)						

< \$25K	0.53 (0.16, 1.76)	0.30	0.47 (0.13, 1.63)	0.24	1.12 (0.63, 1.98)	0.69
\$25K - \$49,999K	0.40 (0.15, 1.03)	0.06	0.50 (0.19, 1.31)	0.16	0.80 (0.55, 1.15)	0.23
\$50K - \$74,999K	0.63 (0.24, 1.64)	0.35	0.73 (0.28, 1.93)	0.53	0.86 (0.62, 1.20)	0.38
\$75K - \$100,000K	0.36 (0.15, 0.83)	0.02	0.35 (0.15, 0.83)	0.02	1.02 (0.73, 1.43)	0.91
-2 LL	-1401.00					
Wald X^2	115.24					
Nagelkerke R^2	0.04					
<i>Note.</i> n = 1,777						

Appendix D - Multinomial Model –Full Weighted Sample (Ch. 4)

Table D.5.4

Multinomial Regression Model for Full Sample—weighted

	More than half v. None		Less than half v. None		More than half v. Less than half	
	RRR (95% CI)	<i>p</i> - value	RRR (95%CI)	<i>p</i> - value	RRR (95% CI)	<i>p</i> - value
Retirement worry						
Strongly disagree	2.74 (1.15, 6.52)	0.02	2.36 (0.97, 5.73)	0.17	1.16 (0.78, 1.73)	0.47
Slightly disagree	1.33 (0.58, 3.05)	0.50	1.26 (0.54, 2.94)	0.73	1.06 (0.69, 1.63)	0.80
Disagree	1.85 (0.69, 4.94)	0.22	1.35 (0.50, 3.69)	0.29	1.37 (0.86, 2.16)	0.18
Agree	1.90 (0.74, 4.89)	0.18	2.28 (0.87, 5.93)	0.08	0.83 (0.55, 1.26)	0.39
Slightly agree	1.80 (0.63, 5.14)	0.27	1.82 (0.63, 5.27)	0.85	0.99 (0.63, 1.57)	0.98
Strongly agree	1.49 (0.62, 3.61)	0.37	1.25 (0.51, 3.10)	0.59	1.19 (0.75, 1.90)	0.46
Age	0.99 (0.98, 1.01)	0.38	0.99 (0.98, 1.01)	0.75	1.00 (0.99, 1.01)	0.97
Gender (<i>ref Male</i>)						
Female	0.71 (0.42, 1.19)	0.19	1.05 (0.62, 1.78)	0.64	0.67 (0.53, 0.85)	0.00
Race (<i>ref White</i>)						
non-White	1.40 (0.72, 2.74)	0.32	1.63 (0.83, 3.19)	0.22	0.86 (0.63, 1.17)	0.35
Education (<i>ref BS</i>)						

Less than HS	0.09 (0.01, 0.61)	0.01	0.08 (0.01, 0.58)	0.46	1.10 (0.17, 7.24)	0.92
HS grad/GED	0.18 (0.08, 0.37)	0.00	0.21 (0.10, 0.44)	0.00	0.85 (0.60, 1.22)	0.39
Some college/ Associates	0.58 (0.27, 1.23)	0.16	0.61 (0.28, 1.33)	0.97	0.94 (0.69, 1.28)	0.70
Graduate	1.05 (0.45, 2.44)	0.92	0.74 (0.31, 1.75)	0.67	1.42 (1.03, 1.96)	0.03
Marital status (<i>ref Married</i>)						
Single	0.74 (0.37, 1.49)	0.41	0.63 (0.31, 1.29)	0.81	1.17 (0.83, 1.66)	0.36
Separated/ Divorced	0.92 (0.43, 1.96)	0.83	0.86 (0.39, 1.87)	0.67	1.07 (0.72, 1.59)	0.73
Widowed	1.34 (0.50, 3.58)	0.56	1.59 (0.59, 4.24)	0.29	0.84 (0.51, 1.41)	0.52
Income (<i>ref \$100K or more</i>)						
< \$25K	0.53 (0.16, 1.80)	0.31	0.50 (0.14, 1.74)	0.04	1.07 (0.61, 1.89)	0.81
\$25K - \$49,999K	0.41 (0.16, 1.08)	0.07	0.52 (0.20, 1.38)	0.19	0.79 (0.55, 1.15)	0.22
\$50K - \$74,999K	0.66 (0.25, 1.72)	0.40	0.78 (0.30, 2.06)	0.60	0.84 (0.60, 1.18)	0.33
\$75K - \$100,000K	0.36 (0.15, 0.84)	0.02	0.36 (0.15, 0.86)	0.03	0.99 (0.71, 1.39)	0.97
-2 LL	-1393.78					
Wald χ^2	128.06					
Nagelkerke R ²	0.04					

Note. n = 1,777.

Appendix E - Mplus Code—Full Path Model (Ch. 2)

Mplus VERSION 8.8 MUTHEN & MUTHEN 01/03/2023 11:21 AM

INPUT INSTRUCTIONS

Title: Investment Worry and Financial Information Sources

Data: FILE IS "C:\Users\Mindy\OneDrive\KSU\Dissertation\Data\Data files\
NFCS2018 Stata to Mpathfile--nomissings.csv";

Variable: NAMES ARE

NFCSID
invworry
objfinknow
invconf
mediaWebX
clubsOrg
friendFam
finProX
race
age
gender
maritalstat
edu
income;

USEVARIABLES ARE ALL;

CATEGORICAL ARE

mediaWebX
clubsOrg
friendFam
finProX;

MISSING ARE ALL (-99);
idvariable is nfcsid;

ANALYSIS:

TYPE IS GENERAL;
ESTIMATOR IS WLSMV;
ITERATIONS = 1000;
CONVERGENCE = 0.00005;
COVERAGE = 0.10;
bootstrap = 2000;

Model:

objfinknow ON invworry;
mediaWebX clubsOrg friendFam finProX ON objfinknow invworry;

objfinknow ON race age gender maritalstat edu income invconf;
mediaWebX clubsOrg friendFam finProX ON race age gender maritalstat
edu income invconf;

Model indirect:

```
mediaWebX ind invworry;  
clubsOrg ind invworry;  
friendFam ind invworry;  
finProX ind invworry;
```

```
OUTPUT: STDYX PATTERNS cinterval(bcbootstrap);  
!MODINDICES (1) RESIDUAL;
```

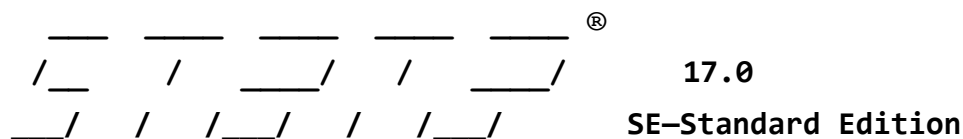
MUTHEN & MUTHEN
3463 Stoner Ave.
Los Angeles, CA 90066

Tel: (310) 391-9971
Fax: (310) 391-8971
Web:
[www.StatModel.c](http://www.StatModel.com)
om Support:
[Support@StatMod](mailto:Support@StatModel.com)
el.com

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Appendix F - Stata Syntax—Multinomial Logistic Regression Model

(Ch. 3)



Statistics and Data Science

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College Station, Texas 77845 USA
800-STATA-PC

<https://www.stata.com>

979-696-4600

stata@stata.com

```
. do "C:\Users\Mindy\AppData\Local\Temp\STD53f8_000000.tmp"
```

```
. use "C:\Users\Mindy\OneDrive\KSU\Dissertation\Data\Data files\NFCS  
2021 State Data 220627--nomissing2.dta
```

```
> "
```

```
.
```

```
end of do-file
```

```
. do "C:\Users\Mindy\AppData\Local\Temp\STD53f8_000000.tmp"
```

```
. *****limit sample to non-retirees*****
```

```
. keep if a9 < 8
```

```
(5,715 observations deleted)
```

```
.
```

```
end of do-file
```

```
. do "C:\Users\Mindy\AppData\Local\Temp\STD53f8_000000.tmp"
```



```

. *****Code 98/99 missing*****
. mvdecode _all, mv(98)
. mvdecode _all, mv(99)
. do "C:\Users\Mindy\AppData\Local\Temp\STD53f8_000000.tmp"

. //OLS regression (worry as continuous)
. regress finworry21 saveret ib6.agecat ib2.gender i.race i.edu
i.maritalstat ib4.income [aweight=wgt_n2],
> beta

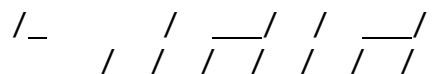
. *key variables
. mlogit finworry21 saveret [aweight=wgt_n2], baseoutcome(1) rrr

. *relative risk ratio & adjusted reference groups
. mlogit finworry21 saveret ib6.agecat ib2.gender i.race i.edu
i.maritalstat ib4.income [aweight=wgt_n2], baseoutcome(1) rrr

```

Appendix G - Stata Syntax—Multinomial Logistic Regression

Model (Ch. 4)

 17.0
SE—Standard Edition

Statistics and Data Science

Copyright 1985-2021 StataCorp LLC
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4905 Lakeway Drive
College
Station, Texas
77845 USA 800-
STATA-PC
<https://www.stata.com> 979-696-
4600
stata@stata.com

```
1.do "C:\Users\Mindy\AppData\Local\Temp\STD3994_000000.tmp"
2.
3. use "C:\Users\Mindy\OneDrive\KSU\Dissertation\Data\Data files\NFCS
   2018 merged_invsurvey--nomissing50+"
4.end of do-file
5. do "C:\Users\Mindy\AppData\Local\Temp\STD3994_000000.tmp"
6. *robustness check (with weights)
7. mlogit ownstk ib4.ret worry ib1.race age i.gender i.maritalstat
   ib4.edu ib5.income, rrr baseoutcome(3), [p> weight=wgt_n2]
8.*more than half v less than half
9. mlogit ownstk ib4.ret worry ib1.race age i.gender i.maritalstat
   ib4.edu ib5.income, rrr baseoutcome(2), [p > weight=wgt_n2]
```

10.

end of do-file

11. do "C:\Users\Mindy\AppData\Local\Temp\STD3994_000000.tmp"

12. *retirement worry continuous

```
> mlogit ownstk retworry ib1.race age i.gender i.maritalstat  
ib4.edu ib5.income, rrr baseoutcome(3), [pweight=wgt_n2]
```

13. *more than half v less than half (worry continuous)

```
14. mlogit ownstk retworry ib1.race age i.gender i.maritalstat  
ib4.edu ib5.income, rrr baseoutcome(2), [pweig  
> ht=wgt_n2]
```

