

IMPACT OF RETIREMENT WORRY ON
INFORMATION PROCESSING

By

HELEN GUTIERREZ

Bachelor of Arts

California State University, Dominguez Hills

Carson, CA

2010

Submitted to the Faculty of the
Graduate College of the
Oklahoma State University
in partial fulfillment of
the requirements for
the Degree of
MASTER OF SCIENCE
July, 2012

IMPACT OF RETIREMENT WORRY ON
INFORMATION PROCESSING

Thesis Approved:

Dr. Douglas A. Hershey

Thesis Adviser

Dr. DeMond M. Grant

Dr. Celinda M. Reese-Melancon

Dr. Sheryl A. Tucker

Dean of the Graduate College

TABLE OF CONTENTS

Chapter	Page
I. INTRODUCTION.....	1
Retirement Saving and Retirement Worry	4
Emotional Stroop Task	6
Financial Inhibition.....	8
Present Study.....	9
II. METHOD.....	11
Participants	11
Procedure.....	12
Experimental Task and Dependent Measure.....	12
Independent Measures: FIS and EST Word Type	13
III. RESULTS	16
Errors and Error Rate Analyses	16
Computation of FIS Subgroups Based on Median Split	18
Trimming of Response Time Scores	19
Primary Analysis Using Median Split	20
Extreme Groups Analysis of Response Time Differences.....	20
Summary of Findings.....	21
IV. DISCUSSION	23
Theoretical Implications	24
Applied Implications.....	26
Limitations and Future Directions	27
Conclusions	29

Chapter	Page
REFERENCES.....	30
APPENDICES.....	37

LIST OF TABLES

Table	Page
1 Demographic Characteristics for the high-FIS and low-FIS groups	15

LIST OF FIGURES

Figure	Page
1 Mean Response Time as a Function of Word Type and FIS Level.....	22

CHAPTER I

INTRODUCTION

Imagine a 40-year-old pre-retiree working a typical nine to five job who does the same routine Monday through Friday. This individual may have thought about retirement but has not had the motivation to plan for the future. He puts a little each month into his savings account but is unsure as to how much he really needs to live the life he desires after leaving the workforce. He knows that he needs to start planning for the future and is worried that he has not been saving enough. Just the thought of retirement makes the palms of his hands sweat, because in terms of getting a plan together, he does not know where to start. Unfortunately, the plight of this nervous worker is not uncommon. The goal of the present investigation is to explore the nature of individuals' retirement-related fears, and how those fears affect cognitive information processing patterns.

In general, working adults are not saving enough to ensure a worry-free retirement (Employee Benefits Research Institute, 2010). Most pre-retirees start to save for retirement late in their work career, yet saving for the future is vital for people to live a comfortable life after they leave the workforce. Doing so helps to ensure a level of financial security that will guarantee a reasonable quality of life. Some working adults feel that social security will cover their costs for retirement. However, as of 2012, social security only provides retired adults \$1,180 a month, on average (Social Security

Administration, 2011). One thing that makes the “savings challenge” complicated is that pre-retirees have different preferences as to how much they want to save and how much each individual thinks he or she will need (Skinner, 2007). Failing to adequately save can affect aging adults in the long run when they decide to retire; if they do not save enough, they may not be able to achieve the standard of living they prefer. Many pre-retirees might not be able to pay for the goods and services they will need because they will have underestimated how much they needed to save (Lusardi & Mitchell, 2009). Working adults should save enough to meet their future financial needs for retirement because sometimes, unexpected turns may occur such as a serious health shock, leading them to draw down resources earmarked for retirement from their saving. According to Skinner (2007), baby boomers are saving only one-third of what they should for retirement. MetLife (2010) also reported that 52% are behind in their savings, while 25% are considerably behind on their retirement planning, and 20% have not even started saving or do not plan to save. Only 28% of respondents from the MetLife survey are saving the amount they need in order to meet their future financial needs.

According to Lusardi and Mitchell (2007), many working adults are not aware of the essential economic issues that are involved in planning for retirement. These authors also suggest that there has been a dearth of attention paid to the topic of saving for retirement. Some pre-retirees are financially illiterate, which is especially true among individuals with minority and ethnic backgrounds, and those with lower levels of education. Lusardi and Mitchell go on to point out that a majority of people feel that it is important to understand economics at a comfortable level. In essence, given the

complexities of financial planning for retirement, working adults need to be at least minimally financially savvy in order to save appropriately for the future.

In order to frame the present study in the context of the psychological literature on retirement planning, it is useful to think of classifying existing empirical work at different levels. Consider three levels of analysis based on a theoretical framework advanced by Hunt (1995a; 1995b). Hunt argues that cognitive research exists at the representational, computational, and biological levels. The representational level looks at “the way that a person’s internal processes reflect external realities” (Hunt, 1995b, p. 169). The computational level is useful for identifying differences in working and long-term memory, and also the differences between two types of knowledge: procedural and declarative (Hunt, 1995a, p. 263). The biological level focuses mostly on the implicitness of the psychological theory (Hunt, 1995a, p. 261). Examples of representational research would be investigations that focus on the way social norms and social forces shape retirement planning decisions (e.g., Henkens, 1999) or work that looks at how perceived behavioral control influences savings contributions (Croy, Gerrans, & Speelman, 2009). An example of work at the computational level would be investigations that attempt to document the existence of unconscious cognitive biases that emerge during the financial decision making process, such as the overconfidence effect (Sieck & Yates, 2001) and delay discounting (Shamosh et al., 2008). Research at the third (and most basic) level of analysis examines the biological basis of financial and economic decisions. Examples of work at this level of analysis include neuroeconomic investigations that attempt to isolate the areas of the brain that are involved in making saving and investing decisions (e.g., Holden, 2010; Hsu et al., 2009; James, 2012).

Of the studies on financial and retirement planning that have been published, the large majority of investigations have been at the representational level of analysis. Research at the computational level is rather limited in scope. That is the unique contribution of the present study to the literature. This investigation, which has as its goal to explore how retirement information is processed at the level of semantic long-term memory representations, is clearly at the computational level. Work such as this is desperately needed in order to build a sufficient theoretical bridge that can support future research at the representational and biological levels of analysis.

Retirement Saving and Retirement Worry

Over the past two decades a body of research has accumulated that suggests a clear link between worry and saving for retirement. Owen and Wu (2007) state that working adults worry about their future retirement income when they encounter negative financial shocks. According to Hershey, Henkens and van Dalen (2010), other working adults worry because they have insufficient levels of general financial knowledge. When comparing individuals of different age cohorts (pre-retirees and retired adults), financial worry is more commonly seen among pre-retirees (Skarborn & Nicki, 2000). One reason why this might be the case is because younger workers may not be knowledgeable when it comes to knowing what to expect in terms of future finances (Hershey et al., 2010). According to Hershey and Mowen (2000), pre-retirees are not sufficiently prepared for retirement, and unfortunately, the problem will only grow worse in the coming decades. This is because most pre-retirees do not look forward to the planning and saving process, and many will not start to plan or save until their late forties.

During the Industrial Revolution, people used to work from the time they were children up until the point when they could not work any longer. In present times, adult workers typically enter the workforce later than in the past (after college), and they tend to retire earlier than they did in previous generations, around the age of 61 (Elman & O’Rand, 2002). This means that workers in contemporary society need to be cautious about their spending habits in order to save enough to ensure a reasonable quality of life. Troublingly, in 2005, savings rates in the U.S. turned negative for the first time since the Great Depression (Thaler & Sunstein, 2008).

Worry about retirement could decrease if more information on the retirement saving process is provided to adults by their employers (Bayer, Bernheim, & Scholz, 1996). Some working adults might not have sufficient workplace information about their retirement packages (such as 401K plans) and therefore, they may begin to worry about their future retirement finances. Thus, finding ways to teach workers about different investment vehicles and financial outcomes can be beneficial, by changing individuals’ understanding of the topic for the better. In addition to workplace programs, pre-retirees can search for financial information online or read books that can teach them about what they need to do in order to retire comfortably. An additional option would be for pre-retirees to find a professional financial advisor who could help them determine how much will need to be saved and how they should ideally invest. However, approaching a financial advisor might be a challenge in itself because pre-retirees might not have enough money to see one, they might be embarrassed that the financial advisor will negatively judge them for not having saved sooner, or they may not be comfortable disclosing their personal financial information (Gutierrez, Hershey, & Gerrans, 2011).

In the present project, individuals' financially-related retirement fears and worries were explored using a well-established cognitive information processing task called the Emotional Stroop Task. More information is provided about this task in the following section.

Emotional Stroop Task

The Stroop Task, developed by J. Ridley Stroop, is designed to measure response latencies using an interference paradigm (Stroop, 1935). Although the Stroop task has been used in a variety of different ways, the most common approach involves presenting words to an individual on a computer screen, and having them say the name of the font color in which the word is presented. The types of words presented are typically either neutral words (e.g., *fish*, *table*) or color words (e.g., *red*, *blue*). For example, the word "red" might be presented to the participant using a green font. The participant's task is to inhibit the tendency to say the word "red," and instead, say the name of the color of the font. Thus, in this example the correct response is to say "green." The dependent measure in the Stroop paradigm is the amount of time (in milliseconds) it takes for the respondent to correctly name the color of the font. Previous investigations have revealed that it takes individuals longer to say the font color of color words (e.g., "*red*") as compared to non-color words (e.g., *bicycle*), due to the interference caused by processing the (color) word and the name of the font color.

One variation of the Stroop Task is a paradigm that has been referred to as the Emotional Stroop Task (EST). Rather than presenting individuals words that are the name of colors, the EST uses *threat words* and *neutral words* that are presented in different color fonts. Threat words are words that the participant should find threatening,

because they are linked to fears or worries in the individual's semantic long-term memory network. Neutral words, in contrast, are neutral because they are not associated with a particular emotional valence. For example, if someone is depressed, he or she would be more likely to take longer to respond to words such as "tired" and "sad," because these words are directly (and negatively) related to their psychological condition. Neutral words (such as *dog* and *desk*) are words that would not be expected to affect the individual on an emotional level, and therefore, would not affect their response times.

Hope, Rapee, Heimberg, and Dombeck (1990) conducted a study of Stoop performance among individuals with social phobia. The researchers found that individuals with social phobia responded more slowly to social threat words than neutral words. Most recently, Dresler, Mériaux, Keekeren, and van der Meer (2007) found consistent effects among individuals diagnosed as having an anxiety disorder. Specifically, anxious individuals took longer to respond to anxiety-linked threat words (e.g., *nervous*; *worry*) than neutral words. This suggests that the emotionally-based threat words are being processed differently than words that have a neutral emotional valence.

A different study from Grant and Beck (2006) revealed that participants with social anxiety took longer to respond to words that implied social threat and depression, such as "*despised*" and "*hopeless*." In these studies it was presumed that participants took longer to respond to the threatening words because they were words that activated negative thoughts and feelings in long-term memory.

Bower (1981) did a mood induction investigation that was designed to make participants either happy or sad, and then they were asked to remember happy incidents

or sad incidents. Although this was not a Stroop investigation, Bower found those who were in a happy mood were quick to retrieve words that were happy, and they took longer to retrieve words that were sad. Bower described the emotional organization of individuals' semantic networks as the reason for the response time differential. From an information processing perspective, this suggests that emotional content is encoded at the level of individual words or concepts in long term memory.

There have been no known studies that have used the EST to look at words related to retirement and financial planning. It is believed that for individuals who have concerns about financial sufficiency in retirement, threat words in the present study (e.g., *poverty*) will be (negatively) emotionally charged, and therefore, result in longer response time latencies. In other words, at a very basic level of information processing, it would be expected that an individual's response time scores would reflect his or her level of financial and retirement-related fears.

Financial Inhibition

A study by Neukam and Hershey (2003) found that some individuals are self-conscious and uncomfortable about their ability to plan and save for retirement. These investigators referred to this condition as financial inhibition. The financial inhibition scale (FIS) they developed is designed to measure financial worry about the future, specifically, worry associated with adequately planning and saving for old age (sample items: "I often find myself concerned about not having enough money in retirement"; "I feel nervous and hesitant when doing financial planning for retirement"). This scale is used in the present study to measure participants' self-reported retirement-related fear levels (more information on the Financial Inhibition Scale can be found in Chapter II).

Present Study

In the present study, individuals were presented with 60 neutral words and 12 retirement-related threat words using the EST. In light of the previous research on anxious individuals and the EST, it was expected that participants who are anxious or worried about their future retirement situation would take longer to respond to retirement threat words relative to neutral words. As it is assumed that these individuals will process retirement words on an emotional level, threat words should delay or otherwise interfere with the processing of the appropriate response (i.e., identification of the font color). Individuals who fail to show a delayed response to retirement words would presumably not have negative emotions linked to the threatening stimulus items.

In addition to completing the retirement Stroop task, all participants in the study completed the Neukam and Hershey (2003) Financial Inhibition Scale. Scores on this scale will then be subject to a median split, in order to create a blocking variable in subsequent analyses. In other words, respondents with high and low levels of financial inhibition will serve as a between-subjects independent variable in this investigation. The second independent variable will be a within-subjects dimension, specifically, whether the type of words presented are threat words (e.g., *poverty*; *saving*) or neutral words (e.g., *shelf*, *paper*). Together, these two independent variables will be used in combination to carry out two dependent samples *t*-tests in which the dependent variable will be color identification response times. These *t*-tests will be computed separately for individuals in the high FIS and low FIS groups. It is hypothesized that the response times for low FIS (i.e., low fear) individuals will not differ as a function of word type, and the response

times for high FIS (i.e., high fear) individuals will be significantly longer in the threat condition compared to the neutral condition.

CHAPTER II

METHOD

Participants

Ninety non-retired working adults participated in this study. The demographic characteristics of the sample were as follows: age ($M_{\text{years}} = 49.09$, $SD = 7.91$, min. = 34, max. = 65), sex ($N_{\text{male}} = 25$, 27.8%; $N_{\text{female}} = 65$, 72.2%), income ($M = \$60,188$, $SD = \$35,993$, min. = \$10,000, max. = \$147,500), years of formal education ($M = 15.46$, $SD = 2.33$, min. = 12, max. = 18). The racial representation of the sample reflected the Midwest region where the data were collected— that is, respondents were predominantly Caucasian.

Six types of recruiting strategies were employed in collecting the data: (i) handing out flyers at local shopping centers, (ii) forming a partnership with a financial advisor who could refer participants, (iii) public service announcements made on local radio stations, (iv) posting newspaper announcements, (v) going to workplaces, and (vi) snowball sampling (i.e., asking participants if they know other eligible persons who might volunteer). All solicitation techniques targeted working adults within the desired age range. Interested individuals were instructed to contact the Life Planning Research Laboratory by e-mail or telephone to arrange an appointment for testing.

Procedure

Participants were tested in the Retirement Planning Research Laboratory or at a location that was convenient for them (e.g., office, home). If tested outside the laboratory, the experimental measures were administered using a laptop computer containing the necessary software (i.e., MediaLab and DirectRT).

Each data collection session consisted of two parts and took a total of ten to fifteen minutes to complete. Before participants began, they read an informed consent form (See Appendix A) and were told that they could discontinue the study at any time without adverse consequences. Participants began by completing the computerized EST. Once the EST was finished, participants were asked to answer a series of demographic questions. The study was concluded by orally debriefing each participant and providing a written debriefing sheet (See Appendix B). Before leaving, each participant was asked whether he or she knew of anyone else who might be interested in participating in the study. If so, they were asked for the nominee's e-mail or telephone number.

Experimental Task & Dependent Measure

Participants sat in front of a computer screen and completed the Emotional Stroop Task using the DirectRT software, which is designed to record their response times as they engaged in the task. For the task, individual words appeared in the middle of the screen one at a time in Arial font (letters 1.5 inch tall). Participants were asked to indicate the color of the ink in which each word was written by pressing the appropriate colored key on the keyboard. The entire task involved 72 trials and the interstimulus interval was set to 500 milliseconds. Sixty trials involved the presentation of neutral words such as: "canyon," "train," and "wrench." The other 12 trials presented retirement-linked threat

words such as: “saving,” “planning,” and “aged.” More will be said about the nature of the stimulus items in the EST Word Type section, below.

The dependent measures on the task were response time latencies, which were represented in milliseconds. This was based on how long it took each participant to respond to the stimulus item by pressing the appropriate key on the keyboard. Overall means for threat words and neutral words were calculated for each individual to obtain their average response times as a function of word type.

Independent Measures: FIS and EST Word Type

Financial Inhibition Level. In addition to the EST, participants were asked to complete a 9-item Financial Inhibition Scale (FIS) that taps two separate constructs: retirement-related financial worry and retirement planning worry. The Likert-type response scale ranged from 1-7, with 1 being “*Strongly Disagree*” and 7 being “*Strongly Agree*.” Items on the FIS scale “reflect a concern for negative future occurrences or apprehension associated with the financial planning and savings process,” (Neukam et al., 2003, p. 22).

The financial inhibition measure assessed whether individuals had a high or low level of concern related to retirement finances and saving. A total score for the financial inhibition scale was calculated as the aggregate mean of all nine items. For analysis purposes, the distribution of scores was dichotomized into “high” and “low” groups on the basis of a median split. The demographic characteristics of these two groups are shown in Table 1.

EST Word Type. Participants were individually presented with 12 threat words and 60 neutral words while using the DirectRT program that records EST response time

latencies. Participants were asked to press the appropriate keys on the computer keyboard based on the color of the stimulus word presented. In developing the list of threat and neutral words, every effort was made to ensure the word length and frequency of usage were equivalent based on the Battig and Montague (1969) word norms (See Appendix C for a list of words that were used). The 72 words were presented in the form of four 18 word blocks, with one quarter of the threat words included in each of the four blocks (i.e., 3 threat words per block). The placement of threat words within blocks was randomly determined. Threat words were found to have a mean length of 6.92 letters and neutral words had a mean length of 6.50 letters, $t(70) = 1.28$, *n.s.* The four different colors of fonts were red, blue, green and yellow, which were displayed on a black background. In order to identify the color, the participant pressed either the T, Y, G, or H keys on the computer keyboard. These four keys were selected for use due to their close proximity to one another and to reduce the possibility of a left-right spatial bias associated with using response keys on opposite sides of the keyboard. To reduce participants' working memory load, colored stickers corresponding to the four colors were placed on the four response keys.

Demographic Questions. After participants completed the experimental task, they answered a series of demographic questions including: gender, age, marital status, occupation, household income level, race and ethnic background (See Appendix D).

Table 1

Demographic Characteristics (means and standard deviations) for the high FIS and low FIS groups.

	Low-FIS	High-FIS
Age	48.60 (7.90)	49.53 (8.02)
Education (Years)	15.95 (2.26)	15.00 (2.34)
Income (Dollars)	72, 222.20 (41,047.78)	50,340.91 (28,075.85)
Percentage Female	72.1%	72.3%

CHAPTER III

RESULTS

Responses to demographic questions and response times from the EST were entered into an SPSS dataset. Frequency distributions were then generated and descriptive statistics were computed for each variable. Variables were checked to ensure that their distributional characteristics were sound, and to make sure that there were no unreasonable levels of skew or kurtosis that would violate the assumptions of parametric-level statistical tests. Any scales with distributions that violated the assumptions of parametric statistics were subject to trimming or transformation prior to analysis. Missing values were imputed as appropriate (mean score for all individuals) for the financial inhibition scale. Response time variables were then checked for errors. After the data were fully cleaned and checked, attention was turned to testing the two primary hypotheses of interest.

Errors and Error Rate Analysis

As a first step in the analysis process, it was determined which Stroop task items each individual participant missed (i.e., false responses). Four new variables were computed that captured the percentage error rate for each color. This allowed for a test of whether error rates differed as a function of color, using a one-way repeated measures ANOVA. A significant difference was found $F(1, 89) = 25.87, p < .01$, with green error

rates (24%) being statistically higher than errors among the other three colors (red [2%], yellow [3%], and blue [3%]).

Multiple comparisons were then carried out between percentage error rates for the different colors using paired samples t-tests to determine which of the four means differed from the others. It was found that the error rate for green items was significantly different from each of the other three colors (all three tests significantly different at the $p < .01$ level). The other three colors were not found to be significantly different from one another (Red/Blue $p = .75$, Red/Yellow $p = .36$, and Blue/Yellow $p = .85$). Based on this analysis it was concluded that all green trials should be eliminated from further analyses (note: eliminated word in Appendix C are marked with a dagger). It appeared that the participants had trouble discriminating the particular hue of green used in this experiment. Because a subset of words were removed from the stimulus set, it was important to again check for differences in word length between threat and neutral stimulus items. If a non-significant difference in word length across word types was found, then it would be possible to rule out word length differences as a contributing factor in determining individuals' response times. Using the reduced set of 60 stimulus items, it was found that threat words had a mean length of 6.82 letters and neutral words had a mean length of 6.41 letters. These word lengths were not found to be reliably different, $t(58) = 0.77$, *n.s.*

Next, overall error rates were calculated for each individual participant using only errors for Red, Blue, and Yellow trials (i.e., 60 trials overall). If particular participants were found to have exceedingly large overall error rates, then they would be eliminated from the sample (because presumably, they were not paying attention to task). A cut-off

point was found between 12 percent and 23 percent in the frequency distribution of error rates, so it was decided to eliminate all individuals with error rates of greater than 22 percent. This resulted in 3 participants being cut (S#8 = 30%, #85 = 67%, and #89 = 23%), thereby reducing the overall sample size to 87. After cutting the three individuals, the new demographic characteristics of the 87 person sample was as follows: Age ($M = 49.24$, $SD = 7.90$, min. = 34, max. = 65), sex ($N_{\text{male}} = 24$, 27.6%; $N_{\text{female}} = 63$, 72.4%), income ($M = \$60,292$, $SD = 36,368$, min. = 10,000, max. = 147,500), years of formal education ($M = 15.53$, $SD = 2.33$, min. = 12, max. = 18). In terms of demographic characteristics, the reduced sample was not appreciably different from the original 90-person sample.

Among the remaining participants, the dataset was recoded so that any response times in which the participant generated a false response became system missing. During this step, the percentage of system missing values due to false responding was determined to be 1.64 percent (86 false responses out of 5220 total trials).

Another dimension that was examined was whether there was a difference in error rate as a function of threat vs. neutral words across all participants. Toward this end, the mean neutral stimulus error rate and mean threat error rate was computed. It was found that the mean number of errors for threat words ($n = 11$) $M = 0.01$ ($SD = .03$) was not statistically different from errors for neutral words ($n = 49$) $M = 0.02$, ($SD = .03$), $t(86) = 1.49$, $p = n.s.$

Computation of FIS Subgroups Based on Median Split

A frequency distribution of FIS scores was then computed and examined. The 50th percentile break in that distribution came between scores of 4.22 and 4.33 on the 1-7

scale. Therefore, to form dichotomized subgroups, a new variable was created in which scores of less than 4.23 were coded as 0 (i.e., low FIS respondents) and scores of more than 4.32 were coded as 1 (i.e., high FIS respondents). This resulted in 42 low FIS individuals, and 45 high FIS individuals.

Trimming of Response Time Scores

Consistent with many chronometric investigations of cognitive processing (Lachaud & Renaud, 2011), the response time scores for a trial greater than 3 standard deviations from the mean (i.e., outliers) were replaced with the mean of the remaining scores (i.e., threat outliers replaced with non-outlier threat mean response times; neutral outliers replaced with non-outlier neutral mean response times). This was done separately for the high-FIS and low- FIS groups. For the low FIS group this resulted in the replacement of 41 values out of a possible 2520 (1.62% of the data) and for the high FIS group this resulted in the replacement of 34 values (1.26% of the data).

The total percentage of scores that were replaced in the dataset is the sum of scores replaced because they were either false responses, or because they were outliers that were greater than 3 standard deviations from the mean of their respective subgroup (i.e., either high-FIS or low-FIS). In other words, 73 response time scores out of all 2520 scores possible were replaced for low FIS individuals, or 2.89 percent of all scores. Similarly, 34 scores out of all possible 2700 were replaced for members of the high FIS group, or 1.26 percent of all values. Thus, 107 scores out of all 5220 response time scores in the dataset were replaced with the appropriate group mean, or 2.04 percent of all response time values.

Primary Analysis Using Median Split

A pair of *a priori* dependent samples *t*-tests were conducted that used EST response times for threat and neutral words as the dependent variable. The two tests were conducted separately for low-FIS and high-FIS groups. As hypothesized, for low-FIS individuals the threat response times ($M = 789$ ms., $SD = 97$ ms.) and neutral response times ($M = 783$ ms., $SD = 90$ ms.) did not differ, $t(41) = 1.07$, *n.s.* For high-FIS individuals, threat words ($M = 789$ ms., $SD = 97$ ms.) and neutral words ($M = 783$ ms., $SD = 90$ ms.) were significantly different, $t(44) = 2.44$, $p = .009$, one-tailed. In terms of effect sizes, the within-subjects mean difference was negligible for the low-FIS group ($M_{diff} = 5$ ms., $SD = 35$ ms., Cohen's $d = .16$). However, the mean difference was in the small-to-medium range for the high-FIS group ($M_{diff} = 15$ ms., $SD = 41$ ms., Cohen's $d = .36$).

Extreme Groups Analysis of Response Time Differences

In an effort to magnify the observed effect, in a subsequent set of analyses a frequency distribution of FIS scores was computed in which the top third and bottom third of the distribution were used as cut-off points to form two extreme groups. FIS scores of less than 3.23 were coded as 0 (i.e., low-FIS working adults) and scores of greater than 4.79 were coded as 1 (i.e., high-FIS working adults). All other cases in the middle of the distribution were treated as missing. This resulted in 28 low-FIS individuals, and 32 high-FIS individuals (27 participants were excluded).

Two *a priori* dependent samples *t*-tests were then conducted in which low-FIS individuals were expected to reveal no difference in response times, and high-FIS individuals would show a delayed response to threat words. Both used threat and neutral

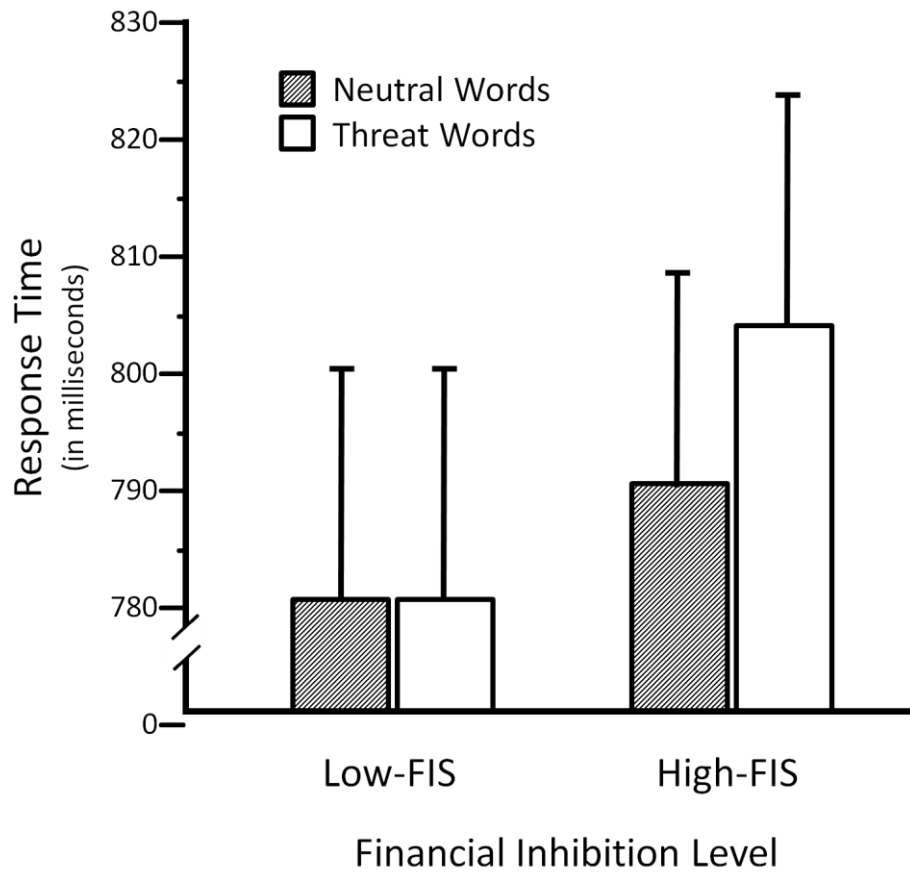
EST response times as the dependent measure. As hypothesized, among low-FIS individuals the threat words ($M = 780$ ms., $SD = 102$ ms.) and neutral words ($M = 780$ ms., $SD = 97$ ms.) did not differ, $t(27) = 0.04$, *n.s.* For high FIS individuals, threat word response times ($M = 808$ ms., $SD = 117$ ms.) and neutral word times ($M = 790$ ms., $SD = 101$ ms.) were found to differ, $t(31) = 2.21$, $p = .02$, one-tailed. The mean effect size for the difference was again negligible for members of the low-FIS group ($M_{diff} = 0.25$ ms., $SD = 31$, Cohen's $d = .01$). However, the effect size was in the small-to-medium range for the members of high-FIS group ($M_{diff} = 17$ ms., $SD = 45$, Cohen's $d = .39$). A figure showing mean EST response times for threat and neutral words is shown in Figure 1, plotted as a function of high- and low-FIS groups. This figure clearly shows the hypothesized *a priori* effects.

Summary of Findings

Participants with high levels of financial inhibition were found to take longer to respond to threat words than neutral words, presumably due to the emotional (fear) response elicited by the threatening stimulus items. Participants with low levels of financial inhibition, however, did not display a corresponding difference in response times. Thus, these analyses serve to support the two hypotheses outlined in the introduction.

Figure 1

Mean Response Time and Standard Errors as a Function of Word Type and Financial Inhibition Level (Extreme Groups Analysis).



CHAPTER IV

DISCUSSION

In the present study, the way in which people's emotions impact their processing of concepts in long-term memory was examined. This was accomplished by looking at the ability of individuals to rapidly access retirement and non-retirement words using a computerized EST. Respondents who were shown to have retirement-linked fears were found to take longer to process retirement-related concepts relative to non-retirement concepts. In contrast, those who were not shown to have retirement-linked fears showed no difference in their processing of retirement and non-retirement words. Thus, the findings from the study support the notion that emotionally-based fears affect the processing of concepts in semantic long-term memory.

Once the data were analyzed, both of the experimental hypotheses were supported. Specifically, it was expected that high-FIS individuals would take longer to respond to threat words than neutral words. The second hypothesis was that there would be no difference in the response latencies of low-FIS individuals for threat words and neutral words. The finding for the low-FIS individuals showed that there was no difference in response times as a function of word type and, in fact, the mean scores for threat words ($M = 780$ ms.) and neutral words ($M = 780$ ms.) were equivalent. The findings for high-FIS individuals showed that response times were significantly

different as a function of word type; the mean difference for threat ($M = 808$ ms.) and neutral ($M = 790$ ms.) words was 18ms.

These findings were verified two different ways. The results outlined above were demonstrated when the data were examined using all participants based on a median split of the FIS dimension (to form the two groups). The same pattern of effects was found based on an extreme groups analysis using a subset of individuals who had more extreme (high and low) scores on the FIS dimension. In this latter analysis, the data clearly demonstrated the *a priori* hypothesized effects (see Figure 1).

Theoretical Implications

This section of the paper will discuss possible theoretical implications of the observed effects. One implication involves an extension of retirement research to a new and different level of analysis (Hunt, 1995b). As of now, most current work focuses on retirement attitudes, knowledge, goals, and social influences as determinants of retirement planning practices (i.e., work at the representational level of analysis). Basic-level cognitive studies (biological work in the Hunt framework) are rarely conducted. There are relatively few exceptions involving studies that have looked at the neuroeconomic basis of financial decisions (Hsu et al. 2009; Lehrer 2009). The present investigation bridges a gap between representational work and biological research. Examining how concepts are organized at the computational level of analysis in Hunt's framework provides a window into how individuals process retirement information, thereby opening up new avenues for research on planning.

Another theoretical implication is that it was possible to extend the EST paradigm to a qualitatively new and different type of population. Previous studies have been carried

out with individuals who have clinically-significant levels of anxiety and depression. The present study was able to successfully examine the relationship between emotions and information processing among members of a non-clinical population who are experiencing some degree of anxiety. It was found that even mildly anxious individuals (i.e., having anxiety at what would be considered a non-clinical level) revealed delayed word activation processes compared to individuals with little or no retirement anxiety.

Findings from this study support Bower's (1981) contention that concepts in long-term memory are linked to emotional content, and that affective content has an impact on how processing takes place. A related theoretical question that has yet to be explored is whether processing differences are linked to behavioral predispositions such as whether one is likely to set retirement-related goals, acquire retirement knowledge and financial knowledge, and make savings contributions for old age. It would be anticipated that individuals with longer response latencies to threat words would be less likely to have well-formulated retirement goals and would be less likely to be engaged in planning and saving activities.

Findings from this study also have theoretical implications for understanding approach and avoidance tendencies. Approach/avoidance theories (Elliot, 1999; Feldman & Beehr, 2011) suggest that individuals are drawn toward activities and behaviors they like, and withdraw from activities they find distasteful or *threatening*. The present study suggests a processing mechanism from which avoidance might stem. This could help explain the reason why so many individuals procrastinate when it comes to retirement planning and saving (Hershey, Jacobs-Lawson, & Austin, in press). The tendency to procrastinate really represents an attempt to avoid the economic "pain" associated with

saving, until it becomes apparent to the individual that one's behavior is terribly maladaptive, which is typically around 45-50 years of age. At that point, many individuals recognize that they have to overcome the tendency toward avoidance and instead engage in approach (i.e., saving) behaviors. This is likely due to the fact that by that age, retirement has drawn near and is no longer an abstract concept. The prospect of leaving the workforce is staring them in the face and they realize that unless they engage in adaptive financial planning behaviors, then their future quality of life will suffer. This realization can lead individuals to take action.

Applied Implications

This section of the discussion will focus on applied implications. One such implication involves the prospect of developing effective intervention programs. It is worth considering what financial planners, retirement counselors, and intervention specialists can take away from this study. One important take-away message is that a poor patterns of planning and saving among individuals does not just reflect a poor attitude or lack of motivation on the part of non-planners. For example, the difficulties that some individuals have presumably stems from a more fundamental challenge that has to do with how retirement concepts are cognitively represented and processed. It is likely that for high-fear individuals, simple intervention solutions aimed at encouraging them to plan more and save more may not be effective. It may be otherwise necessary to devise intervention approaches that address the representational basis of individuals' financial long-term memory networks as a way of stimulating saving motives (more will be said about this below).

An example of an intervention approach would involve retirement counselors seeking to change irrational thought processes among anxious individuals who are actually on track when it comes to planning and saving for the future. A supplemental approach to intervention could involve counseling anxious clients with the goal of “normalizing” perceptions of their anxious state. In most cases, this would involve pointing out to the individual that comparable others face similar saving challenges and that the anxious client is not alone when it comes to the need for engaging in catch-up savings.

This study also has implications for the development of veridical mental representations about retirement starting at a relatively young age. Many have made the argument that retirement planning should begin with children (Danes, 1994; Hershey, Jacobs-Lawson, & Austin, in press; Shobe & Sturm 2007). If parents and society work to cultivate positive mental representations of retirement concepts, then it should help reduce the likelihood of financially-linked fears surrounding the decision to withdraw from the workforce.

Limitations and Future Directions

There are several limitations and future directions that should be mentioned. First, it was tacitly assumed for the purposes of this experiment that negative emotions were linked to retirement and financial planning concepts. Furthermore, it was assumed that that response times could be used as a proxy measure for the impact those emotions had on word activation. Perhaps future studies could explicitly examine the nature of the emotions associated with key retirement planning concepts using a different type of methodology to help better establish the validity of these two assumptions. This might

involve, for example, explicitly asking individuals the extent to which they find threatening the prospect of financial insufficiency in old age. Doing so would also allow us to better understand the mechanisms that underlie the processing of financial and retirement information.

As a second limitation, the characteristics of the sample somewhat limit the broad generalizability of the findings. It would be worthwhile to replicate the investigation with other types of respondents. Examples would include individuals of different ages, including young adults and retirees. Indeed, young adults and retirees face different types of pressures and social norms when it comes to saving for the future. That being the case, their performance (i.e., particularly young and old adults) may differ from that seen among the middle-aged adults investigated in the present study. It might also be worthwhile to examine the EST response latencies of individuals with different amounts of knowledge about financial and retirement planning. Presumably, high-knowledge individuals would have fewer negative concepts associated with key retirement words.

A third limitation involved the fact that it was assumed high-FIS participants experienced a degree of stress as a function of retirement-linked word activation. However, this “stress assumption” was not tested explicitly. One way of looking at stress in future studies would be to include a cortisol test as part of the experimental protocol, in which the researcher would obtain cortisol levels before the stress is induced (i.e., before the EST) and twenty minutes after the task is completed. If changes in cortisol are demonstrated as a function of word exposure, then it could link research at the biological and computational levels of analysis (Hunt, 1995b).

A future direction that stems from this study could involve developing a broader model of the factors that influence performance on the EST. One way of doing this would be to construct a path model to look at the factors that give rise to retirement-linked negative emotions. These factors could include: one's financial knowledge level, one's tolerance for risk, and one's level of future time perspective. The outcome variable would be retirement fears or retirement worry. Another possible investigation could involve looking at information processing differences associated with qualitatively different types of financial decisions – that is, some that are simple and others that are complex (Laran, 2010). This way, it can help to determine which individuals are financially literate and which struggle with the complexities of financial decisions.

Conclusion

This study stands to make an important contribution to the retirement literature, because it focused on an understudied aspect of retirement cognition—semantic long-term memory. As mentioned above, most research has been at the representational level of analysis. Specifically, the findings suggest that those individuals with high fear towards the threatening stimulus items were likely to be those individuals with longer response times. This suggests that future studies could use this novel finding as a jumping off point to more semantic-related research as a way of gaining a better understanding of how individuals process thoughts about retirement.

REFERENCES

- Arnone, W. J., Kavouras, F., Nissenbaum, M., Pape, G. M., Ratner, C. L., Rouse, K. R., Voss, D. C., & Wiley, P. A. (2001). *Ernst & Young's Retirement Planning Guide*. New York: John Wiley & Sons.
- Bandler, R. & Grinder, J. (1979). *Frogs into princes: Neuro-linguistic programming*. London: Real People Press.
- Battig, W. F., & Montague, W. E. (1969). Category norms for verbal items in 56 categories: A replication and extension of the Connecticut category norms. *Journal of Experimental Psychology Monograph*, 80, 1-46.
- Bayer, P. J., Bernheim, B. D., & Scholz, J. K. (1996). The effects of financial education in the workplace: Evidence from a survey of employers (Working Paper No. 5655). Retrieved from National Bureau of Economic Research website <http://www.nber.org/papers/w5655.pdf>
- Bower, G. H. (1981). Mood and memory. *American Psychologist*, 36, 129-148. doi: 10.1037/0003-066X.36.2.129

- Croy, G., Gerrans, P., & Speelman, C. (2010). The role and relevance of domain knowledge, perceptions of planning importance, and risk tolerance in predicting savings intentions. *Journal of Economic Psychology, 31*, 860-871. doi: 10.1016/j.joep.2010.06.002
- Danes, S. M. (1994). Parental perceptions of children's financial socialization. *Association for Financial Counseling and Planning Education, 5*, 127-149.
- de Ruiter, C. & Brosschot, J. F. (1994). The emotional stroop interference effect in anxiety: Attentional bias or cognitive avoidance? *Behaviour Research and Therapy, 32*, 315-319. doi: 10.1016/0005-7967(94)90128-7
- Diener, E., Emmons, R. A., Larsen, R. J. & Griffin, S. (1985). The satisfaction with life scale. *Journal of Personality Assessment, 49*, 71-75. Retrieved from <http://www.unt.edu/rss/SWLS.pdf>
- Dresler, T., Mériaux, K., Heerkeren, H. R., & van der Meer, E. (2009). Emotional stroop task: Effect of word arousal and subject anxiety on emotional interference. *Psychological Research, 73*, 364-371. doi: 10.1007/s00426-008-0154-6
- Elliot, A. J. (1999). Approach and avoidance motivation and achievement goals. *Educational Psychologist, 34*, 169-189. doi: 10.1207/s15326985ep3403_3
- Elman, C. & O'Rand, A. M. (2002). Perceived job insecurity and entry into work-related education and training among adult workers. *Social Science Research, 31*, 49-76. doi: 10.1006/sse.2001.0718
- Employee Benefits Research Institute (2010). *Trends in savings and investments among workers. Employee Benefit Research Institute Issue Brief #158*. Washington, DC: Author.

- Feldman, D. C., & Beehr, T.A. (2011). A three-phase model of retirement decision making. *American Psychologist*, *66*, 193-203. doi: 10.1037/a0022153
- Grant, D. M., & Beck, J. G. (2006). Attentional biases in social anxiety and dysphoria: Does comorbidity make a difference? *Journal of Anxiety Disorders*, *20*, 520-529. doi: 10.1016/j.anxdis.2005.05.003
- Gutierrez, H. C., Hershey, D. A., & Gerrans, P. (2011). What to do when clients are reluctant to share. *CSA: Certified Senior Advisor*, *49*, 39-44 .
- Henkens, K. (1999). Retirement intentions and spousal support: A multi-actor approach. *Journal of Gerontology*, *54*, S63-S73. doi: 10.1093/geronb/54B.2.S63
- Hershey, D. A., Henkens, K., & van Dalen, H. (2010). Aging and financial planning for retirement: Interdisciplinary influences viewed through a cross-cultural lens. *International Journal of Aging*, *70*, 1-38. doi: 10.2190/AG.70.1.a
- Hershey, D. A., Henkens, K., & van Dalen, H. P. (2010). What drives retirement income worries in Europe? A multilevel analysis. *European Journal of Aging*, *7*, 301-311. doi: 10.1007/s10433-010-0167-z
- Hershey D. A., Jacobs-Lawson, J. M., & Austin, J. T. (in press). Effective financial planning for retirement. In M. Wang (Ed.), *The Oxford Handbook of Retirement*. New York: Oxford University Press
- Hershey, D. A., Jacobs-Lawson, J. M., McArdle, J. J., & Hamagami, F. (2007). Psychological foundations of financial planning for retirement. *Journal of Adult Development*, *14*, 26-36. doi: 10.1007/s10804-007-9028-1

- Hershey, D. A., & Mowen, J. C. (2000). Psychological determinants of financial preparedness for retirement. *The Gerontologist, 40*, 687-697. doi: 10.1093/geront/40.6.687
- Holden, K. (2010). Theories of human behavior and emotions: What they imply about the financial behavior of vulnerable populations. *Center for Financial Security Research Brief, 10*, 1-5. Retrieved from http://cfs.wisc.edu/Publications-Briefs/What_Theories_of_Human_Behavior_and_Emotions_Imply_about_Financial_Behavior.pdf
- Hope, D. A., Rapee, R. M., Heimberg, R. G., & Dombeck, M. J. (1990). Representations of the self in social phobia: Vulnerability to social threat. *Cognitive Therapy and Research, 14*, 177-189. doi: 10.1007/BF01176208
- Hsu, M., Krajbich, I., Zhao, C., & Camerer, C. F. (2009). Neutral response to reward anticipation under risk is nonlinear in probabilities. *The Journal of Neuroscience, 29*, 2231-2237. doi: 10.1523/JNEUROSCI.5296-08.2009
- Hunt, E. (1995a). Pulls and pushes on cognitive psychology: The view toward 2001. In R. L. Solso & D. W. Massaro, *The science of mind* (pp. 258-273). New York, NY: Oxford University Press.
- Hunt, E. (1995b). *The cognitive psychology view of thinking*. New York, NY: Sage.
- Jacobs-Lawson, J. M., & Hershey, D. A. (2005). Influence of future time perspective, financial knowledge, and financial risk tolerance on retirement saving behaviors. *Financial Services Review, 14*, 331-344. Retrieved from http://www2.stetson.edu/fsr/abstracts/vol_14_num4_p331.pdf

- James, R. N. III., (2012). Applying neuroscience to financial planning practice: A framework and review. *Journal of Personal Finance*, 10, 10-65.
- Lachaud, C. M., & Renaud, O. (2011). A tutorial for analyzing human reaction times: How to filter data, manage missing values, and choose a statistical model. *Applied Psycholinguistics*, 32, 389-416.
- Laran, J. (2010). The influence of information processing goal pursuit on postdecision affect and behavioral intentions. *Journal of Personality and Social Psychology*, 98, 16-28. doi: 10.1037/a0017422
- Lehrer, J. (2009). *How we decide*. New York, NY: Houghton Mifflin Harcourt.
- Lusardi, A., & Mitchell, O. S. (2007). Baby boomer retirement security: The roles of planning, financial literacy, and housing wealth. *Journal of Monetary Economics*, 54, 205-224. doi: 10.1016/j.jmoneco.2006.12.001
- Lusardi, A., & Mitchell, O. S. (2007). Financial literacy and retirement preparedness: Evidence and implications for financial education. *National Association for Business Economics*, 34-44. doi: 10.2145/20070104
- Lusardi, A., & Mitchell, O. S. (2009). How ordinary consumers make complex economic decisions: Financial literacy and retirement readiness (Working Paper No. 15350). Retrieved from National Bureau of Economic Research website
<http://cid.bcrp.gob.pe/biblio/Papers/NBER/2009/Setiembre/w15350.pdf>
- MetLife. (2010, May). *The MetLife Retirement readiness index. Are Americans prepared for the transition?* MetLife, 4. Retrieved from
https://onlineinvesting.usbank.com/PDF/MMI_Retirement_Readiness_Index_Study.pdf

- Neukam, K. A., & Hershey, D. A. (2003). Financial inhibition, financial activation, and saving for retirement. *Financial Services Review, 12*, 19-37. Retrieved from http://www2.stetson.edu/fsr/abstracts/vol_12_num1_p19.pdf
- Owen, A. L., & Wu, S. (2007). Financial shocks and worry about the future. *Empirical Economics, 33*, 515-530. doi: 10.1007/s00181-006-0115-0
- Shamosh, N. A., DeYoung, C. G., Green, A. E., Reis, D. L., Johnson, M. R., Conway, A. R. A., Engle, R. W., Braver, T. S. & Gray, J. R. (2008). Individual differences in delay discounting: Relation to intelligence, working memory and anterior prefrontal cortex. *Psychological Science, 19*, 904-911. doi: 10.1111/j.1467-9280.2008.02175.x
- Shobe & Sturm (2007). Youth individual development accounts: Retirement planning initiatives. *Children and Schools, 29*, 172-181.
- Sieck, W. R., & Yates, J. F. (2001). Overconfidence effects in category learning: A comparison of connectionist and exemplar memory models. *Journal of Experimental Psychology: Learning, Memory, and Cognition, 27*, 1003-1021. doi: 10.1037/0278-7393.27.4.1003
- Skarborn, M., & Nicki, R. (2000). Worry in pre- and post-retirement persons. *International Journal of Aging and Human Development, 50*, 61-71. doi: 10.2190/CFQ1-7HG3-9APX-1NMA
- Skinner, J. (2007). Are you sure you're saving enough for retirement? (Working Paper No. 12981). Retrieved from National Bureau of Economic Research website <http://cid.bcrp.gob.pe/biblio/Papers/NBER/2007/marzo/w12981.pdf>

- Social Security Administration (2011). Average monthly Social Security benefit for a retired worker. Available: http://ssa-custhelp.ssa.gov/app/answers/detail/a_id/13
- Stawski, R. S., Hershey, D. A., & Jacobs-Lawson, J. M. (2007). Goal clarity and financial planning activities as determinants of retirement savings contributions. *International Journal of Aging and Human Development*, 64, 13-32. Retrieved from <http://testas.cas.okstate.edu/cas2/psychology/templates/okstate/files/hershey/3.pdf>
- Stroop, J. R. (1935). Studies of interference in serial verbal reactions. *Journal of Experimental Psychology*, 18, 643-662. doi: 10.1037/0096-3445.121.1.15
- Thaler, R. H., & Sunstein, C. R. (2008). *Nudge: Improving decisions about health, wealth, and happiness*. New Haven, NJ: Yale University Press.
- Wang, M., & Schultz, K. S. (2010). Employee retirement: A review and recommendations for future investigation. *Journal of Management*, 36, 172-206. doi: 10.1177/0149206309347957

APPENDICES

Appendix A — Participant Information Sheet

Project Title: Reaction Time Test

Investigator: Helen Gutierrez, Oklahoma State University Department of Psychology

Purpose: The purpose of this study is to explore how quickly people respond to a task in which the goal is to name colors as fast as possible. This study is designed to help the researchers better understand how individuals process written information.

Procedure: In this study, you will see words appear on a computer monitor and be asked to press the appropriate key on the keyboard as the words appear on the screen. Once you have completed the computerized task, you will be asked to complete a questionnaire. Portions of the questionnaire will ask about previous life planning decisions you have made. There are no right or wrong answers to these questions; we are only interested in your opinions. The entire session is expected to take between 10-15 minutes.

Risks of Participation: This study has been approved by the Oklahoma State University Institutional Review Board. There is no intrinsic deception involved in this study and your participation will not create risks beyond those encountered in everyday activities.

Benefits: It is expected the data from this study will yield valuable information on the way in which individuals process written information.

Confidentiality: Any data provided as a result of involvement in this study will be kept strictly confidential. The data collected via the questionnaire will not be individually identifiable. When published, the data will only appear in an aggregate form. The scientific data we collect will strictly be used for academic research purposes. All data will be stored in a locked filing cabinet in the Retirement Planning Research Laboratory (North Murray 301/302). Only the principal investigator (H. Gutierrez) and her research supervisor (D. Hershey) will have direct access to the raw data.

Contact: **Your participation in this survey is greatly appreciated and completely voluntary.** If you so desire, you have the right to discontinue your participation in this survey prior to completion without penalty. If you have questions about your rights as a research volunteer, you may contact the Oklahoma State University Institutional Review

Board (IRB) Chair, Dr. Shelia Kennison at 219 Cordell North, Stillwater, Oklahoma 74078, (405) 744-3377 or irb@okstate.edu. If you have other general questions or comments about the study, you may contact the principal investigator, Helen Gutierrez at (405) 744-0382 (helencg@okstate.edu), or the research advisor for the project, Dr. Douglas Hershey at (405) 744-4594 (douglas.hershey@okstate.edu).

By completing the experimental task and questionnaire, you have indicated your willingness to participate in this research.

Appendix B—Debriefing Information

Thank you for your participation in this study. Your answers will help to advance research on the information processing of written text. The results of this study should allow us to find ways to help individuals process information in more efficient ways. Through the use of “chronometric analysis” (i.e., time-based analyses), we hope to better understand the nature of human cognitive processing.

The results of this study should be available in approximately 12 months. If you would like to receive a copy of the findings, you may contact helencg@okstate.edu.

Once again, thank you for your participation!

Sincerely,

Helen C. Gutierrez

Research Associate, Life Planning Laboratory

Appendix C — Words used in the Emotional Stroop Task

First Block	Second Block	Third Block	Fourth Block
1. Canyon [†]	1. Train [†]	1. Wrench	1. Shoulders
2. <i>Finances</i> *	2. <i>Aged</i> *	2. <i>Saving</i> *	2. Rock
3. Chlorine [†]	3. Carrot [†]	3. Monastery	3. <i>Nestegg</i> *
4. Poetry	4. Sailboat	4. Trumpet	4. League
5. <i>Poverty</i> *	5. Socks	5. Food	5. Trout
6. Penguin	6. <i>401K</i> *	6. Precious	6. <i>Elderly</i> *
7. Volcano	7. Chain	7. <i>Future</i> *	7. Sunny
8. Skates	8. Waltz [†]	8. Article	8. Mechanic
9. Captain	9. Electricity [†]	9. Week	9. Distance
10. Walnut	10. Nephew	10. <i>Investing</i> *	10. Ladybug [†]
11. Greece	11. Vanilla	11. Lemonade	11. Corduroy [†]
12. Canvas	12. Mayor	12. Diamond	12. Chemistry
13. Country	13. Desk	13. Baseball [†]	13. Rose
14. Panther	14. Avocado [†]	14. Maroon	14. Aluminum
15. <i>Planning</i> * [†]	15. Elevator	15. Champagne	15. Letter
16. Wood	16. Virus	16. Tent	16. <i>Retirement</i> *
17. Check	17. Slippers	17. Cardinal	17. Fraud [†]
18. Friar	18. <i>Pension</i> *	18. Merchant	18. Spatula

*Words in italics are “threat” words

[†] Words with a dagger were removed from the final analysis because they were green in color and thus, subject to a higher than normal error rate.

Appendix D — Demographic Questionnaire

1. Sex

- Male
- Female

2. What is the highest level of education you have completed?

- Less than 12 years education
- High school or equivalent
- Some college
- Associate's degree (two-year community college)
- Bachelor's degree
- Graduate degree

3. Age _____

4. Marital Status

- Single
- Married
- Divorced or Separated
- Widowed
- Full-time non-married partner
- Other: _____

5. What is your current annual household income?

- No income currently
- Below \$20,000
- \$20,000-\$30,000
- \$30,001-\$40,000
- \$40,001-\$50,000
- \$50,001-\$60,000
- \$60,001-\$70,000
- \$70,001-\$80,000
- \$80,001-\$90,000
- \$90,001-\$100,000
- \$100,001-\$110,000
- \$110,001-\$120,000
- \$120,001-\$130,000
- \$130,001-\$140,000
- \$140,001-\$150,000
- \$150,001 or more

6. Are you Hispanic or Latino?

Yes

No

7. What is your race?

African American

American Indian/Alaska Native

Asian

Native Hawaiian or Pacific Islander

Multiethnic

White

Other

8. Is your spouse (partner; significant other) currently employed?

Yes

No

Not Applicable

9. Are you the primary financial planner in your household?

Yes

No

I'm the co-planner

Appendix E—IRB Approval Form

Oklahoma State University Institutional Review Board

Date: Monday, June 06, 2011
IRB Application No AS1166
Proposal Title: Impact of Retirement Worry on Information Processing

Reviewed and Processed as: Expedited

Status Recommended by Reviewer(s): Approved Protocol Expires: 6/5/2012

Principal Investigator(s):

Helen Gutierrez	Douglas Hershey
116 N. Murray	116 N Murray
Stillwater, OK 74078	Stillwater, OK 74078

The IRB application referenced above has been approved. It is the judgment of the reviewers that the rights and welfare of individuals who may be asked to participate in this study will be respected, and that the research will be conducted in a manner consistent with the IRB requirements as outlined in section 45 CFR 46.

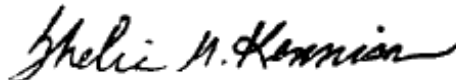
The final versions of any printed recruitment, consent and assent documents bearing the IRB approval stamp are attached to this letter. These are the versions that must be used during the study.

As Principal Investigator, it is your responsibility to do the following:

1. Conduct this study exactly as it has been approved. Any modifications to the research protocol must be submitted with the appropriate signatures for IRB approval.
2. Submit a request for continuation if the study extends beyond the approval period of one calendar year. This continuation must receive IRB review and approval before the research can continue.
3. Report any adverse events to the IRB Chair promptly. Adverse events are those which are unanticipated and impact the subjects during the course of this research; and
4. Notify the IRB office in writing when your research project is complete.

Please note that approved protocols are subject to monitoring by the IRB and that the IRB office has the authority to inspect research records associated with this protocol at any time. If you have questions about the IRB procedures or need any assistance from the Board, please contact Beth McTernan in 219 Cordell North (phone: 405-744-5700, beth.mcternan@okstate.edu).

Sincerely,



Shelia Kennison, Chair
Institutional Review Board

VITA

Helen C. Gutierrez

Candidate for the Degree of

Master of Science

Thesis: IMPACT OF RETIREMENT WORRY ON INFORMATION PROCESSING

Major Field: Psychology

Biographical:

Education:

Completed the requirements for the Master of Science in Psychology at Oklahoma State University, Stillwater, Oklahoma in July, 2012.

Completed the requirements for the Bachelor of Arts in Psychology at California State University, Dominguez Hills, Carson, California in 2010.

Professional Memberships:

Gerontological Society of America, Association for Psychological Science, OSU-Psychology Graduate Student Association, OSU-Graduate and Professional Student Government Association

Name: Helen C. Gutierrez

Date of Degree: July, 2012

Institution: Oklahoma State University

Location: Stillwater, Oklahoma

Title of Study: IMPACT OF RETIREMENT WORRY ON INFORMATION
PROCESSING

Pages in Study: 43

Candidate for the Degree of Master of Science

Major Field: Psychology

Scope and Method of Study:

Individuals with financially-linked retirement worries were explored using a cognitive information processing paradigm called the Emotional Stroop Task (EST). Instead of presenting color words (e.g., "RED") in a non-red color of ink and asking individuals to identify that ink color (i.e., the standard Stroop interference paradigm), the EST uses retirement "threat" words (e.g., "POVERTY;" "SAVING") and non-retirement "neutral" words ("SAILBOAT;" "TABLE"), each of which is presented in one of four ink colors. Individuals with retirement-linked fears were expected to identify ink colors for threat words slower than neutral words, due to the occurrence of an emotionally-based interference effect.

Findings and Conclusions:

Among high-fear individuals, threat word responses took 808 milliseconds to identify on average, and neutral words took 790 milliseconds (an 18 millisecond difference; $t[31] = 2.21, p = .02$, one-tailed). Among low-fear individuals, however, a 0 millisecond difference in response latency was observed across word types (both threat and neutral means = 780 ms; $t[27] = .04, ns$). It was concluded that negative emotional content associated with long-term memory-based retirement concepts disrupt processing among those with strong, financially-linked fears.

ADVISER'S APPROVAL: Douglas A. Hershey, Ph.D.
