

Retirement saving behavior: Transtheoretical Model change processes and life cycle tenets

by

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B.S., University of Louisville, 1984

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AN ABSTRACT OF A DISSERTATION

submitted in partial fulfillment of the requirements for the degree

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School of Family Studies and Human Services
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Abstract

This dissertation sought to examine predictors of retirement savings behavior by analyzing data from the 2019 Survey of Consumer Finances (SCF 2019). The paper considered potential predictors through the lens of the Transtheoretical Model of Change (TTM) and tenets of the Behavioral Life Cycle Hypothesis (BLC). It is common for researchers to focus primarily on the stages of change in TTM without scrutinizing the underlying constructs within TTM that define change.

This research delved more deeply into the underlying constructs than is typical of TTM research efforts. Guided by prior literature, survey items were chosen to model the various processes of change within the TTM model. Reasonable proxies were determined for all constructs except for the stimulus control process of change, which was a common missing variable within the literature.

These survey items from the SCF 2019 were further divided into those that were considered to be cognitive factors and those considered to be behaviors. Cognitive factors were defined as any type of opinion, attitude, knowledge, or belief that was held by the participants. Behaviors were defined as actions either already taken or reported as what action the respondent would take. This process was not a scale, but a checklist for each construct modeled. For each process of change or underlying construct, the subject either demonstrated the response that would be expected of a person in the precontemplation, contemplation, or preparation stage of change or what would be expected of a person in the action or maintenance stage of change. Once this was accomplished, a logistic regression, both unweighted and weighted, was obtained to examine whether there were differences in the two groups regarding owning any type of

retirement savings accounts, thus whether they were saving for retirement. Whether each household was *saving* or *not saving* specifically for retirement was the binary outcome variable.

In addition to the role of TTM factors, this research further searched for evidence of the influence of BLC elements in the presence or absence of retirement savings behaviors. Survey items were chosen to model the specific tenets of the doer versus the planner, the implied recognition of assets belonging either in the current asset or future asset mental account, and the impact of retirement saliency on temptation. These items were included in the overall logistic regression model, both unweighted and weighted, to look for any differences in retirement savings behavior for each of these BLC elements.

Ultimately this dissertation found evidence of statistical significance when considering the TTM constructs whether considering cognitive factors or behaviors. This was true in both the unweighted and weighted regressions. Except for retirement saliency in the unweighted logistic model the BLC tenets were not found to be statistically significant. This research is important because the responsibility for retirement savings shifted dramatically from the employer to the employee in recent decades and evidence suggests that the challenge of saving is not being met. Results of this study could help financial planners, counselors, and educators, as well as employers wishing to support their employees, with valuable information to influence the development of effective interventions designed to increase retirement saving behaviors within the general population.

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Chapter 1 - Introduction

It has now been several decades since the responsibility for planning and saving for retirement shifted to the individual worker in American culture (Biggs, 2020). Seburn (1991) explained that as one major result of the Industrial Revolution, defined benefit plans were introduced to workers as a way for employers to retain and reward their long-term workers. The employer took responsibility for the retirement welfare of employees, including the financial risk and burden of ensuring adequate investing to fulfill those promised benefits (Seburn, 1991). The Revenue Act of 1978 contained the Internal Revenue Code 401(k) that created what are known as defined contribution plans with an impact that changed the dynamics of retirement planning forever (Revenue Act of 1978).

Additional legislation introduced individual retirement arrangements (IRAs), both Traditional and Roth, during the emerging decades to encourage individuals to increase their retirement savings efforts and provide a comfortable standard of living in the golden years of life (Employee Retirement Security Act of 1974; Taxpayer Relief Act of 1997). The issue of improving Americans' retirement savings behavior and improving amounts saved is so important that legislation continues to be created and implemented to encourage more robust retirement savings behavior. The bipartisan Setting Every Community Up for Retirement Enhancement Act of 2019 (SECURE Act) was passed in 2019, resulting in numerous legislative changes to the rules of retirement savings (Setting Every Community Up for Retirement Enhancement Act of 2019). The Securing a Strong Retirement Act (SECURE Act 2.0) passed almost unanimously in the House of Representatives in March 2022 and was included, newly passed, and signed into law as part of the Consolidated Appropriations Act, 2023, making this an extremely relevant and

timely area of study (Securing a Strong Retirement Act of 2022; Consolidated Appropriations Act, 2023).

Statement of the Problem

One of the most pressing financial consequences resulting from this evolution of the shifting retirement preparation responsibility from employers to employees is that workers have needed, and continue to need, to take an active role in their own financial security and bear the financial risks involved in long-term investing. Indications are that in spite of this decades long development, employees have not received and/or understood this message as measured by retirement savings activities (Duley, 2023; Woolley, 2022) and that new approaches are needed to address the retirement savings deficit many American workers and retirees are experiencing and will continue to experience. In fact, according to data from the Federal Reserve's Survey of Consumer Finances (SCF) analysis of changes in family finances between the years of 2016 and 2019, only about two-thirds of all households were saving for retirement (Bhutta et al., 2020). Additionally, Bhutta et al. (2020) found that in households in the lower half of the income distribution, the percentage that were saving for retirement was less than 40% and the percentage of all households participating in retirement savings plans experienced a slight drop in 2019 from the 2016 levels within the data from those two separate SCF findings.

It appears that many Americans believe Social Security will provide for an adequate retirement safety net. The future of Social Security is often debated within the political arena, including a most recent animated exchange between President Joe Biden and several Republican lawmakers during his live and televised February 7, 2023, State of the Union Address (Biden, 2023). Social Security was never intended to fully provide for a worker's financial support, but only to keep seniors out of abject poverty (Dalton & Dalton, 2022; <https://www.ssa.gov/>). When

the Social Security Act was enacted on August 14, 1935 (Social Security Act, 1935), the United States was experiencing the Great Depression and, according to the Social Security Administration, life expectancies were only 61 years for white men and 65 years for white women at birth. At that time, Blacks and other minorities could expect about a 10-year shorter lifespan (<https://www.ssa.gov/>). Originally, life expectancies were generally matched to the full retirement age when the program was first introduced. Prior to both the Covid-19 pandemic and more recent opioid crisis, much improved longevity and the increasing number of recipients, particularly the Baby Boom generation, concerns emerged regarding the long-term sustainability of the program as it is currently structured (Dalton & Dalton, 2022). The Social Security Amendments of 1983 (H.R. 1900, Public Law 98-21) raised the full retirement age, based on year of birth, from the age of 65 gradually to all people born in 1960 or later having a full retirement age of 67. Besides these concerns of the Social Security program, many pension funds, particularly multiemployer plans, are facing insolvency and other financial strains (Tugend, 2022). The general public may not understand that should a person's pension fund fail, there is little protection to the promised benefit, resulting in being paid pennies on the dollar from the Pension Benefit Guaranty Corporation (PBGC) insurance coverage (Dalton & Dalton, 2022).

Purpose and Justification of the Study

It appears that the crux of the problem facing American workers today is that the shift in the world of available employment retirement benefits has resulted in the requirement that employees must save for their own retirement security. This is essential if they expect to maintain the standard of living they had during their working years. Unfortunately, the challenge is not currently being met by a large portion of the population. As mentioned above, data from

the Federal Reserve's analysis of overall changes in personal financial situations between the Survey of Consumer Finances years 2016 and 2019 illustrated that only about two-thirds of the general population were saving for their retirement (Bhutta et al., 2020). Furthermore, of those active savers, saving for retirement was highly concentrated in the upper-income levels with participation generally falling in accordance with annual household income. In fact, participation rates among the "percentile of usual income" remained relatively consistent for results reported in the 2013, 2016, and 2019 surveys (Bhutta et al., 2020). Less than 40% of the age 35- to 64-year-old reference group who fell into the lower half of the annual income range were saving for retirement purposes (Bhutta et al., 2020). Dalton & Dalton's educational materials (2022) suggested that people should be saving between 10% and 12% of their salaries starting at the age of 25 just to fund retirement. As people delay saving for retirement and/or have additional financial goals, the minimum percentage of salary savings guidelines rise.

The current situation points to the need for customized advice focused on people at varying phases of life. This advice could come from many different sources but would likely be most effective coming from a qualified financial advisor, particularly a CERTIFIED FINANCIAL PLANNER™. Working individually with a CFP® professional would allow for customized advice that would benefit most people. According to CFP.net, CFP® professionals provide a comprehensive and holistic approach to help their clients reach their financial goals while acting as a fiduciary for their clients (www.cfp.net).

If a recent Forbes article is any indication (Egan, 2023), odds are generic advice and the associated consequences have only gotten more dire recently. Seventy-nine percent of millennials or Gen Z members are turning to social media for financial education and advice (Egan, 2023). Households have just overcome setbacks from the greatest financial crisis in

almost a century during the Great Recession (2007 – 2009) but will now have to mitigate any more recent impacts of societal changes caused by COVID-19 and the related consequences that may or may not exist and are still to be determined. Either one of those occurrences are seldom seen within one's lifetime, but to have experienced both is most unprecedented in any modern-day scenario and will likely take years to fully process and assess. And, of course, the individual circumstances of the person such as age and life expectancy should drive issues such as that person's savings time horizon and be guided by proven financial principles. These principles often provide households with the ability to financially withstand societal shocks such as these most recent events. In other words, customized advice from a legitimate financial advisor can, and usually should, be informed by rules of thumb to develop a stable financial foundation with the recognition that these should be applied as appropriate to a person's unique situation.

In addition to the surge in those using social media for financial information as mentioned previously (Egan, 2023), there are currently scores of different commercial sources of financial information, such as television personalities and authors Dave Ramsey and Suze Orman, and public agency approaches and viewpoints (<https://www.consumerfinance.gov/>) to help people prepare for retirement. Additionally, there are no restrictions on who is permitted to post videos on social media websites such as YouTube or TikTok, regardless of whether the person who posted the material has any knowledge or expertise on the subject matter. According to a 2020 CNBC story, YouTube was the second largest search engine in the world (Evers, 2020). However, uninformed or unreliable financial advising sources often fail to make realistic or empirically informed adaptations for the less financially educated person trying to manage the likely competing financial goals, needs, and resources that the average U.S. citizen experiences throughout their lifetimes. In fact, CNN reported that 80 factchecking organizations concluded

that there was a large amount of false material on the platform, particularly as it concerned politics (Duffy, 2022).

Various researchers (Boonrourgrut & Fei, 2020; Kerkmann, 1998; Massey et al., 2015; Quartuch et al., 2021; Shockey & Seiling, 2004; Tobe et al., 2021; Xiao et al., 2004; Xiao et al., 2008) have utilized the Transtheoretical Model (TTM) to study numerous behaviors and other cognitive factors such as whether people did or did not practice specific actions and how they thought, felt, and believed about certain issues as well as knowledge people already possessed regarding these issues. Some of these researchers applied TTM principles to develop interventions to address people's financial behaviors and ways to encourage implementation of the more positive behaviors such as eliminating credit card debt (Xiao et al., 2004) and acquiring good money management skills (Shockey & Seiling, 2004). As discussed in much more detail later, TTM is a complex theoretical framework that encompasses not only the behaviors of people, but also a great deal of peoples' cognitive factors that are encapsulated in their knowledge, attitudes, intentions, beliefs, and feelings (Prochaska & DiClemente, 1983).

Dalton et al.'s (2021) Money Education materials define life cycles based on three various financial phases. When people are just starting to build their financial lives, they are considered in the asset accumulation phase and are generally aged in their twenties well into their fifties. Next is the conservation (risk management) phase and starts when individuals have assets to protect such as physical property, the value of their human capital, and their earnings capacity. Typically, this phase starts in one's late twenties and lasts well into a person's seventies. The third area is the distribution (gifting) phase starting sometime in the person's forties or fifties and lasts for the rest of one's life. It is probable that a person will likely be in all three phases for at least a part of their lifetime as there typically comes a point during a person's

work life that not only is that person accumulating more assets while protecting those assets, but also starting to distribute those assets while still in that work life (Dalton et al., 2021).

Using this framework of the typical progression of financial life in American culture, one can recognize that a person's attention could be fixed on the most immediate circumstance in the financial maturation process as he or she passes through these life stages. This issue of saliency, its impact on a person's attitude towards financial behaviors, and the resulting actual financial behaviors have been considered from various points of view and research (Horwich, 2022; Lawson & Heckman, 2017). Much of the research indicates that a common response to the recognition of a retirement savings deficit was to respond by delaying a person's retirement age, whether this was realistic or not (Hanna et al., 2017; Padalka, 2023). Other research indicated that people prioritize savings goals based on satisfying the most basic and immediate needs before the more future-oriented and abstract needs (Lee & Hanna, 2015).

It is of interest in this paper to consider the additional impact of the issue of financial saliency of various events on retirement savings. There has been a recognition that various phases of life have competing and conflicting financial demands (Dalton et al., 2021; Horvich, 2022; Lee & Hannah, 2015; Woolley, 2022). Further consideration will be given to this issue utilizing Behavior Life Cycle Hypothesis (BLC) tenets, particularly as they pertain to retirement savings and the application of the influences of self-control, mental accounting, and framing. It is unrealistic to believe that this dissertation research will provide answers to all these matters, but it is hoped that it will further contribute to the overall conversation to improve retirement preparation in our society.

Research Questions and Objectives

This exploratory research sought to examine and identify predictors of retirement savings behavior and explore potential interventions tailored to an individual's life cycle based upon theory. The theoretical frameworks included both the Transtheoretical Model (TTM) and the Behavioral Life Cycle Hypothesis (BLC) to examine the identification of factors contributing to the likelihood of retirement savings behaviors. The use of both frameworks contemplated and suggested possible effective interventions customized to the individual audiences within specific life cycles rather than proposing a generic standardized approach as is typically presented. Life cycles were considered with a special emphasis on the issue of saliency on the retirement saving behavior differences of those within 10 years of retirement and those further than 10 years away from retirement as stated by the respondents within the dataset. BLC constructs were also utilized to deepen the examination of the temptation/self-efficacy TTM construct by delving more deeply into the influence of those who indicated that they had a short-term money management approach of the doer as opposed to those who indicated a longer-term money management orientation of the planner. And finally, the BLC tenets of mental accounting and framing were considered regarding the retirement savings behavior of individuals based upon whether it was indicated that the subject held a current asset perspective of assets or a future asset view of the household assets held by respondents.

Introduction to the Transtheoretical Model of Change (TTM) and Behavioral Life-cycle Hypothesis (BLC)

The Transtheoretical Model of Change (TTM) provides a promising framework for use in this research. While other theoretical frameworks have been used previously, TTM is a behavioral model that was specifically designed to describe how people can make necessary changes in their lives (Prochaska & DiClemente, 1983). TTM has been applied to financial

behaviors with initial behavioral change results that were positive although there were mixed statistical significance results among these studies (Kerkmann, 1998; Shockey & Sieling, 2004; Xiao et al., 2004). Behavioral Life-cycle Hypothesis (BLC) provides for the consideration of human beings to engage in phenomena such as self-control and temptation, rules and mental accounting, as well as framing of accounts into current income, current assets, and future income (Shefrin & Thaler, 1988).

Using both lenses, little research has explored the effects of underlying financial behaviors and expectations to identify core beliefs that could predict whether a person would be actively saving for retirement. Utilizing information from the 2019 Survey of Consumer Finances (SCF 2019), this exploratory research operationalized the TTM stages of change in savings behavior as independent variables using various statistical analyses such as logistic regression to test and analyze predictors within the data with an emphasis on the processes of change. Utilizing the typically mitigating demographic control variables such as education levels, income, and ethnicity, this study looked specifically for predictive relationships between existing financial behaviors and cognitive factors and the relationship to active retirement savings behavior. Cognitive factors and behaviors included data on the use of savings and investment information sources, long-term financial outlook, importance of leaving an inheritance, and other such factors when operationalizing the TTM evaluation of the sample as was further discussed in the methods section of Chapter 3.

It was expected that analysis of these cognitive factors and behaviors would yield results that would further enhance the ability of financial counselors and planners to more accurately predict in what stage of change an individual belongs. Providing additional tools to help financial professionals understand what drives a person's decision and implementation within certain life

cycle stages to save for retirement could possibly help create more effective interventions to move clients into the stages of action, maintenance, and termination. Termination was a later addition to TTM and is considered a state of change when the behavior change is no longer an issue and has become automatic without any effort. Going forward, this research will refer to these final stages simply as action and maintenance. With the ongoing shift in responsibility for workers to provide for their own retirement security, it is imperative that more effective strategies to motivate people into action are developed.

Definitions

This project sought to determine a binary dependent outcome variable exploring how accurately the processes of change in TTM predict retirement savings activity (i.e., whether a person does or does not save for retirement). Those households that were fully retired were eliminated from the sample because the study's focus was on retirement savings, therefore eliminating the need to include retired households. However, there were households reporting the presence of a partner with one of the household partners still in the workforce even if the other was retired. The TTM predictor variables were built combining multiple variables that may predict a person falling within the appropriate stage of TTM. The stages for those who had not yet started to save for retirement include precontemplation, contemplation, and preparation. For those who had started to save for retirement, the stages are action, maintenance, and termination. The sample was then further analyzed through the lens of BLC to assess the impact of self-control, mental accounting, and framing on retirement savings behavior using variables that are consistent with the theory. It was hoped this further analysis of the differing savings outcomes of various age groups and similarities among those who had been saving can inform the

development of potential interventions that may be developed for those who failed to save for retirement purposes.

Limitations, Assumptions, and Delimitations

One limitation of this study was that TTM has been found to be used most effectively in longitudinal studies, which this was not. The SCF 2019 is a snapshot in time and did not lend itself to any comparison of behavior in the sample other than comparing one age cohort to another and it oversampled wealthier households, as the SCF always has (mymoney.gov). There were few questions that specifically identify cognitive factors associated with TTM processes of change such as motivations, beliefs, or feelings in the SCF, requiring additional effort to accurately model some of the constructs through behavioral responses. For example, this could be whether the person first anticipated future expenses and then was saving for it to determine whether a person could see the impact of their behavior on outcomes.

Closely related to this same issue was the fact that few other studies utilizing the TTM theoretical framework provided survey items to model and measure the construct of stimulus control. This was despite the fact that these researchers created their own items in the design and implementation of their primary research as discussed further within the literature review. Considering both of these facts regarding the SCF 2019 limitations and the scarcity of items for modeling stimulus control within the literature, it was necessary to eliminate this tenet in the application of TTM in this work. The SCF 2019 gathered information before the onset of the Covid-19 pandemic and this research was based on pre-pandemic information.

Additionally, TTM is most effective when employing the entirety of the constructs (Hutchison et al., 2009). The model is extremely complex, and this research combined aspects of the model such as the initial binary outcome dependent variable of saving for retirement or not.

The data were not granular enough to differentiate within the sample that was not saving for retirement as to whether they fell specifically into precontemplation, contemplation, or preparation. The same was true that it would not be possible to differentiate the retirement savers into the remaining stages of change other than the fact that these individuals are saving for retirement. There was a focus on the processes of change in this research which made this effort more unique than many other efforts (Kerkmann, 1998; Shockey & Seiling, 2004; Xiao et al., 2007). Much other work reviewed was primarily concerned with the stages of change without much regard for the processes of change. The sole measurement available on this component of the study was whether the person was saving for retirement. The researcher assumed that looking at the data through the lens of BLC may well provide additional depth and dimension to further analyze people falling into these categories. Additionally, it was hoped that this analysis would provide further insight into effective interventions for individuals falling into the various life cycles with the intention of improving retirement savings rates for all who need help with this important aspect of one's financial life.

Summary

BLC tenets complement many TTM constructs, particularly as they facilitate the further scrutiny of components of temptation and self-control. It was believed that applying both models would enhance the ability of the researcher to examine and consider more succinctly the underlying dynamics of retirement savings behaviors within the various life cycles. The lack of retirement savings appears to be a significant societal problem for many people from all walks of life. It is unclear how much awareness exists to the severity of the problem and how much studies such as this one contribute to the overall raising of consciousness. However, it was hoped that this research would be a significant contribution to finding a solution. This was an especially

important study for helping the Millennial and Gen Z demographics because they appear to be in more danger of having fewer retirement resources outside of their own savings efforts should nothing change and given the uncertainty of what Social Security will look like when these generations retire (da Silva et al., 2021).

Chapter 2 - Literature Review

As previously stated, the theoretical frameworks utilized in this research included both the use of the Transtheoretical Model (TTM) and the Behavioral Life Cycle Hypothesis (BLC), with a much stronger emphasis on TTM. These theories were used to examine not only identification of factors contributing to the likelihood of retirement savings behaviors, but also to discern differences in retirement savings cognitive factors, including feelings, beliefs, motivations, knowledge, and attitudes. Special consideration was paid to various stages of individual life cycles and tenets of BLC, particularly as they related to the issues of self-control, mental accounting, framing, and saliency as individuals were closer to retirement. Using a blended approach utilizing the perspectives of both frameworks, this research attempted to identify and suggest possible effective interventions customized to the individual audiences, dependent upon where one resided in the life cycle and thought about their personal finances rather than proposing a standardized approach as is often presented.

Theoretical Frameworks

TTM provided a promising framework because it is a behavioral model focused on providing people with the ability to bring necessary change to their lives (Prochaska & DiClemente, 1983). Numerous researchers have studied the application of TTM to financial behavior with an effort to introduce change to individual outcomes (Boonrourrut & Fei, 2020; Kerkmann, 1998; Massey et al., 2015; Quartuch et al., 2021; Shockey & Seiling, 2004; Tobe et al., 2021; Xiao et al., 2004; Xiao et al., 2008). BLC transforms traditional economic models to include the reality of the “normal” human who has emotions, temptations, and impulsivity and the need to mitigate those characteristics (Shefrin & Thaler, 1988).

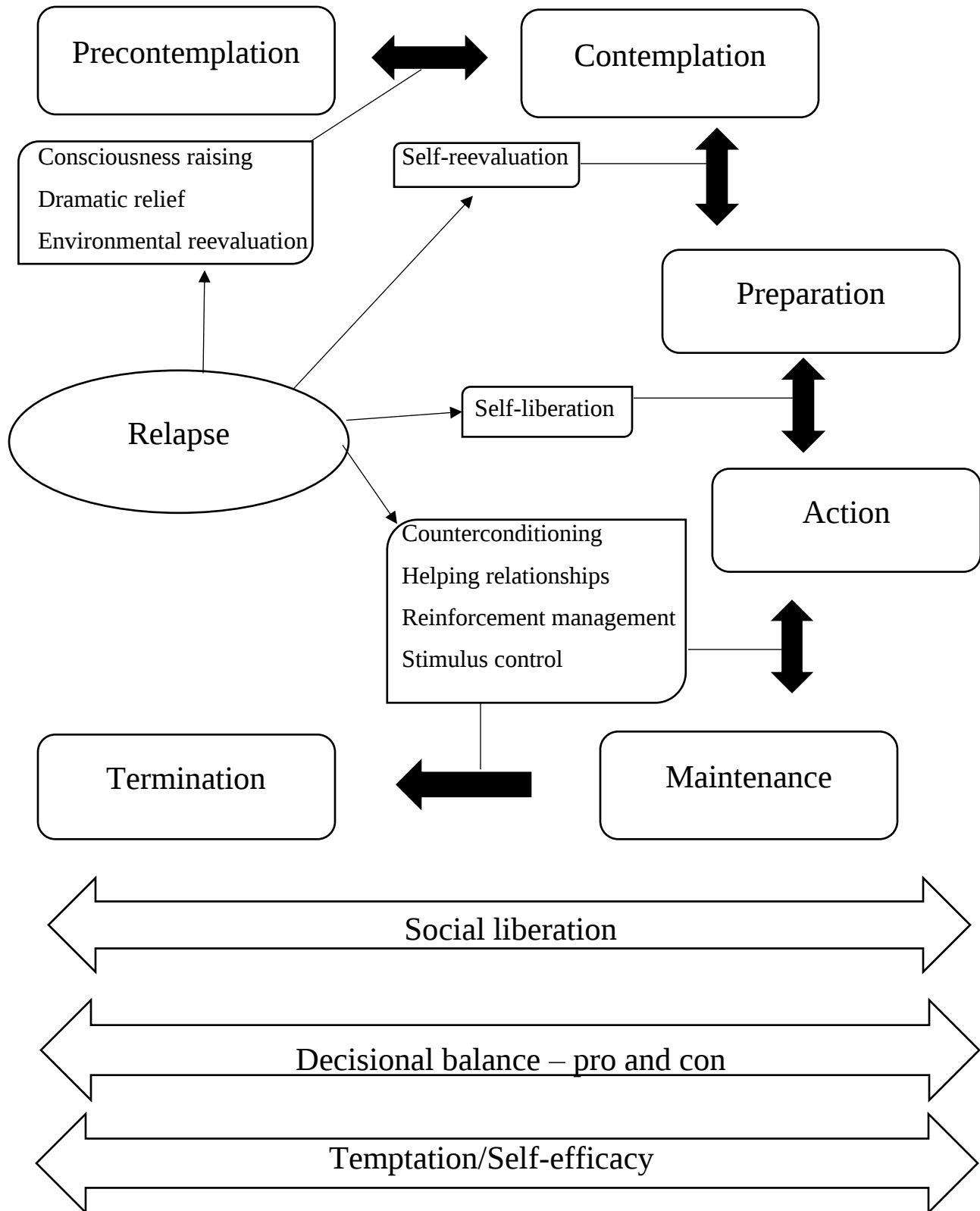
Transtheoretical Model of Change (TTM)

TTM was developed by Prochaska and DiClemente in the late 1970's and first applied to smoking cessation efforts (Xiao, 2008). Original work involved comparing 18 therapeutic systems to determine the most effective processes to change. The original stages of change were contemplation, determination, action, maintenance, and relapse (Prochaska & DiClemente, 1983). Over time the stages of change have evolved to precontemplation, contemplation, preparation, action, maintenance, and termination. Relapse is a threat at any stage other than precontemplation and termination and is outside of the realm of this project.

The model represented in Figure 2.1. below illustrates that the process is more circular than linear, although a person could move through the stages in a linear manner. Particularly with more difficult changes in a person's life, it is likely that a person will move forward and backward within the stages. Given the right circumstances, a person could move several stages in either direction nonlinearly. For example, a young newly hired employee who may technically be in the precontemplation stage could go to a lunch and learn presentation hosted at his or her workplace, learn for the first time about the employer plan, speak with a plan representative, and fill out the necessary paperwork at the event to begin payroll deduction with his or her next paycheck. Although unusual, this employee would have walked into the lunch and learn in the precontemplation stage and walked out of it already in the action stage. In other instances, a person who is in the action or maintenance stage saving for retirement may be forced into precontemplation upon unexpected and overwhelming circumstances such as losing a job, getting divorced, or becoming seriously ill. This is illustrated by the position of relapse and leads back to the processes of change that provide the pathways between the stages of change.

Figure 2.1. The Transtheoretical Model of Change

Adapted from Prochaska and DiClemente, 1983



Timelines of the stages can vary but generally the precontemplation stage occurs when the subject is completely unaware that a problem exists and is more than six months removed from addressing any issue. Contemplation is the stage in which a person may start to recognize that some issue may be of concern and intends to take action within the next six months. Preparation occurs when a person recognizes the problem and expects to make a change within the next 30 days. A person in this stage may begin to complete some preliminary tasks such as reading about the issue or determining where help may be sought. Action occurs when the subject starts changing, usually for the first six months of the changed behavior. Maintenance is generally recognized as having adopted or eliminated, whichever is being sought, the behavior for six months or more. Termination occurs once the temptation for relapse no longer exists (Prochaska et al., 2008; Xiao et al., 2008).

The processes of change are represented by the arrows that indicate that a subject could move either way between the stages. Prochaska, Redding, and Evers (2008) described the processes of change constructs as the independent variables that move people through the stages of change, the stages being the dependent variables. The pertinent transitional constructs that are presumed to be present in each of these phases are contained within the figures that are attached to the arrows. Consciousness raising, dramatic relief, and environmental reevaluation are connected to represent the processional segue between precontemplation and contemplation. The illustration further shows the relationship of self-reevaluation to moving into preparation and self-liberation to moving into action. Counterconditioning, helping relationships, reinforcement management, and stimulus control strengthen action into the longer-term behavior patterns that qualify a person to be considered either in maintenance or termination. These processes of change represent the independent variables used in this analysis. It should be emphasized that the

impetus of creating TTM was to develop a more comprehensive behavior change model that combined effective portions of several other theories and models (Prochaska et al., 2008).

Underlying the entire illustration then are social liberation, decisional balance, and temptation and self-efficacy. These constructs are always present regardless of the person's position within the stages of change. Social liberation is presumed to increase as people progress into the more mindful and action-oriented states as they have increased knowledge about the problem and are gaining skills in order to address the situation. Decisional balance represents the idea that a person is continually evaluating costs and benefits associated with making the change. Temptation and self-efficacy share the same underlying influential arrow because one is the opposing force to the other in the model. Essentially temptation is the absence of self-efficacy and vice versa (Prochaska et al., 2008).

The processes of change are generally associated with specific points within the stages of change. Transitioning between precontemplation and contemplation is associated with consciousness raising, dramatic relief, and environmental reevaluation (Prochaska et al., 2008). Consciousness raising involves starting to get a person's attention. This could be accomplished through transmitting information regarding the basics of the issue like the existence of company 401(k) plans. Dramatic relief is when emotional responses to the target problem are triggered such as empathizing sufficiently enough with another's story to identify personally. Environmental reevaluation is the awareness that personal behaviors do affect significant others such as the realization that a spouse may have to work longer than he or she planned because of the lack of retirement savings (Prochaska et al., 2008).

Self-reevaluation is the construct that leads the individual from contemplation into preparation and self-liberation from preparation into action. Self-reevaluation occurs when the

person can cognitively assess different likely long-term outcomes with and without the behavior that has now come to the attention of that person. Analytical comparisons to others are now possible, with the ability to attribute successful outcomes to the implementation of more positive behaviors. Self-liberation involves the development of the belief that the individual has the capability to make the needed change. Self-liberation can include making firm commitments, and even recommitments, to making the change (Prochaska et al., 2008).

The processes of change from action to maintenance to termination involve the additional constructs of counterconditioning, helping relationships, reinforcement management, and stimulus control. Counterconditioning involves introducing substitution behaviors. Helping relationships are those trusted relationships that help a person make a change. A good helping relationship could be working with a financial advisor. Reinforcement management is concerned with back up planning and provides positive or negative reinforcement consequences. Receiving an employer match in an employee's 401(k) plan could serve as positive reinforcement for an employee to contribute to an employer retirement plan. Stimulus control is the removal of triggers for negative behavior and the addition of prompts for positive behavior (Prochaska et al., 2008).

Although the stages of change are the most recognizable and utilized portion of the model, these are only one overall construct of the theory. The other constructs not only include processes of change just explained, but also social liberation, decisional balance, and temptation and self-efficacy (Ozmete & Hira, 2011; Prochaska, et al., 2008; Xiao et al., 2004). One item to note is that some researchers have included social liberation within the processes of change used to move people from precontemplation into contemplation (Boonrourrut & Fei, 2020; Massey, et al., 2015) although Prochaska & DiClemente created the model with social liberation

underlying the entire processes and stages of change. This research utilized the original work of the researchers that developed TTM (Prochaska & DiClemente, 1983).

As mentioned above, social liberation, decisional balance, self-efficacy, and temptation underlie the entire model. Social liberation is expected to increase with progression through the stages regarding the development of the ability and knowledge to recognize changing social norms surrounding the problem. Social liberation also deals with providing those who lack access with more opportunity to receive help with the problem (Prochaska et al., 2008). Decisional balance is simply the constant reassessment of the costs and benefits of the changed behavior. Self-efficacy is one's confidence regarding his or her ability to specifically manage the problem while temptation is the lack of self-efficacy. In situations where temptation is no longer an issue, termination has occurred (Prochaska et al., 2008).

TTM is best applied in longitudinal studies because specific subjects can be observed and assessed as to in which stage they are currently operating (Prochaska et al., 2008). Adams and White (2003) provided another analysis of a TTM application to health behaviors that showed just two documented programs were able to show long-term success. A total of 26 programs were analyzed in this particular research (Adams & White, 2003). Further analysis revealed the importance of applying all of the TTM dimensions in order to have a more successful intervention. Interventions that focus only on the stages of change were insufficient to make a significant impact, those that included the processes of change increased effectiveness significantly, and those that included the full set of the constructs were extremely effective (Hutchison et al., 2009).

There are several complexities within the TTM theoretical model when looking at the entirety of the constructs. The current research narrowed the focus to determining the financial

behaviors and cognitive factors of thoughts, attitudes, projections, emotions, intentions, and knowledge of actively employed respondents compared to the household retirement savings status to answer the question of whether there was a pattern to identify those in the saving for retirement or not saving for retirement categories. As patterns emerged as expected regarding differences between the groups in the above-mentioned categories, possible interventions, including potential workplace intervention strategies, were further discussed and suggested utilizing the processes of change in the closing discussion.

Behavioral Life Cycle Hypothesis (BLC)

BLC is a much more simplistic model than TTM, but used in combination, the application of both models attempted to provide an often overlooked dynamic in the retirement savings advice arena. Most often, recommendations are made in a generic manner regardless of other items on an individual's list of financial goals, circumstances, and obligations, although more recent attempts by advisors such as the Money Guy have started to make strides to increase customization to different age groups (<https://moneyguy.com>). Therefore, it appeared prudent to more meticulously consider how people in various life stages, particularly those who are within 10 years of retirement, are affected by the psychological impact of the tenets of BLC while analyzing data in this research. Shefrin and Thaler (1988) explained that BLC has its roots in both the Permanent Income Hypothesis (Friedman, 1957) and the Life-Cycle Hypothesis (Ando & Modigliani, 1963) and drives those theories further by addressing humanity with the accompanying psychological frailties to these theories.

Before discussing BLC in more detail, it is important to understand the most basic premises of the Life-Cycle Hypothesis (LCH). LCH was developed by Albert Ando and Franco Modigliani and introduced the idea of people “smoothing” their income over their life

expectancies. This results in individuals and households borrowing when income is low, saving and paying off debt when income is high, and spending down savings at the end of one's lifetime with the assumption that people would earn more over the course of their work life expectancy and is illustrated in Figure 2.2. below (Horwich, 2022; Wolla, 2014). Smoothing is the ability to maintain a certain consumption level enabling the individual to achieve essentially the same lifestyle from graduation through retirement, or one's work life expectancy. There are assumptions of rational behavior and decision-making, as well as time period preference neutrality, on the part of the consumer in LCH (Ando & Modigliani, 1963). The theory further posits that regardless of the source of income, whether from earned income, winnings from a lottery or gambling, or received inheritances, the individual looks at all receipt of income equally and does not treat one differently from another (Ando & Modigliani, 1963).

Figure 2.2.

A Model of Savings and Spending: The Life Cycle Theory of Consumption and Saving



Note. From “Education, Income, and Wealth,” by S. A. Wolla and J. Sullivan, in *Page One Economics*®, 2017, n.d. (<https://research.stlouisfed.org/publications/page1-econ/2017/01/03/education-income-and-wealth>).

As aforementioned, BLC posits that people engage in various psychological tendencies and behaviors when considering their financial situation such as self-control and temptation, rules and mental accounting, and framing of accounts into current income, current assets, and future income (Shefrin & Thaler, 1988). Shefrin and Thaler (1988) described LCH as a solution to an optimization problem but cited problems such as the lack of consistently significant research results and the inability to include some basic financial considerations such as legacy planning with bequests and changing financial circumstances over one’s lifetime. They argued that by considering these additional dynamics, BLC was an “enriched” version of LCH. Specifically, these added enrichments were the constructs of self-control, mental accounting, and framing (Shefrin & Thaler, 1988).

Self-Control

There are assumptions of a consistent duality within everyone between the doer, who is motivated and concerned with current consumption, and the planner, who possesses a comprehensive concern for the individual's lifetime well-being. Within the construct of self-control, one must consider the elements of temptation, willpower, and internal conflict because there is a continual struggle for people to either immediately consume or to save for future needs. According to Shefrin and Thaler (1988), the planner is thought to exert willpower to mitigate the impulsivity of the doer but does so at a negative psychic cost which increases with the intensity of the willpower needed in any given situation. However, the cost lessens as an individual approaches retirement (Shefrin & Thaler, 1988). This last point complements the saliency perspective included in the overall analysis in this dissertation and was considered in terms of the immediacy of a person's retirement and how that appeared to impact whether the person saved for retirement.

Mental Accounting

Shefrin and Thaler (1988) define mental accounting as the creation of household wealth accounts into current spendable income, current assets, and future income. Because willpower is so costly, the solution the theory provides lies within rules and mental accounting, developed to alleviate tension between the doer and the planner. Rules are defined as any preset commitment restricting the individual's power of choice or ability to consume resources such as a pension plan, reducing the need for the planner to expend the costs associated with willpower. Such plans represent external rules while internal rules are self-imposed and require willpower costs. Rules must be simplistic, have few exceptions, and be stable (Shefrin & Thaler, 1988).

Framing

Framing is the process of the actual assignment of different sources of income into the various mental accounts. Shefrin and Thaler (1988) argued that the assignment of the receipt of \$1,000 would vary depending on the origin of the \$1,000, be it from winning the lottery, receiving a work bonus, or an inheritance. This is one area where BLC diverges from LCH because of this differentiation of types of income and wealth. Mental accounting is likely behind the tendency for people to view, or frame, differing sources of income with varying behaviors in whether the income is consumed or saved (Shefrin & Thaler, 1988). Shefrin and Thaler (1988) realized that while there may be wide variations in how some households treat different situations such as increases in home equity, the model they created reflected the representative household. For instance, a household that framed increases in home equity as belonging in the future income account would be unlikely to take out a home equity loan while those that framed it in the current asset account would be much more likely to do so (Shefrin & Thaler, 1988). This research also examined if the potential implication of this concept would apply to an individual's propensity to save for retirement based upon how people held differing time orientations on budgeting and differing views on whether changes in the value of assets reflected a person's mental accounting into current assets or future assets.

They further argued that this concept was similar to accounting methods at universities when determining which are current available funds and which are longer-term when dealing with endowments. Where the income is placed in a person's mental accounting system will determine the extent of temptation to spend those resources. Temptation is strongest in the current income account, followed by the current asset account, and least present in the future income account. Despite these various accounts, BLC still recognizes the law of diminishing

returns and the impact of lessening temptation based upon this cornerstone economic principle (Shefrin & Thaler, 1988).

Review of the Literature

Retirement Adequacy and Perceptions

Many aspects of retirement have been researched as concerns regarding the solvency of both private and public defined benefit plans (DB) and the future of Social Security are questioned (Tugend, 2022). Many researchers and financial analysts have agreed that there is a retirement crisis looming (Ellis et al., 2014; Munnell et al., 2021; Sabelhaus & Volz, 2022; Woolley, 2022) and that people are not only unprepared but are unrealistic as to the reality of their situations (De Villiers & Roux, 2019; Kim & Hanna, 2015; Lee & Hanna, 2020). Prior to the 2008/2009 financial crisis, participation rates were found to be increasing in defined contribution plans (DC) and Individual Retirement Accounts (IRA's). DB participation rates had fallen below both retirement savings vehicles by 1998 due to the loss of the availability of such plans offered by employers (Copeland, 2009). According to the U.S. Bureau of Labor Statistics (BLS, 2021, March), in March 2021 roughly two-thirds (68%) of private industry employees had access to some type of employer retirement plan with slightly more than half (51%) of those employees participating in the available plan.

Despite the ongoing changing retirement savings landscape, workers have yet to adjust to the shift in responsibility of saving for their own retirement needs. Several risks that were previously absorbed by the employer in traditional defined benefit plans, particularly investment, inflation, and longevity risks have shifted to workers. The National Retirement Risk Index (NRRI) developed by the Center for Retirement Research at Boston College (CRR) used information obtained from SCF to measure the overall risk level of households to maintain

preretirement lifestyles. NRRI analyzed the ability of households to maintain their working life consumption with retirement consumption with every new release of the SCF beginning with the 2004 survey (Munnell et al., 2021). Previous findings were dire in that over half of the households were at risk of not being able to achieve this lifestyle maintenance. Trend analysis of the NRRI further showed that the number had climbed over the past three decades when unprepared households represented around 30% during the 1980's (Ellis et al., 2014). Much of this was attributed to the growing needs of retirement stage income needs and faltering sources of traditional retirement income. The effect of additional income taxation rates on Social Security alone was expected to cut replacement benefits from an estimated 40 percent in 1985 to approximately 31 percent in 2030 (Ellis et al., 2014).

More recent analysis of information by the CRR used the NRRI and data from the SCF 2019 and considered what effect the recent pandemic would likely have reflected had the survey been conducted in 2020 rather than 2019. Of particular interest was the impact of such large job losses that occurred, especially among lower-income workers. Using a combination of various historical and projected variables such as income replacement rates and trend analysis of actual wealth-to-income ratios calculated from all the existing surveys, the CRR calculated that the percentage of at-risk households held relatively steady from the results of the 2016 and beyond surveys, including the post-2019 adjustments. The results were that 50 percent of households were at-risk of failing to maintain their preretirement lifestyle in 2016, 49 percent of households were at-risk in 2019, and 51 percent of households were at-risk when controlling for changes attributed to the pandemic (Munnell et al., 2021).

Objective and subjective assessments of retirement preparedness were found to be an area of concern (Kim & Hanna, 2015). One interesting finding was that those subjects who utilized a

financial planner were more likely to be an “unrealistic optimist” in this particular study, which raised questions about the quality of some financial planning services. In this Kim and Hanna (2015) study, an “unrealistic optimist” objectively had inadequate retirement savings and subjectively considered himself or herself to have an adequate amount of retirement savings. The research added more dimension to the area of study because the roles of experience and cognitive ability were closely examined and indicated a relationship that as a person ages, that subject was more likely to be an “unrealistic optimist.” Discrepancies between perceived conditions and actuality were well illustrated (Kim & Hanna, 2015).

Researchers considered the role of financial literacy when reviewing such inconsistencies between the subjective and objective as has been highlighted by Lusardi and Mitchell for numerous years (Lusardi & Mitchell, 2007; 2009; 2011). In their well-known research conducted for the Financial Industry Regulatory Authority (FINRA), the authors created five simple questions to assess financial literacy levels of the respondents through the 2009 National Financial Capability Study and found that there was a discrepancy between actual and perceived knowledge levels. Much of the analysis from this work resulted in descriptive demographic statistics regarding literacy levels but also included an OLS regression that showed a positive and statistically significant relationship between financial literacy and retirement planning. Three of these questions now appear on recent versions of the SCF.

Smith (2015) reported that one mass effort to educate people on a factor of the retirement scenario was the introduction of the Social Security statement to help workers know details of what credits were earned and understand likely monthly benefits at various retirement ages. The statement was intended for one other important purpose, to raise awareness of the need to save for one’s own retirement when the worker saw the projected monthly benefit (Smith, 2015).

Regardless of this purpose, the monthly payments represented 50% or more of income for over half of those receiving these payments in 2012. In early 2020, an article in Forbes reported that Social Security provided about 12% of recipients with 90% or more of their monthly income, but that the percentage jumps to 42% of households that get at least half of their monthly income from the program (Biggs, 2020). The Social Security Administration hired the Gallup Organization to discover how people were using the statements. It was found that many people were studying the statements and those who were 55 and older were also more likely to keep it with other important papers in order to plan for retirement (Smith, 2015). Beginning in 2017, annual statements are mailed to those individuals who were at least 60 years-old and had not created an online account with Social Security (Smith, 2020). In 2020, approximately 19 million statements were mailed out to workers (Konish, 2021).

These studies all pointed to the need to address the retirement situation in the United States. Some researchers argued that the situation is not as dire as has been presented (Biggs & Schieber, 2015). The authors argued that there are numerous unresolved assumptions even in academic literature, that there remains a lack of consensus on appropriate replacement ratios, and that adjustments should be made for various factors within a household's circumstances such as size of family. They presented an argument that much of the ratios used at the time were really reflecting cyclical effects of the financial crisis such as the decline in the wealth-to-income ratios and that this decline was due to falling values in assets such as housing and stocks that will likely be corrected (Biggs & Schieber, 2015).

However, most of the previously mentioned researchers and policy makers would agree that while the economy is certainly dynamic, the retirement outlook for most families is an area of concern. Most of the afore-mentioned research found that retirement savings and preparation

were lacking. Recognizing that there was much support for addressing the state of retirement in our society, debates on the issue have focused on what actions to take rather than whether a shortfall exists.

Transtheoretical Model (TTM) Research and Applications

Many theoretical frameworks have been applied to retirement research. Because of the relative infancy of the field of personal financial planning as compared to other disciplines, theories are often borrowed from other fields such as economics and psychology. In an analysis of articles published in the *Journal of Financial Counseling and Planning* from 1990 until 2012, it was found that only 39% of the research articles utilized a theoretical framework and of those which did, almost half used an economic framework (Danes & Yang, 2014). One common application has included LCH (Ando & Modigliani, 1963). The choice of this intertemporal theory has addressed the long-term nature of retirement saving patterns. Researchers have created several approaches when using this theory such as considering the number and timing of cash flows and their effects (Kim & Hanna, 2014). As previously addressed, one of the issues associated with the use of the LCH is that it requires an assumption of perfect information and consistency in consumption (Danes & Yang, 2014).

Researchers explored and identified the demographic profile of those who are most likely to engage in retirement savings behavior (Copeland, 2009; Gutter et al., 2007). They reported that the most significant predictors to save for retirement were those households and/or individuals who had higher education levels, greater incomes, and had a white, non-Hispanic head of household. Additional research investigated the possibility of workplace education (Kim et al., 2005). Although TTM was first applied to health issues, applications exist to numerous

financial scenarios including financial counseling (Kerkmann, 1998), financial education (Shockey & Sieling, 2004), and credit card debt behavior (Xiao et al., 2004).

Behavioral economic theories have been applied on a more regular basis because researchers recognized that neoclassical theories do not account for the issues of imperfect information, emotional responses, and the otherwise human condition (Shefrin & Thaler, 1988). Add to that the desire researchers have had regarding providing effective interventions and the neoclassical theories do not include anything because it was assumed that economic units were operating at optimal capacity. In recent decades, researchers have started to defend the use of behavioral economics and judgment and decision-making theories (Knoll, 2010).

TTM was initially utilized in smoking cessation programs (Prochaska & DiClemente, 1983) and quickly applied to other health behaviors. Researchers eventually saw the applicability of TTM to financial behaviors such as financial counseling (Kerkmann, 1998), financial education (Shockey & Seiling, 2004), and consumer debt behavior (Xiao et al., 2004). Though not empirical, Kerkmann postulated not only the stages of change, but cognitive factors such as resistance or hesitation from a partner that would likely be found within those stages. Kerkmann then developed suggestions to counselors of methods to employ to move clients into more advanced stages, thus ready to act. Kerkmann's (1998) research focused on how clients would likely respond in a financial counselor's office and scripted appropriate responses to clients within each stage of change as assessed by the professional. Suggested questions were provided such as asking a person if they were intending to make a certain change within the next 6 months and/or 30 days. Responses to the suggested questions and the attitudes that were reflected were then compared to where a person would lie within the TTM stages of change. For example, if a

person blamed their circumstances on not getting that big break, that person would be assessed to fall within the precontemplation stage (Kerkmann, 1998).

Shockey and Seiling (2004) applied TTM to six specific financial management behaviors that included debt reduction, using a budget, setting financial goals, tracking spending, creating an emergency fund, and saving for a large purchase such as a house or education through participation in the Individual Development Account (IDA) program. These researchers developed original instruments to measure the stages of change based on TTM and classified participants into the appropriate stage for each behavior of interest. There were no instruments developed for any of the other constructs (Shockey & Seiling, 2004).

When applied to increasing savings behaviors among lower income people, a series of four classes were presented to participants spread out over a month. The program was delivered through a credit union and participants could choose to continue within the program for as long as they wished to do so. The increased savings rates showed statistical significance even after only a few classes using an application of TTM. Many participants continued taking the classes for close to two years (Shockey & Seiling, 2004).

Shockey and Seiling (2004) developed original instruments to measure progress in these financial behaviors based on TTM and hypothesized that their adoption will lead to beginning or increasing savings behavior among low wealth participants. The experimental design created four financial literacy classes taught weekly by topic. Participants were assessed prior to the start of the experiment utilizing the Money Management Behavior Scales as developed by the researchers to evaluate readiness to change and be classified into the stages of change. Termination was not identified as a stage of change in this study. Their scale asked questions regarding if participants were currently engaging in each of the behaviors being studied such as

tracking spending. The subjects were also asked if there was any intention of beginning each behavior if the answer was no. Those who were not doing the behavior nor had any intention of doing so were classified as being in the precontemplation stage. Those who had tried to take the action within the past six months, had not been successful, and were planning to try again within the next six months were assigned to the contemplation stage. Those planning to make the necessary change within the next month were considered in the preparation stage. People who had been at least somewhat successful at performing the change for the past 1 – 6 months were considered in the action stage and those who had been at least successful for more than 6 months were classified as in the maintenance stage (Shockey & Seiling, 2004).

Participants answered, “not at all successful, not very successful, somewhat successful, successful, or extremely successful” for all six financial behaviors being examined. The scale was tested for reliability using a 25-person convenient sample, yielding inter-rater reliability coefficients of 1 for all behaviors other than the emergency fund activity, with the emergency fund factor receiving a .98. An expert panel of Extension professionals was assembled and they determined that there was content validity for the scales. Although a curriculum was created, there were no specific references to how the material matched up to the processes of change in this experiment (Shockey & Seiling, 2004).

Using a detailed TTM model, subjects who were experiencing debt problems were recruited to participate in a study seeking to work with participants in the MONEY 2000™ financial education program. MONEY 2000™ was based on TTM and applied by the Cooperative Extension system in about half of the United States. The two-pronged goal was to both increase savings and decrease debt although some participants focused only on one of these goals. Similar to Kerkmann’s (1998) approach, four questions were created in order to determine

which stage of change people within MONEY 2000™ would fall. These asked respondents whether or not they were expecting to change within the given 6 month or 30-day timeframes as was mentioned above, whether they had taken action within the past 6 months, or had solved the problem. Interventions were then designed for those that fell within the various stages of change (Xiao et al., 2004).

MONEY 2000™ included 2,292 participants living in New Jersey and New York who were sent questionnaires for purposes of the specific study to determine the effectiveness of the utilized interventions, or processes of change, within the program against moving people into more advanced stages of change (O'Neill et al., 2000). Of those 2,292 questionnaires sent, the combined response rate was 22.7%. Ultimately there were not many statistically significant relationships found within this effort, but many relationships were considered suggestive of supporting TTM as an effective framework for changing financial behaviors. The cumulative improvement in overall net worth nationwide was estimated as having improved by almost \$20 million by the end of 2000 indicating that the program had results. Xiao et al. (2004) suggested that because of the number of variables used and the relatively small sample size, there was not enough power. This specific study clearly demonstrated the complexity of TTM for consideration when designing a project using this framework and ensuring a large enough sample.

TTM applications have shown improvement in people's financial behavior as measured by both savings and debt reduction behavior in the previous studies despite some of the statistical significance issues. Overall net worth was increased applying TTM in MONEY 2000™ (Xiao et al., 2004) and savings increased in the credit union setting (Shockey & Seiling, 2004). Although these efforts have occurred within contexts that were specifically concerned with people and

their money, more recent attention has been put on financial wellness initiatives in the workplace (Davidson, 2015; Prawitz & Cohart, 2014). Considering that employment is most people's primary source of income and funds, it could be argued that this emphasis is past due when considering a potential solution to the lack of retirement savings behavior with which this research is concerned.

Workplace Interventions

Some research indicated that a vast amount of a company's employees tended to fall into one of three categories (Davidson, 2015). "Uncertain employees" saved enough for retirement but due to fears of the unknown needed additional help to understand what they had and their retirement options. "Underfunded employees" spent more than they saved, were not on track for retirement, and needed an overall guidance program to help them get on track. "Unknowns" do not know whether they are prepared for retirement and needed some intervention in order to get a clear picture of the reality of the situation. Over half of all employees aged 55 or older fell into this category. Employers could develop financial education programs designed specifically for each group and sample assessments showed improvement in responses to questionnaire responses one year later, although there was no statistical analysis shared on these results (Davidson, 2015).

Participation in retirement education showed a positive relationship with the degree of realism on the part of workers (Prawitz & Cohart, 2014). Research was framed within LCH and specific behaviors that increased included the use of budgets resulting in employees consciously smoothing consumption behavior. This resulted in an increase in personal and retirement savings as well as the elimination of debt. The project utilized an employee-needs-driven financial education approach and results were mixed in terms of statistical significance depending on

whether subjects participated in the program or not. The most interesting finding was that those who participated were 1.8 times more likely to develop and use a budget than those who did not (Prawitz & Cohart, 2014).

Prior literature reinforced that retirement planning must be given a more serious effort and attention in order to avoid an impending crisis. Overall, current workers have not been saving enough for this stage of their lives. Many people were unaware of the shortcomings of retirement savings amounts. One common theme throughout the literature was a disparity between subjects' subjective and objective realities as it concerned their retirement readiness. TTM applications have shown increased financial savings and net worth improvements. Workplace interventions have become more commonplace although there appears to be no agreement as to any effective approach or accepted protocol.

Saliency

Lawson and Heckman (2017) examined the issue of subjective life expectancy and its relationship to consumption. These researchers were interested in the influence of retirement saliency on financial behaviors and divided the sample into a) those within 10 years of self-reported retirement age and b) those expecting to retire more than 10 years from the time reported in the 2013 Survey of Consumer Finances (Lawson & Heckman, 2017). The three dependent variables in their research were financial assets, credit card balances, and saving behavior. The researchers found that overall, there existed a significant and positive relationship between retirement life expectancy (RLE) and the likelihood of saving, although this was overall saving and not specifically retirement saving (Lawson & Heckman, 2017). They also found that those with shorter time planning horizons, both short-term and intermediate term, were less likely to save. This would also be consistent with the doer rather than the planner in BLC. For

their secondary analysis comparing those within 10 years of retirement and those further than 10 years from expected retirement, there was no significance in regard to saving behavior and RLE for those nearing retirement. However, for remaining work life expectancy (RWLE), there was a significant and negative association with saving for those approaching retirement (Lawson & Heckman, 2017).

Hanna et al. (2017) queried whether those subjects in the SCF 2013 who responded that they would never retire were doing so because of lack of retirement preparation or an affinity for their career. These researchers expanded upon the Hatcher model which theorized that workers will plan to retire when actual wealth exceeds reservation wealth (Hatcher 1997; 2002; Hanna et al., 2017). Those workers who find satisfaction from their jobs would be expected to have a higher reservation wealth requirement while dissatisfied workers would have a lower threshold of reservation wealth (Hatcher 1997; 2002; Hanna et al. 2017).

Hanna et al. (2017) posited that there would be an expected negative relationship between age and the “never retire” response and chose a maximum age of 60 years for this analysis. Part of their justification for this was the data analysis that showed that there was a rapid decrease in the number of working participants after the age of 60. They did find that those over the age of 48 were less likely to respond “never retire” than those aged 35 – 40 years and that respondents that expected to die by age 70 were much more likely to respond “never retire” (Hanna et al., 2017). Interestingly, they found that in the overall sample, those who spent more than they earned had a lower expected retirement age than those who spent about the same as income (Hanna et al., 2017).

Hanna et al. (2017) queried whether the uncertainty in respondents’ retirement age plan was actually due to either an inability to plan or a lack of sufficient resources. In their final

conclusions, Hanna et al. (2017) felt that “never retire” should be interpreted as “do not know” because of the issues identified as significant in this research. These included whether the participant had a defined benefit plan, perceived having adequate resources for retirement, attained level of education, and expected a substantial inheritance (Hanna et al., 2017). One could argue that while the urgency of saving as one approaches retirement is substantial, there may come a point when people give up because of lack of prior planning.

Prior TTM Process of Change Modeling

Various studies, experiments, and efforts have defined and measured either the stages of change, the processes of change, or other TTM constructs in different manners (Boonrourrut & Fei, 2020; Kerkmann, 1998; Massey et al., 2015; Quartuch et al., 2021; Shockey & Seiling, 2004; Tobe et al., 2021; Xiao et al., 2004; Xiao et al., 2008). Using the SCF 2019 dataset presented challenges when determining intent because the data collected primarily reported behavior and there were very few items that reported any specific feeling, intention, or attitude. Therefore, there was a necessity to determine reasonable and realistic measures of behavior to represent some of the attitudes considered within TTM.

As a starting point, the literature had a few approaches to define and measure either the stages of change, the processes of change, or both. However, much of this was gathered from primary research, allowing the developers to create their own data gathering instruments and ask specifically about motivations, feelings, and attitudes (Boonrourrut & Fei, 2020; Massey et al., 2015; Quartuch et al., 2021; Shockey & Seiling, 2004; Tobe et al., 2021; Xiao et al., 2004). Other literature suggested and/or illustrated methodologies intended to utilize TTM in the approaches through either some type of financial advising (Kerkmann, 1998; Lurtz, 2021) or providing guidance to employers (Xiao et al., 2008). This research reviewed what others have

done specifically to identify processes of change under these circumstances, analyzed commonalities among these efforts, and determined what SCF 2019 items most captured these commonalities based upon the examined literature.

Consciousness Raising

Consciousness raising is capturing someone's attention and awareness to the issue at hand. Boonroungrut and Fei (2020) studied college students in Thailand to determine where students fell in the stages for money management intentions with regard to six of the processes of change. The original number of items was 24 and the final version of their 5-point Likert scale questionnaire consisted of 18 statements that had a range of from .66 for consciousness raising to .84 for self-liberation using Cronbach's alpha (Boonroungrut & Fei, 2020). They attempted to measure research participants' level of consciousness raising through the answers provided to three statements that all involved hearing about or knowledge of money issues regarding money management. None of these statements involved any action or behavior items (Boonroungrut & Fei, 2020).

Massey et al. (2015) were interested in evaluating athletes' psychological performance using TTM. Their final questionnaire consisted of 27 items, five of which were to measure consciousness raising using a Likert scale. Their five statements focused on behavior such as looking for and reading material on mental skills training, thinking about articles, and noticing more media coverage on benefits of sports psychology (Massey et al., 2015). When constructing this questionnaire, researchers applied factorial analysis and removed items from the original questionnaire that did not load less than .30 or greater than .40 (Massey et al., 2015).

Xiao et al. (2004), developed a questionnaire after interviewing 15 clients using the services of a regional Consumer Credit Counseling Services location. After analyzing the data,

questions were then developed to determine final participants' level of the various processes of change. Four statistical tests were conducted to determine indices of fit, resulting in 56 processes of change items being used in the final questionnaire. For consciousness raising, three items were included that were searching for whether the person read, looked for information, or heard about reducing credit card debt (Xiao, et al., 2004). Like Massey et al. (2015), questions to assess consciousness raising were related to behaviors of the participants.

Xiao et al. (2008) created recommendations to employers through a project undertaken by a group of researchers from Personal Finance Employee Education Foundation (PFEEF). The resulting article utilized the processes of change to help employers provide support to employees who were possibly experiencing financial difficulties. The group recommended that employers use consciousness raising through providing more information and suggesting solutions to employees via articles regarding various subject matters related to their possible financial situations (Xiao et al., 2008).

Dramatic Relief

Dramatic relief is experiencing an emotional response to, or empathizing with, the issue. Boonroungrut and Fei (2020) had three items to determine subjects' level of dramatic relief. These statements concerned how hearing about a person overspending affected the subject's mind, whether people who successfully managed their money were role models to each individual subject, and how happy each subject felt when imagining financial success for themselves (Boonroungrut & Fei, 2020). Just as when attempting to measure consciousness raising, these researchers utilized only psychological factors for measuring dramatic relief.

Massey et al. (2015) utilized five items to ascertain dramatic relief. These five statements were primarily concerned with the subjects' state of mind, particularly as it concerned

experiencing feelings of frustration. These frustrations were generally linked to various measures of performance such as how thinking has affected the athletes' performance, failing to live up to the athletes' potential, and recognizing a lack of self-discipline to practice methods to restructure one's way of thinking on these issues (Massey et al., 2015). Xiao et al. (2004) also queried along emotional responses to evaluate dramatic relief. The three questions asked of the subjects of this study concerned feelings of worry and being upset by circumstances of bankruptcy, bill collector activity, and other people's painful debt stories (Xiao et al., 2004).

The guidance provided to employers attempting to apply TTM procedures provided by Xiao et al. (2008) suggested relaying true stories of people who had to continue to work into at least their seventies because of a failure to save sufficiently for retirement. They also recommended having employees take the Personal Financial Wellness scale developed by PFEEF. The thought behind that suggestion was that employees could self-assess their own level of financial distress. The authors noted that this revelation could be a powerful experience for individuals (Xiao et al., 2008).

Environmental Reevaluation

Environmental reevaluation is the ability to recognize that one's behavior affects and/or has an impact on the people most important to that person such as close family members. Boonroungrut and Fei (2020) asked participants to reply to three items about personal realizations to determine environmental reevaluation. They asked subjects whether they realized that it was good for each individual, as well as the effect on those around them, to have more income than they spent. They also queried about levels of any realizations regarding the benefit of saving money and the role of financial planning in enabling them to do so (Boonroungrut & Fei, 2020). Massey et al. (2015) did not have any questions designed to capture environmental

reevaluation while Xiao et al. (2004) asked participants how often they realize they would be a good example to others by getting out of credit card debt. They also asked subjects how often they thought society would be better off with less debt and other loved ones would feel a sense of relief on the subject's behalf if the credit card debt was eliminated (Xiao et al., 2004). Massey et al. (2015) eliminated items related to environmental reevaluation due to validity testing issues with the original version of the scale.

The recommendation made by the PFEEF initiative recommended that employers help employees realize that their individual behavior, both negative and positive, did have an impact on their family, friends, and loved ones. The researchers recommended that the employer find a way to get the employees to ponder the effect of personal actions on those around them. They suggested that the employer provide a means for employees to realize that both positive and negative financial actions and decisions do help determine the level of financial security that others who are financially dependent upon those employees experience. Employers should try to help employees recognize the impact of their actions on significant others in their lives (Xiao et al., 2008).

Self-Reevaluation

Self-reevaluation is the ability of a person to recognize differing outcomes based upon individual actions that the person chooses. Boonrourrut and Fei (2020) developed three items to detect the level of self-reevaluation. The statements asserted whether the person felt good being known as a person who was good with money and whether they felt bad if either they were in debt or perceived as an extravagant person (Boonrourrut & Fei, 2020). Neither Massey et al. (2015) nor Xiao et al. (2004) had questions regarding identifying self-reevaluation. Self-reevaluation was another item area that was removed from Massey et al. (2015) due to item

validity issues. No reason was cited for the lack of a measurement item for self-reevaluation in the Xiao et al. (2004) study. Xiao et al. (2008) suggested that employers introduce numerous things to encourage self-reevaluation. It was suggested that the employer introduce the idea that how one viewed oneself when overcoming obstacles could be empowering although it could require some self-honesty to recognize current behavior patterns and some effort to make the worthwhile changes (Xiao et al., 2008).

Self-Liberation

Self-liberation is the belief that the person can make the change and may include a firm commitment or recommitment to making the change. Boonroungrat and Fei (2020) queried about whether the participants began to consider financial planning, were starting to set short-term savings goals, and/or started to have confidence on the subjects' ability to develop a good financial plan to assess self-liberation. Massey et al. (2015) presented three items asking whether the athlete was committing to engage in mental training and mental skills. Xiao et al. (2004) had three items for self-liberation that asked how often participants engaged in goal setting to help with eliminating credit card debt, how often participants promised themselves that they were willing to do the necessary work, and how often they engaged in self-talk reinforcing the commitment to rid themselves of credit card debt. Employers were encouraged to have employees make firm commitments to addressing their financial problems by taking smaller steps to build confidence and to create a plan (Xiao et al., 2008).

Counterconditioning

Counterconditioning involves finding appropriate substitute behaviors. Boonroungrat and Fei (2020) did not provide any items to attempt to measure counterconditioning. Boonroungrat and Fei (2020) only provided measures for six constructs in total. The only remaining construct

measured was social liberation, which according to the original model, underlies the entire portion of the model that includes all stages of change and processes of change (Prochaska & DiClemente, 1983) and will be revisited in the appropriate section.

Massey et al. (2015) used four items to measure counterconditioning that included rating trying to enjoy viewing mental skills training, incorporating these skills as part of one's preparation routine, seeing it as helpful in goal attainment rather than a chore, and realizing it is to enhance strengths rather than a remedial activity. Xiao et al. (2004) asked participants three questions regarding how often they told themselves it would be worth it to get out of debt whenever feeling the stress of it, remembering the benefits of a debt-free life whenever feeling discouraged, and frequency of pushing away negative thoughts regarding getting rid of the debt. Xiao et al. (2008) recommended that employers suggest alternatives to employees such as checking books out of the library rather than buying books or having automatic payroll deduction for retirement savings.

Helping Relationships

Helping relationships are trusted personal relationships with another human being that facilitate the necessary change. Massey et al. (2015) utilized three items to measure helping relationships that dealt with whether the athlete could be open with at least one person with individual struggles, had someone who would listen when needing to vent, and had someone to depend on when struggling. Xiao et al. (2004) asked three questions regarding how often there were people they could turn to for advice, how often they realized there were others who had also overcome debt that they could talk to about it, and how often they realized that there were others that they could call who had experienced the same struggles. Xiao et al. (2008) suggested

that employers encourage employees to find supportive people to connect with and to provide accountability for behaviors.

Reinforcement Management

Reinforcement management is adequate backup planning as well as the existence of negative and/or positive reinforcement mechanisms. Massey et al. (2015) had three items to measure reinforcement management that dealt with feelings associated with the reinforcement of winning, feelings of accomplishment when having played as well in practice as in games, and beating rivals that used to defeat the athlete. Xiao et al. (2004) asked three questions regarding how often family and friends encouraged behavior to eliminate credit card debt, how often the person told themselves they could accomplish the goal, and how often the person found the effort used to overcome the debt a rewarding experience. Xiao et al. (2008) recommended that employers encourage employees to find inexpensive ways to celebrate successes whenever they make progress on their goals.

Stimulus Control

Stimulus control is the removal of triggers for negative behaviors and the addition of prompts for positive behaviors. Massey et al. (2015) presented four statements to their athletes in their effort to measure stimulus control. These statements dealt with about whether the athlete kept things in the facility or house – as two separate statements – to remind them of their new efforts and skills, setting an alarm to remind them to work on their mental skills, and working on their mental skills upon awakening rather than letting the day get away from them. Xiao et al. (2004) had no questions regarding stimulus control nor any reason cited for having none. Xiao et al. (2008) directed employers to suggest to employees to remove shopping cues such as not to watch the shopping channel or not to take credit cards when shopping. They also suggested that

employers encourage employees to add reminders to keep them on track such as making lists, tracking debt elimination progress, and participating in employer financial education classes (Xiao et al., 2008). As stated within the limitations in Chapter 1, because of the shortage of both survey items within the SCF 2019 to accurately capture this concept as well as the literature in prior research, stimulus control was not modeled in this research.

Social Liberation

Social liberation is the increased level of opportunities and knowledge, sources of information, and resource availability. It is expected that as a person masters the challenge area and moves through the stages, social liberation increases. This was the final construct that Boonrourrut and Fei (2020) developed items to measure. The three items these researchers posed were whether students had found role models, another peer that was good at financial planning, and realized that other people of all ages do not spend more than money than they have (Boonrourrut & Fei, 2020). Massey et al. (2015) had no items regarding social liberation. Xiao et al. (2004) asked three questions that included how often subjects noticed that agencies were willing to help, how often they noticed that there were resources available to help, and how often they noticed ads for debt consolidation services. Xiao et al. (2008) told employers to recognize the paradigm shift to support healthy behaviors and for them to remind employees of the financial freedom and positive feelings that accompany practicing good financial behaviors.

In addition to social liberation underlying the entire model of both the stages of change and the processes of change lie the additional constructs of decisional balance and the spectrum of temptation and self-efficacy. As discussed earlier, these three tenets of the model are present regardless of where one lies within the stages and processes of change. It is expected that as one makes progress there are more options, knowledge, and resources as measured by social

liberation. Decisional balance is the constant cost-benefit analysis that presumably favors the benefit portion of the analysis as one continues to make the change. And it is also assumed that as one masters the change, temptation fades as self-efficacy builds (Prochaska & DiClemente, 1983).

Decisional Balance

Of the supporting research efforts used to examine measurement efforts for this project, only Xiao et al. (2004) provided any structure to consider the concept of decisional balance. They asked participants to rate their reaction to four “pros” statements that stated that “getting rid of credit card debt would”....increase feelings of self-esteem, increase family’s financial security, decrease stress levels, and provide a good example for others. The “cons” statements were “getting rid of credit card debt may”...not allow the person to keep up with the trends, may create a tense home environment, may cause individual unhappiness within the household, and may cause lost family entertainment opportunities (Xiao et al., 2004).

Temptation/Self-efficacy

Xiao et al. (2004) measured subjects’ “confidence” on certain situations for this construct regarding whether there was a car breakdown, an illness, holiday season, feelings of stress, a change in one’s financial situation, or it was taking longer than what was expected to eliminate the person’s credit card debt. It was unclear exactly how the survey items were specifically worded but was assumed that subjects were responding to how confident they felt that they would not use their credit cards under these various scenarios. That would accurately reflect the spectrum that one end is temptation and the other self-efficacy. Massey et al. (2015) constructed a five-item scale to measure subjects’ confidence level on their ability to apply psychological skills and improve their athletic performance. It is within the temptation/self-efficacy construct

that the tenets of BLC and saliency could be easily combined to more comprehensively examine this concept. Therefore, this research delved more deeply into the roles of the doer versus the planner, mental accounting and framing, and the saliency of upcoming retirement and their impacts on the role of temptation and self-efficacy within the TTM model.

Behavioral Life Cycle Hypothesis (BLC) Modeling Concepts

Dalton Education materials used material developed by Dr. William Droms from the McDonough School of Business at Georgetown University to explain risk tolerance and asset allocation in their Investment Planning textbook (Dalton & Forjan, 2022). Droms developed the Global Portfolio Allocation Scoring System (PASS) to provide a systematic approach to match time horizons to risk tolerance levels while building asset allocations within portfolios (Droms, 1994). The PASS system defined short-term as three years or less. This research used this definition to determine respondents' financial time orientation to budgeting their saving and spending when defining doers versus planners within the BLC framework (Shefrin & Thaler, 1988).

Shefrin and Thaler (1988) specifically discussed the concept that depending on which mental account people put home equity, current assets or future assets, it would be likely that those who consider it a part of current assets would take out a home equity loan while those who consider it a part of future assets would be unlikely to tap into that home equity. There are two questions in the SCF 2019 that ask how spending would change based on if the value of assets were to increase or decrease. This would be a good proxy to identify how each respondent applies mental accounting to the value of their assets. This will be further discussed in the methods section as will the modeling of examining what role, if any, the saliency of those approaching retirement plays in the likelihood of saving for retirement. Shefrin and Thaler

(1988) also specifically said that as people approach retirement age, willpower is less costly. One would postulate that this would be indicative of the likelihood of saving for retirement as one approaches retirement.

Research Questions

- 1) Is there a difference in retirement savings behavior between those people who demonstrate precontemplation, contemplation, or preparation *cognitive factors* and those people who demonstrate action and maintenance *cognitive factors*?
- 2) Is there a difference in retirement savings behavior between those people who demonstrate precontemplation, contemplation, or preparation *behaviors* and those people who demonstrate action and maintenance *behaviors*?
- 3) Is there a difference in retirement savings behavior between those people who indicate a shorter general financial planning time orientation and those people who indicate a longer general financial planning time orientation?
- 4) Is there a difference in retirement savings behavior between those people who maintain current spending behaviors when the value of their assets increase and those people who change their spending behavior when the value of their assets increase?
- 5) Is there a difference in retirement savings behavior between those people who maintain current spending behaviors when the value of their assets decrease and those people who change their spending behavior when the value of their assets decrease?
- 6) Is there a difference in retirement savings behavior between those people who are within 10 years of retirement and those who are not within 10 years of retirement?

Summary

The intent of this research was to combine the areas of financial behaviors and expectations of current workers utilizing both the TTM and BLC to explain and predict whether a person does or does not actively save for retirement. There are 12 constructs within the TTM model. Of the first 10 constructs discussed, Xiao et al. (2004) specifically defined five of these as experiential and five as behavioral. They define consciousness raising, dramatic relief, environmental reevaluation, self-reevaluation, and social liberation as experiential. They define self-liberation, counter conditioning, stimulus control, reinforcement management, and helping relationships as behavioral (Xiao et al., 2004). This research looked to these definitions for guidance as closely as possible to determine appropriate items to measure the processes of change within the operationalized model of this dissertation, including the decision to eliminate stimulus control. However, because of the limitations in the SCF 2019 response items, the final division of survey items into behavioral or cognitive factors had to be driven by what was available. The designation of “cognitive factors” was chosen as the most all-encompassing terminology for the various personal composition of thoughts, emotions, attitudes, and knowledge that was represented in the survey items that were not behaviors.

Three main psychological constructs were introduced by blending in BLC. These were self-control versus temptation, mental accounting, and framing. Self-control versus temptation in BLC brought the underlying concepts of both the planner and the doer within BLC as well as the self-efficacy and temptation spectrum within TTM to the forefront. Examining the saliency issue of being within 10 years of retirement is a more nuanced analysis of the doer and the planner. Mental accounting is closely aligned with framing within the concept because both are reflective of how people view assets. There is not enough nuance in the data to sufficiently differentiate the

perceptive differences between these two concepts. These constructs will be further considered using appropriate questions within the 2019 SCF that best addresses each of these constructs as discussed in the following chapter.

Chapter 3 - Methodology

Brief Overview

As stated earlier, this research sought to examine and identify predictors of retirement savings behavior within the 2019 Survey of Consumer Finances dataset and consider potential interventions tailored to an individual's life cycle based upon theory. The theoretical frameworks included both the use of the Transtheoretical Model (TTM) and the Behavioral Life Cycle Hypothesis (BLC) to examine the identification of factors contributing to the likelihood of retirement savings behaviors within individual life cycles and various financial psychological viewpoints. Using a blended approach utilizing the perspectives of both frameworks, this research contemplated and suggested possible effective interventions customized to the individual audiences, dependent upon where one belonged in the life cycle, particularly as it pertained to retirement saliency.

Design of the Study and Methods

Hypotheses

The first set of hypotheses correlate with the initial portion of the study regarding predictor variables to determine whether a person was saving for retirement specifically using TTM principals.

H1: People who demonstrate TTM action and maintenance *cognitive factors* will have greater odds of saving for retirement than people who demonstrate TTM precontemplation, contemplation and preparation *cognitive factors*.

H2: People who demonstrate TTM action and maintenance *behaviors* will have greater odds of saving for retirement than people who demonstrate TTM precontemplation, contemplation and preparation *behaviors*.

The focus of this paper was on the previous TTM considerations. However, there was a second set of hypotheses that explored the relationship between retirement savings behavior and the tenets of BLC.

H3: People who indicate a short-term financial planning horizon will have less odds of saving for retirement than people who indicate a longer-term financial planning horizon.

H4: People who don't change their spending when the value of their assets increase will have greater odds of saving for retirement than people who do change their spending habits when the value of their assets increase.

H5: People who don't change their spending when the value of their assets decrease will have greater odds of saving for retirement than people who do change their spending habits when the value of their assets decrease.

H6: People who are within 10 years of retirement will have greater odds of saving for retirement than people who are not within 10 years of retirement.

Description of the Data Collection Method

Description of the Data Collection Method

According to Bhutta et al. (2020), the SCF is a triennial cross-sectional voluntary survey administered by the Federal Reserve Board in cooperation with the Department of the Treasury. Although random sampling methods were applied, wealthier citizens were oversampled in an effort to discover nuances in the financial behavior of those in the higher socioeconomic

households. Subjects were interviewed either in person or on the telephone. The person responding was known as the respondent. Lindamood and Hanna (2005; 2006) reported that interviewers were trained to identify the most financially literate person in the household and to rely on that person's responses for the survey.

Sampling Procedures

Two unique methods used in each SCF are multiple imputation, also known as imputates, and weighting of multivariate analyses. The multiple imputates are a series of five projected values generated for each missing value within the dataset. This method addresses issues associated with missing values. Weighting is used to mitigate the bias of the oversampling of wealthier households. Weighting allows findings to be generalized to the overall population. The reference person is automatically the male in heterosexual couples and the older partner in same sex couples. This approach causes the reported gender within the dataset to skew heavily male. The respondent may or may not have been the reference person. A few other possible issues are race, age of the significant other, and reconciling the number of significant other status to the number of those reported married in marital status category. Race was only recorded for the respondent and did not account for the possibility of interracial households (Lindamood et al. 2007).

The main issue with the age of the significant other in the sample was that the only age category was based on whether the significant other was included within the primary economic unit, causing the significant other number to differ by 32 more individuals in all other categories. And, finally, because some of the households with a significant other were not married, attempting to reconcile other descriptive categories with the numbers reported for marital status could not be accomplished. Additionally, this issue with the presence or lack of a significant

other was that SAS reported the percentages based on households, not significant others. This resulted in having a large percentage (35.09%) of the partner category represented as no significant other in the descriptive statistics, creating challenges in grasping some tendencies in this group of significant others when reviewing data. This issue should be kept in mind when analyzing the reported composition of significant others in the sample. When discussing the percentages, it is always in terms of the reference person's household.

The multiple imputation process employed by the SCF counts all respondents five times in a statistical method that smooths out and corrects for missing responses. It was important to adjust for this in the coding so that the correct number of respondents were recognized. This methodology sometimes results in SAS reporting descriptive characteristics in numbers not divisible by 5 therefore causing some rounding issues that may slightly skew these reports in such a way that reporting the number of respondents within the categories may occasionally add up to 99.9% or 100.1%. Additionally, because the SCF oversamples for wealthier households, it is important to use weighting when using the SCF. Most researchers who recognize this issue will run analyses both weighted and unweighted to check for differences and was done with this analysis.

Description of the Sample

There were 5,777 public record respondents in the SCF 2019 (Bhutta et al. 2020). This study was most interested in the pre-retirement issues of predicting and encouraging savings behavior for retirement. Therefore, households that this project considered fully retired were removed from the sample. To determine fully retired households took some maneuvering to account accurately for the remaining households that were not married but had a significant other. As such, numbers and responses from the self-reported health status were paired with the

retirement status of all respondents to identify households that had a single person household and retired and households that were counted as including a significant other and retired. Those reference people without a significant other who reported being retired ($n = 491$) and those households with partners where both people identified as being retired were then removed ($n = 413$). These remaining households accounted for 4,873 public record respondents, suggesting that this dataset would provide a sufficient number of subjects to provide reliable regression models with enough power. However, there were five additional households that were eliminated through the coding process due to fact that the household's total assets appeared as a negative number because of negative values associated with various business ownership situations. This left a final sample size of 4,868.

There were several questions that appear to closely measure the desired information other than for stimulus control that was removed from the model as was discussed previously. For example, a query regarding how the respondent viewed the economic outlook over the next five years was asked and could be used to measure dramatic relief. TTM consists of 12 specific constructs that are attached to the processes of change between the stages of change and the underlying constructs, 11 with the removal of stimulus control. The potential weakness of this dataset is that there were few questions that assessed intentions. The stages of change required consolidation into savers and those who did not save because there was no way to clearly assess what the person was thinking in terms of being in the specific stages of precontemplation, contemplation, preparation, action, or maintenance.

Operationalization of Concepts

Dependent Variable

The dependent variable for the proposed hypotheses in this project was a dichotomous outcome, either “saving” or “not saving” for retirement. Although the dependent variable was simply *yes* or *no*, much rigor was introduced to the model when accounting for the complexity of the topic and the theoretical frameworks that were used in this research. Both categorical and continuous independent variables were used in the quantitative analysis, attempting to discover more accurate predictors to increase and encourage the likelihood of people of all life cycles and lifestyles to save sufficiently for retirement. According to the initial review of the dataset, 61.80% of households in the sample had some sort of retirement plan. These plans were a combination of personally held IRA and Keough accounts and employment related retirement accounts.

Retirement accounts included employment defined contribution plans, defined benefit plans, and any individual retirement plan owned respondents. Defined benefit plans were included in counting a household as saving because many active respondents in this sample were self-employed and had the ability to create traditional pension plans. There were no questions that specifically divided this population out of the sample and benefit payments may not be substantial enough to provide for one’s entire retirement income for some. Further analysis of these data will provide statistical backing for the identification of respondents’ stage of change and suggestions of effective retirement interventions utilizing the processes of change within the TTM and BLC frameworks. In the final analysis, this research project will investigate consolidated constructs within TTM as can be extrapolated from the SCF 2019, as well as contributing factors from BLC.

Independent Variables – TTM

Consciousness Raising. The first process of change within TTM is consciousness raising. This is referring to whether a person is aware of the existence of the problem. Within the 2019 SCF, respondents were asked whether they used sources of information when making decisions about savings and investment. Those who indicated that the household did not seek additional information on saving and investment were scored as not displaying behavior of consciousness raising. Anyone who did seek out information on savings and investment was assigned the status of displaying consciousness raising behavior. The choice of this item is consistent with the types of items prior research efforts used to measure consciousness raising and specifically targeted whether participants sought out additional information on savings and investment. Xiao et al. (2004) defined it as “finding and learning new facts, ideas, and tips” that help support positive changes about the area of concern.

Dramatic Relief. Dramatic relief is when a person’s emotions are triggered in some respect regarding the issue at hand. Xiao et al. (2004) specifically defined it as “experiencing negative emotions” when dealing with the issue. One of the questions included in the 2019 SCF asked about the respondent’s five-year economic outlook. The question read, “I’d like to start this interview by asking you about your expectations for the future. Over the next five years, do you expect the U.S. economy as a whole to perform better, worse, or about the same as it has over the past five years?” The possible responses are “Better,” “Worse,” or “About the same.”

Although this question did not delve into an emotional aspect, it still asked the respondent to share his or her own perspective. The assumption for this research was that people answered such questions from a micro perspective as the economy related to their own personal financial situation. “Better” responses would be less likely to feel pressure to save based on

feelings of optimism and less of a sense of urgency. Additionally, those who responded “better” were not demonstrating negative emotions as should be present according to Xiao et al. (2004). Those who responded “About the same” would likely not feel pressure to save because that is a neutral response that equated no emotion regarding future economic conditions. Those who responded “worse” would score as displaying dramatic relief as it appeared to be the most likely response to measure those who were experiencing some level of worry about their economic future. Both other responses were considered as not displaying a cognitive factor of dramatic relief.

Environmental Reevaluation. Environmental reevaluation is considered to occur when a person can see that his or her own behavior has an impact on other people in his or her own personal circle of friends and family. Because life insurance is a financial product that is purchased specifically to provide for those who are financially dependent and left behind after the death of the insured, it was first considered to use the SCF 2019 question, “Do you have any life insurance? Please include individual and group policies, but not accident insurance” to measure this construct. Answers of no life insurance would have indicated a lack of awareness of the wellbeing of others because life insurance is a product that is purchased as a way to protect those who financially depend upon the insured. However, the SCF 2019 did not differentiate between making the choice to purchase life insurance or solely receiving it as an employee benefit. In an analysis of 2023 life insurance trends, it was reported that about 52% of adults have life insurance from a combination of private policies and employer provided policies (Crail, 2023). This same article reported that the percentage of covered adults from private policies dropped to roughly 33%.

Additionally, some people either have no one who is financially dependent upon them or they are financially strong enough to be self-insured. Therefore, a question that asked, “Some people think it is important to leave an estate or inheritance to their surviving heirs, while others don’t. Which is closer to your (and your (husband/wife/partner/spouse)’s feelings? Would you say it is very important, important, somewhat important, or not important?” was used as the measure for this construct. In addition to the available listed responses, the respondent could also answer, “R and SP/Partner differ.” Those who answered other than very important or important were considered not to demonstrate a cognitive factor of environmental re-evaluation, otherwise the person was considered to display a cognitive factor of environmental re-evaluation.

Self-Reevaluation. Self-reevaluation is determined by whether a person can see different outcomes based on behavior and/or can compare his or her own situation to that of others. Even in prior research there were few items presented to measure specifically the construct of self-reevaluation. There were also few questions that specifically appeared to measure this concept within the SCF 2019. However, the SCF 2019 had two questions that asked first, “In the next five to ten years, are there any foreseeable major expenses that you (and your family) expect to have to pay for (yourself/yourselves), such as educational expenses, purchase of a new home, health care costs, support to other family members, or anything else?” The available responses were either yes or no. The survey then asked, “Are you saving for these/this expense now?” Respondents could answer “Yes,” “No,” “Already saved for it,” or “Inappropriate – (no expected major expenses).”

For those people who responded “No” to expecting to have any large expenses in the next five to ten years, this would be highly unlikely. In 2020, information from the Federal Reserve estimated that there was a 31.8% chance that an unexpected expense of at least \$2,000 would

arise for the average American within the next month (Bieber, 2021). Given this information regarding unexpected expenses on such a short time horizon, it's likely that people were deceiving themselves if they did not believe they would have a significant expense over a more intermediate time horizon. Therefore, people who responded that they did not have an upcoming expense and those who expected an expense but had not saved toward that expense were assigned a status of not displaying a behavior of self-reevaluation. Those who not only anticipated upcoming expenses but were either saving already or had completed the savings goal were considered as demonstrating self-reevaluation behavior.

Self-Liberation. Self-liberation is recognized as whether a person believes that he or she has the capacity to make the change required to solve the problem and is similar to self-confidence or the traditional definition of self-efficacy. Starting with the SCF 2019, questions were added to gauge subjective and objective financial knowledge measures of respondents. To address the self-liberation construct, this study used the subjective knowledge question, "Some people are very knowledgeable about personal finances, while others are less knowledgeable about personal finances. On a scale from zero to ten, where zero is not at all knowledgeable and ten is very knowledgeable, what number would you and your spouse/partner be on the scale?" It was expected that the self-assigned confidence level was a good indicator of believing that any behaviors needed to accomplish the desired end result would occur. Additionally, self-liberation is the process of change that operates as the transitional impetus from not saving to saving in TTM. Households responding less than seven were scored as not displaying self-liberation, primarily because this score would not be high. Self-ratings of seven or more were assigned a status of displaying a self-liberation cognitive factor.

Counterconditioning. Counterconditioning is substituting alternative behaviors. This construct was more difficult to measure with the available responses than the others and presented some limitations. However, because money is either spent or saved, substitution was defined as saving rather than spending. This definition fit nicely with traditional economic theory and could be measured using the response to the question of, “Over the past year, would you say that your (family’s) spending exceeded your (family’s) income, that it was about the same as your income, or that you spent less than your income?” It was assumed that those who spent less than their income would be more likely to be “saving” for retirement, therefore demonstrating counterconditioning behavior. Households who spent more than or the same as income were considered not displaying counterconditioning behavior.

Helping Relationships. Helping relationships are those that are trusted and somewhat paternalistic. Xiao et al. (2004) defined it as “seeking and using social support” for help with the problem. Massey et al. (2015) inquired specifically whether there were people the athlete could talk to for support. Therefore, this research looked to identify those participants who sought advice from a known and trusted person or group of people rather than from media sources or other resources that were not human. The SCF 2019 item that determined the answer to whether someone had support for making savings and investment decisions stated it similarly for the in-person version and the phone version of the survey. Respondents were asked what sources of information the respondent used, “to make decisions about saving and investments. Do you call around, read newspapers, magazines, material you get in the mail, use information from television, radio, the Internet or advertisements? Do you get advice from a friend, relative, lawyer, banker, broker, or financial planner? Or do you do something else?” The possible answers that included interacting with at least one other human being include “Call around,”

“Friend/relative,” “Lawyer,” “Accountant,” “Banker,” “Broker,” “Financial planner,” “Spouse/Partner,” “Material from work/business contacts,” “Investment club,” “Investment seminars,” “Store; dealer,” “Insurance agent,” “Other institutional source (e.g., college, social service agency, etc.),” and “Telemarketer.” Because the definition of helping relationships deals with trusted sources, investment seminars were eliminated due to the sales objective of these seminars. Additionally, the answers “Call around,” “Store; dealer” and “Telemarketer” were eliminated because it would be unlikely that those sources would be a close trusted associate of any kind. Any respondent that did not indicate a trusted human source of support was assigned a not displaying helping relationships behavior status and those who did indicate such a resource was assigned a displaying helping relationship behavior status.

Reinforcement Management. Reinforcement management is anything that involves having back up plans or has positive or negative consequences for behaviors that do or do not happen. The SCF 2019 question that most measured this was, “Does your employer/the business make contributions to this plan?” Employers who contributed to retirement plans were considered as providing reinforcement management to employees as employees must usually first contribute to receive the employer match. Because it was clearly not a behavior on the part of the household and it was a piece of knowledge, it was included in cognitive factors. Households without an employer match were considered as not displaying a reinforcement management cognitive factor and those with an employer match were considered as having a reinforcement management cognitive factor.

Social Liberation. Social liberation is a person’s increased opportunities, knowledge, and alternatives. It is expected that as a person continues to make progress, he or she becomes more competent and knowledgeable. Therefore, it was expected that a more experienced and

knowledgeable person would have a good score on the objective financial knowledge questions within the SCF 2019. The survey reads, “The next three questions are about your opinion on money and investments.” The first question was stated, “Do you think that the following statement is true or false: a single company’s stock usually provides a safer return than a stock mutual fund?” The responses were either, “True, False, Don’t know, or Refused.” The second question read, “Suppose you had \$100 in a savings account and the interest 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: more than \$102, exactly \$102, or less than \$102?” Respondents could also answer, “Don’t know or refused.” The third question asked, “Imagine that the interest rate on your savings account was 1% per year and inflation was 2% per year. After 1 year, would you be able to buy more than today, exactly the same as today, or less than today with the money in this account?” Respondents could also be coded, “Don’t know or refused.” Based on the simplicity of the three questions, it was decided to require a correct answer to all three questions for a respondent to be considered displaying a social liberation cognitive factor.

Decisional Balance. Decisional balance occurs when people weigh the pros and cons of the behavior change. For this construct the SCF 2019 question used read, “If tomorrow you experienced a financial emergency that left you unable to pay all of your bills, how would you deal with it?” The response is expected to provide insight into how important savings in general are to the respondent based on the response. Choices are to “borrow money, spend out of savings/investments, postpone payments, cut back, work more/get extra job, or other.” Any answer other than “spend out of savings/investments” would be considered to indicate a likelihood of the household that “saves” for retirement and assigned a designation of

demonstrating decisional balance. People who spent out of savings/investments were scored as not displaying a behavior of decisional balance.

Temptation and Self-Efficacy. Temptation and self-efficacy are two different ends of a spectrum. At the one end is the loss of control causing the person to give into temptation and at the other is self-confidence that a person can handle situations without reverting into old behaviors. There were no questions that specifically measured a devolution of behaviors in the SCF 2019. This construct was best represented by the SCF 2019 question that read, “People have many different reasons for borrowing money which they pay back over a period of time. For each of the reasons I read, please tell me whether you feel it is all right for someone like yourself to borrow money...” The one item that most easily could be seen as a completely unnecessary expense was “the expenses of a vacation trip.” All other items had some feasibility of being necessary and were concerned with covering basic living expenses when income was cut, purchasing a car, or borrowing for education expenses. Those who thought it was acceptable to borrow money for a vacation that was paid back over time were considered as showing a temptation cognitive factor that was not self-efficacy and those who thought it was not acceptable were considered instead to be demonstrating self-efficacy.

From these TTM individual independent variables, cognitive factors consisted of the chosen items for dramatic relief, environmental reevaluation, self-liberation, reinforcement management, social liberation, and temptation/self-efficacy. Anything that was not a behavior but reflected a cognitive component such as a belief, intention, or measurable knowledge were labeled as cognitive factors. See Table 3.1. below for the list of cognitive factors and how they were determined.

Table 3.1.*List of TTM Cognitive Factors (N = 4,868)*

Cognitive Factors	Survey Item	Present if Answered
Dramatic Relief	5-year economic outlook	Worse
Environmental Reevaluation	Important to leave inheritance	Very important or important
Self-Liberation	Subjective financial knowledge score	Score of 7 or more
Reinforcement Management	Employer contributes to retirement account	Yes
Social Liberation	Objective financial knowledge score	Score of 3
Temptation/Self-Efficacy	Acceptable to borrow for vacation expenses	No (for Self-Efficacy)

Scores were then created to delineate the designation of people who demonstrated the cognitive factors associated with early stages leading up to making the desired change of precontemplation, contemplation and preparation or the later stages after making the desired change of action and maintenance cognitive factors and behaviors. Recall that the cognitive factors determination modeled dramatic relief and environmental reevaluation that are processes of change within the precontemplation stage into the contemplation stage. Self-liberation is the process of change from the preparation stage to the action stage, taking a person from the nonaction stages to the action stages. Reinforcement management is present in the transition from the action to the maintenance stages in the TTM model. Recall also that it is expected that as a person becomes more attuned to the desired change that person will display more social liberation and demonstrate self-efficacy instead of temptation. Because of these positions within the processes of change and the modeling of the underlying constructs of social liberation and

self-efficacy, it was decided that from these six possible cognitive factors, those households that answered as demonstrating cognitive factors in four or more were considered to display action and maintenance cognitive factors. Otherwise precontemplation, contemplation, or preparation cognitive factors were assumed for purposes of assigning these groups. This process was not based on being on a scale as the processes of change are independent of one another.

Behaviors consisted of the chosen items for consciousness raising, self-reevaluation, counterconditioning, helping relationships, and decisional balance. See Table 3.2. below for the list of behaviors and how they were determined.

Table 3.2.*List of TTM Behaviors (N = 4,868)*

Behaviors	Survey Item	Present if Answered
Consciousness Raising	Savings information seeking	Seeks a source of outside information
Self-Reevaluation	Recognize and saving for future expenses	Expected expense and saving or saved for it
Counterconditioning	Spending income	Spend less than earn
Helping Relationships	Source of information for savings and investment	Uses trusted human relationship including friend or relative, lawyer, accountant, banker, broker, financial planner, spouse or partner, material from work or business partner, investment club, insurance agent, or other institutional source.
Decisional Balance	What would do for emergency	Any answer other than take from savings/investments

The behavior variables were consciousness raising, self-reevaluation, counterconditioning, helping relationships, and decisional balance. For the scoring on behaviors, households who scored at least four behaviors were assumed to be demonstrating action or maintenance behaviors. This was determined because consciousness raising and self-reevaluation were both processes of change that moved people within the precontemplation, contemplation, and preparation stages. For the more accomplished respondent with this change model, decisional balance should demonstrate actions that reflect recognition that the pros outweigh the cons of saving. The remaining two constructs were counterconditioning and helping

relationships, falling in the action and maintenance stages. Respondents were considered to be demonstrating in the precontemplation, contemplation, or preparation stages with a score of less than four behaviors. Again, this process was simply looking for the presence or absence of these behaviors and the process of designating whether a household demonstrated behaviors falling into either the precontemplation, contemplation, or preparation stages or the action and maintenance stages and was not a scale but was more like an index although other SCF years were not compared in this study.

It is important to strongly emphasize that this process was simply looking for the presence or absence of these cognitive factors and the determination process was not a scale. It would be much more accurate to think of these items as a checklist of possibilities. As illustrated in Table 3.1 above, every cognitive factor had a determinative outcome of whether the construct was demonstrated or not and what outcome would be associated with which grouping. The same circumstances were true for the designation of behaviors in Table 3.2 above. Therefore, if a person did not demonstrate the presence of dramatic relief and environmental reevaluation but did demonstrate the remaining constructs when considering cognitive factors, the assignment of that person into demonstrating action or maintenance cognitive factors would still be accurate because of the number of cognitive factors that were present. This would be despite the fact that dramatic relief and environmental reevaluation are contained within the earliest stages and the others within this checklist of cognitive factors are associated with later stages of the TTM model. These assumptions were further investigated during correlation testing to be discussed in a later section. See Table 3.3. below for cognitive factors and designation results.

Table 3.3.*Independent Variables – TTM Cognitive Factors Present (N = 4,868)*

Variable	Percent
Dramatic relief	27.20
Environmental Reevaluation	55.76
Self-Liberation	69.35
Reinforcement management	36.20
Social liberation	52.36
Self-Efficacy (side of spectrum)	87.56
Results of scoring – TTM cognitive factors	
Precontemplation/Contemplation/Preparation	55.85
Action/Maintenance	44.15

As was the case with the cognitive factors above, the same parameters and assumptions should be applied to behaviors. The implemented scoring system was not a scale and was simply a process of looking for the presence or absence of behaviors that were reflective of what would be expected of someone demonstrating either the early stages of the TTM model or the later stages of action or maintenance in the model. See Table 3.4. below for behaviors and designation results.

Table 3.4.*Independent Variables – TTM Behaviors Present (N = 4,868)*

Variable	Percent
Consciousness raising	90.57
Self-Reevaluation	37.64
Counterconditioning	55.91
Helping Relationships	82.55
Decisional Balance	42.22
Results of scoring – TTM behaviors	
Precontemplation/Contemplation/Preparation	63.79
Action/Maintenance	36.21

Independent Variables – BLC Tenets

Financial Time Orientation. As the research then blended into the influence of BLC tenets on the struggle between temptation and self-control, a SCF 2019 question asked, “In planning or budgeting your (family’s) saving and spending, which of the following time periods

is most important to you (and your family living here); the next few months, the next year, the next few years, the next 5 to 10 years, or longer than 10 years?” The respondents would then answer one of those options. Dalton’s Investment Planning text utilizes the PASS system when teaching students about matching appropriate investments with clients’ short-term, intermediate term, and long-term financial goals. Because the PASS short-term planning horizon definition is defined as three years or less (Dalton & Forjan, 2022; <http://www.droms-strauss.com>), any responses of “Next few years” or less were considered a doer with a short-term financial time orientation and all other responses were considered a planner with a longer-term financial time orientation.

Mental Accounting and Framing. The next BLC concept of interest was the concept of whether people who view their assets in current assets or future assets would be predictive of retirement savings behavior. It was suspected that those who viewed assets as current assets would not be saving for retirement while those who viewed assets as belonging in the future assets mental account would be saving for retirement. SCF 2019 had two separate questions that asked respondents how changes in the value of their assets would affect their spending habits. The survey said, “For the following two statements, please say whether you agree strongly, agree somewhat, neither agree or disagree, disagree somewhat, or disagree strongly.” The first statement read, “First, when the things that I/my husband and I/my wife and I/my partner and I) own *increase* in value, (I am/we are) *more* likely to spend money.” As already conveyed, the respondents had five possible responses from “agree strongly” to “disagree strongly” with the statement. The second statement read, “Second, when the things that (I/my husband and I/my wife and I/my partner and I) own *decrease* in value, (I am/we are) *less* likely to spend money.” The same five possible responses were available for the second statement. Those who

respond “neither agree nor disagree, disagree, or strongly disagree” were considered as putting their assets in the future assets mental account, because if that were the case, the present value would be inconsequential. It was also of interest to compare whether responses were consistent or whether there was a loss aversion effect when considering an increase versus a decrease in the value of assets.

Saliency. BLC specifically states that temptation becomes much less prevalent as one approaches retirement. To test for this condition, households were divided into those who expected to retire within the next 10 years and those who did not fit into that designation. There were a couple of factors to consider when modeling this component. First, because this is based upon a person’s individual perspective, the grouping was driven by when respondents indicated expected retirement whether it was realistic or not. Therefore, even though it was unlikely that someone would be capable of working for their entire natural life, any person who indicated they would never retire was not included in the group of retiring within the next 10 years regardless of that person’s current age. Second, this was an area that was slightly askew because of the significant other age issue regarding whether the person was included in the primary economic unit or financially independent of the unit. Recall the difference between these two was 32 people out of a sample size of 4,868. These two issues should be considered when reconciling the number of people SAS reported once each group was determined by taking each expected retirement age minus each current age. See Table 3.5. for breakdown of BLC tenet characteristics of the sample.

Table 3.5.*Independent Variables – BLC Tenets (N = 4,868)*

Variable	Percent
Short-term budgeting time horizon	56.79
Spending does not change when asset values increase	75.44
Spending does not change when asset values decrease	43.65
Within 10 years of stated full retirement	
Reference person	6.96
Significant other	6.27
Households	12.05

Control Variables

Control variables included age, gender (male/female), marital status (married/separated/divorced/widowed/never married), education level (high school or less/some college or associate/bachelor/graduate or higher), ethnicity (white/black/hispanic/other), employment status (working/retired/not working, not retired), household size (one/two to four/five or more) and composition (no children/one or two/three or more), home ownership (owns/does not own/partial own, farm, or mobile), both subjective health assessment (excellent/good/fair/poor) and life expectancy, and expected retirement age. Calculating the expected retirement age for both the reference person and the significant other required reviewing three different survey items for each. These were the expected retirement age for those who currently work full-time, who currently work part-time, and who currently do not work but are not retired. The three were then combined to determine the expected retirement age for both the reference person and the significant other. Most of these control variables are commonly used demographic control variables found in research projects because they have often been found to have varying significance in outcomes as demonstrated in the literature review section of this dissertation.

Remember there were issues with age, marital status, and race/ethnicity due to the design of the survey. Age of significant other was difficult to code because it was collected only if the significant other was in primary economic unit. All other demographics and results were reported with just the presence of a significant other regardless of this status. Therefore, when comparing the category of age of a significant other with all other categories of no partner, there was a 32-person difference in the results. This was a fraction of 1% of the sample. Also recall that some of the households that reported including a significant other were not legally married. This made attempts to reconcile the number reported in the marital status category with most other categories impossible. This was the reason that reference person and significant other job status had to be paired with subjective health status items to identify households with a significant other present, regardless of legal marital status. One other issue with whether a significant other was present was that SAS reported the percentages based on households, not significant others. This resulted in a large percentage (35.09%) of a no partner category and created challenges in grasping some tendencies in this group when reviewing data. This challenge should be remembered when analyzing the reported composition of significant others in the sample. When discussing the percentages, it was always in terms of the reference person's household. And, finally, recall that race was only recorded for the respondent and did not identify interracial unions of any kind.

Veteran status (served/did not serve) was considered due to the additional pensions often earned through their years of service. Smoking status was considered because of existing research showing an impact of this status on the retirement years (Ayyagari, 2016; Finke & Huston, 2013). Other economic conditions include whether a household had access to \$3,000 in an emergency, if an inheritance was expected, and the existence of household debt. The value of

assets and the amount of debt, net worth, and income were also included. See Table 3.6. below for a list of the control variables and how they were coded.

Table 3.6.*List of Control Variables and Coding*

Variable	Survey Item	Type
Gender (Reference Person - RP)	Gender	Categorical
Age (RP)	Reconciled age	Continuous
Age (Significant Other in PEU)	Reconciled age	Continuous
Marital Status	Marital Status	Categorical
Household Size	Number of people in household	Categorical
Children in Household	Sum of children listed	Categorical
Job Status (RP)	Present job status	Categorical
Job Status (Significant Other - SO)	Present job status	Categorical
Military Service (RP)	Served in military	Categorical
Education (RP)	Highest level of education	Categorical
Education (SO)	Highest level of education	Categorical
Race (Respondent)	Racial Category	Categorical
Homeownership	Ownership Status	Categorical
Previous Homeownership (RP)	Previous ownership	Categorical
Health Status (RP)	Respondent-Reported Health	Categorical
Health Status (SO)	Respondent-Reported Health	Categorical
Smoking Status (RP)	Smoking Status	Categorical
Smoking Status (SO)	Smoking Status	Categorical
Subjective Life Expectancy (RP)	Reported life expectancy	Continuous
Subjective Life Expectancy (SO)	Reported life expectancy	Continuous
Expected Retirement Age (RP)	Reported retirement age	Continuous

Table 3.6.*List of Control Variables and Coding - continued*

Variable	Survey Item	Type
Expected Retirement Age (SO)	Reported retirement age	Continuous
Expect Inheritance	Reported expected inheritance	Categorical
Emergency Fund	Access to \$3,000 for emergency	Categorical
Household has Debt	Presence of Reported Debt	Categorical
Log of Assets	Sum of all Reported Assets	Continuous
Log of Household Debt	Sum of all Reported Debt	Continuous
Log of Income	Sum of all Reported Income	Continuous
Log of Net Worth	Assets minus Debt	Continuous

Data Analysis Methodology and Justification

A logistic regression was utilized for this research. For all hypotheses there was a categorical, dichotomous dependent variable which was whether a person was an active retirement saver as determined by the ownership of someone in the household owning a retirement account, whether private or through an employer. When using one categorical outcome variable with two or more predictor variables that are both categorical and continuous, it is recommended to perform a logistic regression (Field & Miles, 2010). Analysis was run both unweighted and weighted. Weighting allows samples that are oversampled for a particular population to become generalizable to the overall population. SCF is always oversampled for affluent households and provides the appropriate weight variable within the codebook. Hanna et al. (2018) provided additional guidance on coding the appropriate weighting, providing the appropriate weight code for the SCF 2016. After researching appropriate numbers for using the

SCF 2019 (Busboom, 2020), the weight code was calculated and is shown in Appendix A. Results are reported from the weighted model. Results of the unweighted logistic regression model can be found in Appendix D.

Univariate Testing

After performing univariate testing of the independent variables, all but the remaining work life expectancy independent variables were a good fit with both skewness and kurtosis. This was true even of the individual variables that comprised the groupings of the TTM cognitive factors and behaviors. Univariate analysis of this independent variable produced results outside of these acceptable ranges with skewness of 3.51 and kurtosis of 13.35.

Correlations

Although the scoring methods for determining group designations for both cognitive factors and behaviors were not a scale, correlations were run for the individual variables contained within each independent variable. When analyzing the Pearson Correlation Coefficients, correlations were very strong among the chosen survey items chosen to measure the various constructs. Of the possible 15 cognitive factor variable pairings, only one was not significant for these individual variables used within the cognitive factors checklist. In addition to what prior literature had used to model these constructs, these correlation coefficients add decisional strength to the items that were chosen within the SCF 2019 to model these constructs as one independent variable to determine where subjects should be assigned in regard to TTM cognitive factors. These results are shown for TTM cognitive factors relationships in Table 3.7. below.

Table 3.7.*Correlation Table for TTM Cognitive Factors*

Variables	1	2	3	4	5
1. Dramatic Relief	-				
2. Environmental Reevaluation	0.09***	-			
3. Self-Liberation	-0.04***	-0.03***	-		
4. Reinforcement Management	0.07***	-0.02**	0.11***	-	
5. Social Liberation	0.03***	0.07***	0.20***	0.18***	-
6. Temptation/ Self-Efficacy	0.03***	0.01	0.05***	0.02*	0.07***

The behavior variable grouping results were also interesting when further analyzing the Pearson Correlation Coefficients. Two items did not show significance in grouping model for assigning TTM behavior groups. These results also provide additional backing for using the specific items within the SCF 2019 to model the behavior designations as one independent variable. Results for TTM behaviors relationships are shown in Table 3.8. below.

Table 3.8.

Correlation Table for TTM Behaviors

Variables	1	2	3	4	5
1. Consciousness Raising	-				
2. Self-Reevaluation	0.09***	-			
3. Counterconditioning	0.13***	0.06***	-		
4. Helping Relationships	0.28***	0.13***	0.10***	-	
5. Decisional Balance	0.04***	0.01	0.36***	0.00	-

When examining the correlations between the independent variables within the measurement model, the model showed correlation significance in all instances when analyzing the interaction amongst the independent variables. See Table 3.9. below for results of correlation between the independent variables.

Table 3.9.*Correlation Table for Independent Variables*

Variables	1	2	3	4	5
1. TTM Cognitive Factors	-				
2. TTM Behaviors	0.17***	-			
3. Budget Horizon	0.16***	0.14***	-		
4. Assets Increase in Value	0.08***	0.03***	0.02**	-	
5. Assets Decrease in Value	0.02**	-0.06***	0.01*	0.28***	-
6. Retirement Saliency	0.04***	-0.02**	0.07***	0.02**	-0.02***

Based on the results of not only the univariate and correlation testing, but also prior modeling that was discovered within the literature, it was felt that the chosen survey items were good choices in the modeling of this research. The appropriate regression model testing for a binary categorical outcome variable using both categorical and continuous independent and control variables is a logistic regression. Both unweighted and weighted analyses were run as had been emphasized as important by researchers familiar with utilizing the various years of the SCF datasets (Hanna et al., 2018; Lindamood & Hanna, 2005). Results were reported using the weighted data analysis.

Chapter 4 - Findings and Results

Demographic Characteristics of the Sample

Once the fully retired households, as well as the accompanying five households reporting negative total assets, were eliminated, the composition of the sample was 3,898 (80.07%) males and 970 (19.93%) females. Recall that the reference person was always the male in a heterosexual relationship and only female if that reference person was a single woman or the older in a same sex relationship. The ethnicity of the respondents was more diverse than is often seen in datasets with those who reported as identifying as white at 69.61%. There could be even greater diversity than what was reported because it was only the *respondent's* race that was recorded. According to 2017 research from the Pew Research Center, around 18% of newlywed couples were interracial, making the overall interracial marital incidence in the U.S. population around 10% (Livingston & Brown, 2017). Therefore, there is a reasonable likelihood that there was a significant representation of interracial households in the sample.

The sample was older with a mean age of 46.67 years of age for the reference people and a median age of 47 years. When examining households with a significant other by eliminating those without, the mean age of the significant other was 45.47 years of age with a median age of 45 years. A little over half (55.90%) of the reference people had a significant other, 20.48% were separated, divorced, or widowed, and the remaining 23.62% were never married. Household composition included children in the home 44.37% of the time and only 19.86% of households were comprised of a single-person home. The overall sample was highly educated with just over 70% including a reference person having an education level minimum of some college and 21.86% of reference people had earned more than an undergraduate degree. Homeownership in the overall sample was 61.96%. There were some (5.14%) reference people living in more

unique situations such as on farms or ranches or in mobile homes, as well as some that partially owned their residence. The remaining 32.91% did not own a primary residence in any manner. Most of these overall demographics are commonly associated with the traits one would expect when considering that the study purposely oversampled wealthier households. Highly educated older people are often found to be thriving financially.

Most of the self-reported health status responses were either excellent or good with 77.51% of reference people reporting one or the other and just 10.37% of households reporting a significant other with fair or poor health. Smoking was reported by 16.71% of the reference people. Of all households there was a 6.56% representation of a significant other that smoked. These circumstances likely had an impact on the households' length of retirement life expectancy for which the retirement savings must sustain financially. This perceived health status was most likely to inform the subjectively reported life expectancy in addition to information such as family history and lifestyle choices for most people. The percentage of reference people who were military veterans was 12.25% and far above the national average of those who serve in the general population, which according to the U.S. Census Bureau in 2018 was about 7% (<https://www.census.gov/>). One possible explanation could be that the older participants in the dataset lived through periods of military drafts and periods of war. Military benefits can be a substantial addition to a person's retirement outcome and could affect retirement savings behavior. These factors suggest that the inclusion of military veteran status in the control variables may provide some interesting insights.

An interesting observation that emerged during a closer analysis of the employment account data was that 24.69% of the reference people were self-employed. Some additional subjects included people who were students, homemakers, temporarily unemployed, and those

with other such employment situations and accounted for 19.08% of the sample. The fact that the overall household retirement account ownership was 61.80% suggests that quite a few of these accounts could have belonged to self-employed reference people utilizing various options available to those in the self-employment sector.

Economically, few households expected an inheritance (16.91%) and most participants had the ability to access \$3,000 in an emergency (69.76%). Households had a mean of roughly \$884,500 of total assets, a standard deviation of a little over \$4.2 million, and a median of about \$203,000. Debt was part of the economic situation in 71.86% of households with a mean debt load of roughly \$154,600, a rather large standard deviation of about \$1,736,400, and a median of \$35,900. As discussed earlier, every household within the sample had at least one person who was still working. The mean household income was reported as about \$110,400, a standard deviation of around \$215,500, and a median income of \$61,000. Net worth had a mean of about \$729,800, a standard deviation of roughly \$3,087,700, and a median of \$96,100. The financial results reported above are weighted means and were largely different than unweighted means.

To report more accurate descriptive statistics for the reference person's expected retirement age and the significant other's age (within the Primary Economic Unit), subjective life expectancy, and expected retirement age, these variables were coded to only include responses that reflected actual ages and actual people for the descriptive statistics table. This means that for the reference person's expected retirement age, responses of "never stop" or "inappropriate – not working for pay" were removed to provide an accurate mean and standard deviation for working reference people reporting an actual expected retirement age. The same was done for significant other categories of age, subjective life expectancy, and expected retirement age. With regard to significant other responses, "inappropriate" also included having no significant other in the

household. These adjustments to give accurate descriptive statistics on the sample resulted in the reference person's expected retirement age to only include 1,518 subjects. For the significant other's age within the Primary Economic Unit, which was 32 people more than most significant other categories overall, the number of subjects was 3,192. Significant others' subjective life expectancy resulted in 3,160 subjects and significant others' expected retirement age resulted in a headcount of 1,115 subjects. SAS output logs and coding for this information can be found in Appendix B. See Table 4.1. for full descriptive statistics.

Table 4.1.*Descriptive Statistics (N = 4,868)*

Variables	<i>Percent</i>	<i>Median</i>	<i>SD</i>
Household has some sort of retirement plan	61.80		
Gender (Reference person - RP)			
Male	80.07		
Female	19.93		
Age (RP)	46.69	47.00	6.85
Age (SO in Primary Economic Unit)	45.47	45.00	6.14
Marital Status (RP)			
Married	55.90		
Separated/Divorced/Widowed	20.48		
Never married	23.62		
Household Size			
One	19.86		
Two to four	68.36		
Five or more	11.77		
Number of children living in household			
None	55.63		
One or two	33.69		
Three or more	10.68		
Employment Status (RP)			
Working	80.92		
Retired	5.83		
Not working/not retired	13.25		
Employment Status (SO)			
Working	39.69		
Retired	3.82		
Not working/not retired	21.41		
No significant other	35.09		
Military Service (RP)	12.25		

Table 4.1.*Descriptive Statistics – continued, (N = 4,868)*

Variables	Percent	SD
Education (RP)		
High school or less	29.57	
Some college/Associate	24.33	
Bachelor	24.24	
Graduate or higher	21.86	
Education (SO)		
High school or less	15.18	
Some college/Associate	14.69	
Bachelor	20.06	
Graduate or higher	14.98	
No partner	35.09	
Ethnicity (Respondent)		
White	69.61	
Black	13.41	
Hispanic	10.73	
Other	6.25	
Homeownership		
Owns	61.96	
Does not own	32.91	
Partial own, farm or mobile	5.14	
Owned home previously (RP)	52.13	
Health status (RP)		
Excellent	28.33	
Good	49.18	
Fair	18.75	
Poor	3.74	
Health status (SO)		
Excellent	23.73	
Good	30.81	
Fair	8.42	
Poor	1.95	
No partner	35.09	
Smoker (RP)	16.71	

Table 4.1.*Descriptive Statistics – continued, (N = 4,868)*

<i>Variables</i>	<i>Percent</i>	<i>Median</i>	<i>SD</i>
Smoker (SO)	6.56		
Subjective life expectancy (RP)	84.78	85.00	11.57
Subjective life expectancy (SO)	86.62	87.00	10.20
Expected retirement age (RP)	69.15	70.00	7.39
Expected retirement age (SO)	65.40	65.00	8.13
Expected inheritance	16.91		
Access to \$3,000 for emergency	69.76		
Has debt	71.89		
Amount of Debt (in thousands)	154.64	35.90	1,736.44
Total Assets (in thousands)	884.90	203.00	4,253.02
Net Worth (in thousands)	729.84	96.10	3,396.79
Income (in thousands)	110.43	61.00	215.51

Representativeness of the Sample and Report of Statistical Results

All iterations of the Survey of Consumer Finances have oversampled for more affluent families. Because of this fact, it is important when working with any SCF year to use weights when analyzing data. As mentioned earlier, weighting is important so that any datasets that have oversampled a population can be generalized to the overall population and it is important to run models both unweighted and weighted. However, it is the weighted results that should be reported. Details on the weighting calculations are included with the coding in Appendix A. The fact that there were some differences between the unweighted and weighted results indicates that there could be some differences between the affluent population and the general population. Further discussion will be provided in Chapter 5 regarding possible future research to examine this possibility.

Logistic regression was used to examine the relationship between numerous variables and whether a person was saving for retirement as measured by the existence of an owned retirement account. The pseudo r-square was 0.410 meaning that the model explained the situation 41 percent better than the null model did. The concordance ratio was 86.2, meaning that 86.2% of all cases can be explained by these conditions. Results of the logistic regression model can be found in Table 4.2. below.

Table 4.2.*Weighted Logistic Regression Results (N = 4,868)*

Variable (reference group)	β	se β	Odds Ratio
Intercept	-10.90***	1.02	
Cog Factors- Action/Maintenance	1.23***	0.09	3.44
Behaviors – Action/Maintenance	0.17*	0.08	1.19
Short Financial Time Horizon	0.02	0.08	1.02
Increase in Value Future Assets	0.05	0.10	1.05
Decrease in Value Future Assets	0.05	0.08	1.05
Retirement Within 10 Years	-0.06	0.15	0.94
Female	0.30*	0.12	1.34
Age of Reference Person	-0.00	0.00	1.00
Age of Significant Other in PEU	-0.01	0.01	0.99
Marital Status (Married)			
Separated/Div/Widowed	-0.46*	0.15	0.63
Never Married	-0.08	0.14	0.92
Household Size (Single)			
2 to 4 people	-0.30*	0.13	0.74
5 or more people	-0.46	0.25	0.63
Children at home (None)			
1 or 2 children	0.15	0.10	1.16
3 or more children	-0.18	0.22	0.83

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

Table 4.2.*Weighted Logistic Regression Results – continued, (N =4,868)*

Variable (reference group)	β	se β	Odds Ratio
Job Status – Reference Person (Working)			
Retired	-0.71***	0.20	0.49
Not Working, Not Retired	-1.18***	0.13	0.31
Job Status – Significant Other (Working)			
Retired	-0.68**	0.25	0.51
Not Working, Not Retired	-0.51***	0.12	0.60
No Spouse in Household	-1.82***	0.50	0.16
Ref Person - no Military Service	-0.06	0.12	0.94
Education – Reference Person (Some College or Associate)			
High School or Less	0.04	0.10	1.04
Undergraduate	0.13	0.11	1.14
Graduate or Professional	0.54***	0.15	1.73
Education – Significant Other (Some College or Associate)			
High School or Less	-0.12	0.13	0.88
Undergraduate	0.11	0.14	1.12
Graduate or Professional	0.15	0.18	1.16
Race (White)			
Black	-0.02	0.11	0.97
Hispanic or Latino	-0.84***	0.12	0.43
Other	-0.38*	0.17	0.68
Homeownership (Owns)			
Doesn't own	0.46***	0.13	1.59
Other	-0.21	0.17	0.82
Has Owned Home	-0.06	0.09	0.94

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

Table 4.2.*Weighted Logistic Regression Results – continued, (N =4,868)*

Variable (reference group)	β	se β	Odds Ratio
Health Status – Reference Person			
(Good)			
Excellent	-0.07	0.10	0.94
Fair	-0.05	0.10	0.95
Poor	-0.67**	0.23	0.51
Health Status – Significant Other			
(Good)			
Excellent	-0.10	0.13	0.90
Fair	0.14	0.15	1.15
Poor	0.06	0.27	1.07
Reference Person Smokes	0.02	0.10	1.02
Significant Other Smokes	-0.22	0.15	0.80
Ref Person Subj Life Expectancy	0.00	0.00	1.00
Sig Other Subj Life Expectancy	-0.02**	0.01	0.99
Ref Person Exp Retirement Age	0.00*	0.00	1.00
Sig Other Exp Retirement Age	0.00	0.00	1.00
Expect Inheritance	0.09**	0.03	1.09
Can Access \$3k in Emergency	-0.02	0.02	0.97
Household has Debt	0.59	0.51	1.81
Log Net Worth	0.01	0.01	1.01
Log Income	0.73***	0.07	2.08
Log Debt Amount	-0.02	0.04	0.98
Log Total Asset Value	0.37***	0.04	1.44
Pseudo R ² = 0.41			
Concordance Ratio: 86.2			

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

As reported in Table 4.2., there were a number of statistically significant demographic attributes in the model. These included certain categories of gender, marital status, household size, job status of the reference person and significant other, education status, home ownership, and race. Additionally, several additional statistically significant control variables included the reference person's health status, the subjective life expectancy of the significant other, the reference person's expected retirement age, whether a person was expecting an inheritance, log income, and log total assets owned.

All things being equal, odds were 34% higher that a female would be saving for retirement than a male as well as odds were 37% lower that people in the separated, divorced, and widowed marital status would be saving for retirement than the reference group of those who were legally married. Additionally, all things being equal, households comprised of two to four people had 26% lower odds of saving for retirement in an account than single person households. All work status categories showed statistical significance, all things being equal including that a retired reference person had 51% lower odds of the household owning a retirement account and saving for retirement than a working reference person. Remember that if a retired reference person was included in the sample, the reference person reported having a significant other that was not retired. Holding all things equal, a reference person who was not working but not retired had 69% lower odds of saving for retirement than a reference person who was working. Households without a significant other had 84% less odds of saving for retirement than households with a working significant other. All things equal, a retired significant other had 49% lower odds and a significant other who was not working and not retired had 40% lower odds of saving for retirement than a working significant other. For the reference person's level of education, all things equal, a reference person who obtained a professional or graduate degree

had 73% greater odds of saving for retirement than a reference person with some college or an associate degree. All things remaining constant, a Hispanic or Latino respondent household had 57% less odds and an other race respondent household had 32% less odds of saving for retirement than a white respondent household. Households that were not homeowners had 58% greater odds of saving for retirement than homeowners, holding all things equal.

All things equal, a reference person in poor health had 49% less odds of saving for retirement than a reference person in good health. For every one unit increase in the significant other's subjective life expectancy, the odds of saving for retirement dropped by 1%. For every one unit increase in the reference person's expected retirement age, the odds of saving for retirement increased by 1%. Households that were expecting an inheritance had 9% greater odds of saving for retirement than households that were not expecting an inheritance, holding all things constant. For every one unit increase in log income, all things equal, the odds of saving for retirement were 108% greater and for a one unit increase of log total assets, the odds of saving for retirement were 44% greater.

Report of Research Questions/Hypotheses

Retirement Saving Behavior Based on TTM Cognitive Factors

H1: People who demonstrate TTM action and maintenance *cognitive factors* will have greater odds of saving for retirement than people who demonstrate TTM precontemplation, contemplation and preparation *cognitive factors*. Holding all things equal, those households that demonstrated cognitive factors of action and maintenance had 244% greater odds of saving for retirement than those households that demonstrated cognitive factors indicative of precontemplation, contemplation, and preparation. The p-value was significant at <.0001 resulting in rejection of the null hypothesis.

Retirement Saving Behavior Based on TTM Behaviors

H2: People who demonstrate TTM action and maintenance *behaviors* will have greater odds of saving for retirement than people who demonstrate TTM precontemplation, contemplation and preparation *behaviors*. Holding all things equal, those households that demonstrated behaviors of action and maintenance had 18.9% greater odds of saving for retirement than those households that demonstrated behaviors indicative of precontemplation, contemplation, and preparation. The p-value was significant at 0.04 resulting in rejection of the null hypothesis.

Retirement Saving Behavior Based on Daily Financial Planning Time Horizons

H3: People who indicate a short-term financial planning horizon will have less odds of saving for retirement than people who indicate a longer-term financial planning horizon. No statistical significance was found in the logistic regression model of this hypothesis. Therefore, the null hypothesis failed to be rejected.

Retirement Saving Behavior Based on Increased Asset Value Mental Accounting

H4: People who don't change their spending when the value of their assets increase will have greater odds of saving for retirement than people who do change their spending habits when the value of their assets increase. No statistical significance was found in the logistic regression model of this hypothesis. Therefore, the null hypothesis failed to be rejected.

Retirement Saving Behavior Based on Decreased Asset Value Mental Accounting

H5: People who don't change their spending when the value of their assets decrease will have greater odds of saving for retirement than people who do change their spending habits when the value of their assets decrease. No statistical significance was found in the logistic regression model of this hypothesis. Therefore, the null hypothesis failed to be rejected.

Retirement Saving Behavior Based on Retirement Saliency

H6: People who are within 10 years of retirement will have greater odds of saving for retirement than people who are not within 10 years of retirement. No statistical significance was found in the weighted logistic regression model of this hypothesis. Therefore, the null hypothesis failed to be rejected. However, although the weighted model is what was reported, in the unweighted logistic regression model, analysis suggested that all things being equal, those people within 10 years of retirement had 15% lower odds of saving for retirement than those further away than 10 years from retirement. The p-value in the unweighted model was 0.012.

Summary of Findings

Results of the logistic regression produced statistically significant results for the TTM hypotheses. None of the BLC hypotheses were shown to be statistically significant, resulting in the failure to reject the null hypotheses. The results for the cognitive factors grouping for TTM testing were especially strong and more significant with a p-value of $< .0001$. This suggests that further analysis of this particular set of items be given more thorough consideration when developing potential interventions to encourage more robust retirement saving behavior. It was interesting that both cognitive factors and behaviors produced statistically significant results.

Chapter 5 - Discussion, Conclusions, Recommendations, and Implications

Discussion of Research Findings and Connection to Theoretical Frameworks

Results of the logistic regression model found statistical significance in questioning whether people who displayed both the TTM cognitive factors and TTM behaviors expected in the action and maintenance stages would differ in their retirement saving behavior from those people demonstrating the earlier TTM stage cognitive factors and behaviors. One surprising result was how important the items assigned to the cognitive factors were within these results. Not only was significance found, but the odds difference that a person displaying the action and maintenance cognitive factors would have 244% greater odds of saving for retirement than someone demonstrating precontemplation, contemplation, and preparation cognitive factors. This could be interpreted as an indicator that beliefs, feelings, and knowledge are the primary driver to a person's behavior and adds validation to the idea that there is a deep connection between a person's internal psychological makeup and that person's retirement saving behavior.

It was also interesting that no support was found for BLC tenets as this theoretical framework is well established and accepted in the field of behavioral finance. The items chosen within the dataset to measure some very specific constructs such as the doer and the planner seemed all but certain to reflect that these factors would prove to play a role in whether a person was saving for retirement. Because of the popularity and prior use of the BLC theoretical framework, it is most likely that the items chosen were not as reflective as they appeared at face value to measure the concepts as one might expect. However, there was some statistical significance found regarding the question of retirement saliency in the unweighted model, but not in the direction that one might expect. Theory would predict that as a person neared

retirement, that person would face less temptation. It would likely be predicted that lessened temptation would translate into saving more for retirement as one approached retirement. But what the model showed was that as a person was nearing retirement, the odds were 15% less that person was saving for retirement than someone who was further than 10 years from retirement. Add to this the fact that the determination of whether someone was saving for retirement was whether the household owned either a personal or employer retirement account and it revealed that the statement could be reworded to say that the odds of owning any retirement account was 15% lower if a person was within 10 years of retirement than if a person was more than 10 years from retirement. Given that the SCF oversamples for affluent households, it is possible that these households are more likely to be business owners and consider the business to be the source of retirement security in some form or another.

Implications of Findings

As stated above, even though there was a connection between both the modeled cognitive factors and behaviors, there was an intense connection between the grouping of cognitive factors in this dissertation and the likelihood that someone was saving for retirement if they were displaying those cognitive factor items that were associated with the action and maintenance stages. These items were chosen after reviewing what other researchers had done to model the more granular processes of change constructs within the model that are associated with specific stages of change or the underlying constructs present regardless of which stage of change a person belongs. Although these items were not a scale, for each process of change or each underlying construct, an item had a response that was associated with having experienced each one of these constructs. Looking at the correlation model, the specific construct that proxied social liberation was objective financial knowledge. The correlation between this construct and

the others was significant with a p-value of $< .0001$. This seems intuitive that greater objective financial knowledge would be an important component of the cognitive factors, but dramatic relief that was proxied by having a pessimistic 5-year economic outlook and self-liberation that was proxied by the strength of a person's subjective knowledge both also had significant $< .0001$ p-values across the board with the other chosen items within the grouping of cognitive factors. Reinforcement management was represented by receiving an employer match to a person's retirement account and was also significant in the correlation between all other items within cognitive factors, but not to the same degree as these previously mentioned items.

These findings indicate that these four items are an especially important combination for a person to be more likely to save for retirement. That being said, an argument could be made that not only is actual financial knowledge important, but having confidence in one's financial knowledge, financial concern, and support from one's employer all contribute to the likelihood that a person will save for retirement. Given this combination of factors, it appears that people would benefit tremendously from employer financial wellness initiatives that included not only an employer match in the available employment retirement accounts, but also the availability of financial literacy programs that taught concepts, instilled financial confidence, and raised awareness of financial pitfalls to motivate employees to take action to save for retirement.

Based on the apparent importance of some items discussed above, there was one particular suggestion from the PFEEF project provided by Xiao et al. (2008) that appears to have relevance when applying the various constructs of the TTM model. It was suggested that employers share true financially negative stories of previous employees and offer employees the opportunity to take an assessment to determine their personal levels of financial distress. This was suggested for utilizing dramatic relief and would be supported by the results of this study.

These objectives could be accomplished by the employer either hiring a financial planner as part of the Human Resource Department, contracting with a financial education partner, working with Cooperative Extension Systems in many states, or choosing a retirement plan administrator that offered these services as part of their contract. Any of these sources would have the expertise and desire to provide programming that would instill the components that would recreate many of these constructs. Many financial service companies such as Financial Finesse, PayActiv, HR.COM, and Pathwise Group are developing business models that contract with employers to provide financial advice to the employees of those companies. Traditional payroll companies such as PayChex, ADP, and Paycor are extending their services to include employee financial services in addition to payroll services. As these services continue to expand, creating a process that incorporates these constructs into a systematic approach to helping employees will likely provide a competitive advantage while also accomplishing increased retirement savings for those employees.

Financial planners should consider ways to apply these findings of the importance of cognitive factors in motivating and redirecting client retirement saving behavior. Findings suggest that an effective new client intake process includes a systematic approach that could begin with some type of nonthreatening verbal financial knowledge quiz. A financial planner could start the initial meeting with an explanation that he or she wanted to get a general assessment of how much the client understood financial concepts. He or she could then further explain that by getting a better understanding of how comfortable and knowledgeable the client felt about these concepts, the financial professional could better serve that client by being alert to areas that may require additional explanation or illustration. Using this approach could address both objective *and* subjective knowledge issues because the financial planner would not only

know whether the client did possess the general objective knowledge but could observe how confidently clients answered questions or expressed thoughts regarding financial matters, both verbally and nonverbally. Therefore, the financial planner must also be mindful of these additional cues from the client during the interaction.

Additionally, both during the initial intake meeting and subsequent ongoing meetings, the financial planner could share generic stories about how he or she has seen that under certain circumstances a client failed, and why, to introduce the dramatic relief element. These discussions could also include asking the client about their longer-term financial expectations for additional dramatic relief assessment and introducing material that illustrates the interconnectedness of that person's financial life and those of the people and/or causes that are special to the client for environmental re-evaluation. Environmental re-evaluation elements could well be included in goal setting and the financial planner could additionally assess the level of temptation versus self-efficacy when discussing any action plans that accompany these goals.

The financial planner could make it a regular part of the process to review the retirement benefits available to the client to help remind them of any employer matches. This would be a good time to review the current asset allocation in the plan and how it contributes to the client's overall portfolio as part of this process. There could also have been changes in fund offerings or other important considerations to review. This review would contribute to maintaining the reinforcement management element in the client's attention. Throughout the entire process, the financial planner could find times within all these suggestions to both continue to educate for objective financial knowledge purposes and to provide positive reinforcement regarding clients' subjective financial knowledge confidence level by praising them for how much they have learned and accomplished.

Limitations of Current Study

There were several limitations to this study, particularly because of some of the idiosyncrasies of the SCF. Many of these were discussed in earlier segments of the dissertation and included issues with who was included and excluded when reporting the significant other within households. The age category differed from all other significant other categories because only the age category excluded those significant others that were not considered part of the primary economic unit. This resulted in 32 fewer significant others in the age category than all other significant other categories. Additionally, race was only recorded for the respondent and did not allow for any recognition of mixed-race households and marital status included legally married but not having a significant other in the household unless the couple was legally married. One other limitation that occurred during this study was that income was only coded for positive incomes. For those who lost money for the year, presumably from investment and/or business losses, the coding in the codebook was -9 and for those who had no income, the coding in the codebook was -5. This eliminated 40 records from being read in the logistic regression. When this was discovered, the regression was run without including log income to ensure that significance looked the same or similar. This did prove to be true, so it was felt that losing 40 records out of 4,868 was not an issue.

As is true in many studies that depend upon secondary data, while it is helpful to have such a large sample size, many constructs must be created based on the information that is available within the dataset. Fortunately, other research provided items that were used in those modeling efforts, and many were similar to items within the SCF 2019. However, some were simply the closest that could be identified. This was particularly true of the two-question construct modeled for self-reevaluation because there was no item that specifically indicated an

awareness of how one's own behavior affected a financial outcome or could compare oneself to others. The primary query was whether a household had anticipated major expenses in the future with the follow-up question that ascertained whether that household had saved or was saving. It is possible that the household could have emergency savings for unanticipated expenses and did not consider overall expenses when answering this particular question.

The fact that the correlations were strong as they were made the researcher more confident that reasonable items were chosen for this effort. And finally, in regard to modeling the groups of cognitive factors and behaviors, there was some ambiguity as to whether some items were more suitable for the cognitive factor group or the behavior group. For example, for decisional balance that was included in the behavior group, the question that determined whether it was demonstrated or not asked what the person would do under certain financial circumstances. It could be argued that rather than including what a person said they would do is really a cognitive factor. Sometimes what that person thought they would do is not necessarily what they do.

It should also be remembered that the information gathered in this dataset was before the onset of the Covid-19 pandemic. This event was so significant that the responses received before the outbreak could be very different if received today. Of course, the impact is still being felt in 2023 and it will likely be some number of years before society stabilizes enough to make meaningful measurements and comparisons. This could well be the catalyst of many future studies.

Recommendations for Future Studies

It seems that given the previous discussion of this dataset being gathered during the pre-Covid years, one of the most obvious recommendations would be to compare results from this

study and SCF 2022 data results. In the future, it would be especially helpful to also include data from the SCF 2025 whenever that dataset is available. Comparing at least three different SCF datasets would likely provide some insight into what, if any, long-term impact the pandemic had on the retirement saving behavior of the general public.

Another area of interest would be to develop a long-term experiment with a control group who did not receive any intervention and another group or other groups that received different treatments based on the findings of this study. Of course, in order to do no harm to the control group, care should be taken to offer any treatment that proved to be effective so that this group would also benefit from any effective interventions that were uncovered during the experiment. Another approach would be to conduct treatment in varying environments such as different work locations such as a manufacturing plant, a call center, and a university. Surveys could be created that were constructed in such a way to specifically measure the entirety of the constructs within the TTM model. In such an experiment, it would be useful to know not only whether people were saving for retirement, but also whether they were saving sufficiently for retirement.

It was disappointing not to obtain statistically significant results from the BLC hypotheses. It was interesting that there was one statistically significant result on the unweighted model regarding retirement saliency. Further analysis of these findings is warranted and could include the removal of the TTM components to examine if there is a compounding effect between the two models or other statistical interference. Additionally, it may be helpful to explore the results if the BLC tenets were grouped in the same manner as the TTM cognitive factors and TTM behaviors were grouped. The unweighted result that was found could be indicative that analysis of differences between the affluent and the general population could

produce interesting results. These results could possibly provide some insight into money management that could benefit everyone.

Summary

There are many different directions that one could go to further explore this area of interest. This particular effort was unique in that it much more closely scrutinized many of the constructs, particularly the processes of change within the TTM model. This study contributed to the further development of the application of TTM principles to improve retirement saving behavior. Efforts to create a systematic approach utilizing these findings could contribute to a society more prepared for retirement. It is hoped that further research and application will yield positive results to increase retirement savings activity and the amounts saved.

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Appendix A - Sample Frequency and Coding

The SAS System

The MEANS Procedure

Variable	N	Mean	Median	Std Dev
amtofdebt	24340	154643.70	35900.00	1736436.80
totalassets	24340	884485.73	203001.00	4253019.41
networth	24340	729842.03	96100.00	3087699.31
income	24340	110432.03	61000.00	215505.88

The SAS System

The FREQ Procedure

dramreliefyes	Frequency	Percent	Cumulative Frequency	Cumulative Percent
0	17719	72.80	17719	72.80
1	6621	27.20	24340	100.00

environreevalyes	Frequency	Percent	Cumulative Frequency	Cumulative Percent
0	10769	44.24	10769	44.24
1	13571	55.76	24340	100.00

selfliberationyes	Frequency	Percent	Cumulative Frequency	Cumulative Percent
0	7461	30.65	7461	30.65
1	16879	69.35	24340	100.00

reinforcementmgtyes	Frequency	Percent	Cumulative Frequency	Cumulative Percent
0	15528	63.80	15528	63.80
1	8812	36.20	24340	100.00

socliberationyes	Frequency	Percent	Cumulative Frequency	Cumulative Percent
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0	11595	47.64	11595	47.64
---	-------	-------	-------	-------

1	12745	52.36	24340	100.00
---	-------	-------	-------	--------

selfefficacyyes	Frequency	Percent	Cumulative Frequency	Cumulative Percent
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0	3027	12.44	3027	12.44
---	------	-------	------	-------

1	21313	87.56	24340	100.00
---	-------	-------	-------	--------

ttmcogfacactmain	Frequency	Percent	Cumulative Frequency	Cumulative Percent
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0	13593	55.85	13593	55.85
---	-------	-------	-------	-------

1	10747	44.15	24340	100.00
---	-------	-------	-------	--------

consciousnessraiseyes	Frequency	Percent	Cumulative Frequency	Cumulative Percent
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0	2295	9.43	2295	9.43
---	------	------	------	------

1	22045	90.57	24340	100.00
---	-------	-------	-------	--------

selfreevalyes	Frequency	Percent	Cumulative Frequency	Cumulative Percent
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0	15179	62.36	15179	62.36
---	-------	-------	-------	-------

1	9161	37.64	24340	100.00
---	------	-------	-------	--------

counterconditionyes	Frequency	Percent	Cumulative Frequency	Cumulative Percent
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0	10732	44.09	10732	44.09
---	-------	-------	-------	-------

1	13608	55.91	24340	100.00
---	-------	-------	-------	--------

helprelationyes	Frequency	Percent	Cumulative Frequency	Cumulative Percent
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0	4247	17.45	4247	17.45
---	------	-------	------	-------

1	20093	82.55	24340	100.00
---	-------	-------	-------	--------

decbalanceyes	Frequency	Percent	Cumulative Frequency	Cumulative Percent
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0	14064	57.78	14064	57.78
---	-------	-------	-------	-------

decbalanceyes	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	10276	42.22	24340	100.00

ttmbehactmain	Frequency	Percent	Cumulative Frequency	Cumulative Percent
0	15526	63.79	15526	63.79
1	8814	36.21	24340	100.00

shorthrzn	Frequency	Percent	Cumulative Frequency	Cumulative Percent
0	10518	43.21	10518	43.21
1	13822	56.79	24340	100.00

incvaluefa	Frequency	Percent	Cumulative Frequency	Cumulative Percent
0	5978	24.56	5978	24.56
1	18362	75.44	24340	100.00

decvaluefa	Frequency	Percent	Cumulative Frequency	Cumulative Percent
0	13716	56.35	13716	56.35
1	10624	43.65	24340	100.00

rwlehhsal	Frequency	Percent	Cumulative Frequency	Cumulative Percent
0	21407	87.95	21407	87.95
1	2933	12.05	24340	100.00

The SAS System

The MEANS Procedure

Analysis Variable : X42001 X42001: CONSISTENT WGT: REVISED KW

N	Mean	Mode	Std Dev
28885	22268.03	49107.11	14075.23

Weight calculated: $22268.03 \times 28885 = 643,212,046.55/5 = 128,642,409.32/6,248 = 20589.3741$

Coding:

```
data out.datasetworking;
set out.dataset;
wgt=x42001/5;
nwgt=x42001/(5*20589.3741);

*Demographics;

*Determine working households - eliminate fully retired households;

jobstatref = x6670;
if jobstatref = 1 then jobrefwork = 1; else jobrefwork = 0;
if jobstatref = 7 then jobrefret = 1; else jobrefret = 0;
if jobstatref in (2,3,4,5,6,10,16) then jobrefnowknoret = 1; else
jobrefnowknoret = 0;

jobstatpart = x6678;
if jobstatpart = 0 then jobstatnupart = 1; else jobstatnupart = 0;
if jobstatpart = 1 then jobpartwork = 1; else jobpartwork = 0;
if jobstatpart = 7 then jobpartret = 1; else jobpartret = 0;
if jobstatpart in (2,3,4,5,6,10,16) then jobpartnowknoret = 1; else
jobpartnowknoret = 0;

sostathh = x6124;
if sostathh = 0 then nosoinhh = 1; else nosoinhh = 0;
if sostathh in (1,2,3,4) then soinhh = 1; else soinhh = 0;

sohhstat = sostathh + jobrefret;
if nosoinhh + jobrefret = 2 then retshhld = 1; else retshhld = 0;
if soinhh + jobrefret = 2 then retrefso = 1; else retrefso = 0;

rethhld = retrefso + jobpartret;
if retrefso + jobpartret = 2 then bothret = 1; else bothret = 0;

*retired households;

fullret = sum (of bothret retshhld);

*Remove fullret;

if 0<=fullret<1;

*Gender of reference person;

genderref = x8021;
if genderref = 1 then male = 1; else male = 0;
if genderref = 2 then female = 1; else female = 0;

*Age of all reference and significant others included in Primary Economic
Unit - continuous;

agerefcont = x14;

agepartcont = x19;
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*When getting accurate descriptive stats on the age of the significant other
in PEU;

/*if agepartcont = 0 then agepartcont = '.';*/

*Legal marital status;

marstat = x7372;
if marstat = 1 then marmarried = 1; else marmarried = 0;
if marstat in (3,4,5) then marsepdivwid = 1; else marsepdivwid = 0;
if marstat = 6 then marnever = 1; else marnever = 0;

*Household size and children living there;

hysize = x101;
if hysize = 1 then hysize1 = 1; else hysize1 = 0;
if hysize in (2,3,4) then hysize2to4 = 1; else hysize2to4 = 0;
if hysize in (5:12) then hysize5plus = 1; else hysize5plus = 0;

person3 = x108;
if person3 = 4 then chd1livewith = 1; else chd1livewith = 0;
if person3 in (0,5,6,7,8,11,29,34,35,39) then nochd1present = 1; else
nochd1present = 0;

person4 = x114;
if person4 = 4 then chd2livewith = 1; else chd2livewith = 0;
if person4 in (0,5,6,7,8,11,29,34,35,39) then nochd2present = 1; else
nochd2present = 0;

person5 = x120;
if person5 = 4 then chd3livewith = 1; else chd3livewith = 0;
if person5 in (0,5,6,7,8,11,29,34,35,39) then nochd3present = 1; else
nochd3present = 0;

person6 = x126;
if person6 = 4 then chd4livewith = 1; else chd4livewith = 0;
if person6 in (0,5,6,7,8,11,29,34,35,39) then nochd4present = 1; else
nochd4present = 0;

person7 = x132;
if person7 = 4 then chd5livewith = 1; else chd5livewith = 0;
if person7 in (0,5,6,7,8,11,29,34,35,39) then nochd5present = 1; else
nochd5present = 0;

person8 = x202;
if person8 = 4 then chd6livewith = 1; else chd6livewith = 0;
if person8 in (0,5,6,7,8,11,29,34,35,39) then nochd6present = 1; else
nochd6present = 0;

person9 = x208;
if person9 = 4 then chd7livewith = 1; else chd7livewith = 0;
if person9 in (0,5,6,7,8,11,29,34,35,39) then nochd7present = 1; else
nochd7present = 0;

```

```

person10 = x214;
if person10 = 4 then chd8livewith = 1; else chd8livewith = 0;
if person10 in (0,5,6,7,8,11,29,34,35,39) then nochd8present = 1; else
nochd8present = 0;

person11 = x220;
if person11 = 4 then chd9livewith = 1; else chd9livewith = 0;
if person11 in (0,5,6,7,8,11,29,34,35,39) then nochd9present = 1; else
nochd9present = 0;

person12 = x226;
if person12 = 4 then chd10livewith = 1; else chd10livewith = 0;
if person12 in (0,5,6,7,8,11,29,34,35,39) then nochd10present = 1; else
nochd10present = 0;

depchildren =
chd1livewith+chd2livewith+chd3livewith+chd4livewith+chd5livewith+chd6livewith
+chd7livewith+chd8livewith+chd9livewith+chd10livewith;
if depchildren = 0 then nodepchs = 1; else nodepchs = 0;
if depchildren in (1,2) then depchlors = 1; else depchlors = 0;
if depchildren in (3:10) then depchs3ormore = 1; else depchs3ormore = 0;

*Job status of remaining sample;

refperjobstatus = x6670;
if refperjobstatus = 1 then jobrefwork = 1; else jobrefwork = 0;
if refperjobstatus = 7 then jobrefret = 1; else jobrefret = 0;
if refperjobstatus in (2,3,4,5,6,10,16) then jobrefnowknoret = 1; else
jobrefnowknoret = 0;

partnerjobstatus = x6678;
if partnerjobstatus = 0 then jobstatnopart = 1; else jobstatnopart = 0;
if partnerjobstatus = 1 then jobpartwork = 1; else jobpartwork = 0;
if partnerjobstatus = 7 then jobpartret = 1; else jobpartret = 0;
if partnerjobstatus in (2,3,4,5,6,10,16) then jobpartnowknoret = 1; else
jobpartnowknoret = 0;

*Self-employment status;
selfempstatusref = x4106;
if selfempstatusref in (2,3,4) then refselfemp = 1; else refselfemp = 0;

selfempstatuspart = x4706;
if selfempstatuspart in (2,3,4) then partselfemp = 1; else partselfemp = 0;

*Reference veteran status;

milref = x5906;
if milref = 1 then milrefserve = 1; else milrefserve = 0;
if milref = 5 then milrefnoserve = 1; else milrefnoserve = 0;

```

```

*Education level;

eduref = x5931;
if eduref in (-1,1,2,3,4,5,6,7,8) then edurefhsorless = 1; else
edurefhsorless = 0;
if eduref in (9,10,11) then edurefsomecollorassoc = 1; else
edurefsomecollorassoc = 0;
if eduref = 12 then edurefbac = 1; else edurefbac = 0;
if eduref in (13,14,15) then edurefgrad = 1; else edurefgrad = 0;

edupart = x6111;
if edupart = 0 then edunopart = 1; else edunopart = 0;
if edupart in (-1,1,2,3,4,5,6,7,8) then eduparthsorless = 1; else
eduparthsorless = 0;
if edupart in (9,10,11) then edupartsomecollorassoc = 1; else
edupartsomecollorassoc = 0;
if edupart = 12 then edupartbac = 1; else edupartbac = 0;
if edupart in (13,14,15) then edupartgrad = 1; else edupartgrad = 0;

*Ethnicity;

race = x6809;
if race = 1 then racewhite = 1; else racewhite = 0;
if race = 2 then raceblack = 1; else raceblack = 0;
if race = 3 then racehisplatino = 1; else racehisplatino = 0;
if race = -7 then raceother = 1; else raceother = 0;

*Home ownership status and history;

ownshome = x701;
if ownshome in (1,3,4,5) then ownsyes = 1; else ownsyes = 0;
if ownshome in (-7,2,6) then ownsno = 1; else ownsno = 0;
if ownshome in (0,8) then ownsother = 1; else ownsother = 0;

ownedhome = x7052;
if ownedhome = 1 then owndyes = 1; else owndyes = 0;
if ownedhome = 5 then owndno = 1; else owndno = 0;

*Health status;

healthstatref = x6030;
if healthstatref = 1 then hltrefex = 1; else hltrefex = 0;
if healthstatref = 2 then hltrefgd = 1; else hltrefgd = 0;
if healthstatref = 3 then hltreffr = 1; else hltreffr = 0;
if healthstatref = 4 then hltrefpr = 1; else hltrefpr = 0;

healthstatpart = x6124;
if healthstatpart = 0 then hltnopart = 1; else hltnopart = 0;
if healthstatpart = 1 then hltpartex = 1; else hltpartex = 0;
if healthstatpart = 2 then hltpartgd = 1; else hltpartgd = 0;
if healthstatpart = 3 then hltpartfpr = 1; else hltpartfpr = 0;
if healthstatpart = 4 then hltpartpr = 1; else hltpartpr = 0;

smokestatref = x7380;
if smokestatref = 1 then refsmoke = 1; else refsmoke = 0;

```

```

smokestatso = x7395;
if smokestatso = 1 then sosmoke = 1; else sosmoke = 0;

*Subjective life expectancy;

subreflife = x7381;

subpartlife = x7396;

*When getting accurate descriptive stats on the subjective life expectancy of
the existing significant others;

/*if subpartlife = 0 then subpartlife = '.';*/

*Expected retirement age for reference person;

expretrefageftw = x7700;
if expretrefageftw = -2 then neverretrefftw = 1; else neverretrefftw = 0;
if expretrefageftw = 0 then notwrkrefftw = 1; else notwrkrefftw = 0;

expretrefageptw = x7702;
if expretrefageptw = -2 then neverretrefptw = 1; else neverretrefptw = 0;
if expretrefageptw = 0 then notwrkrefptw = 1; else notwrkrefptw = 0;

expretrefagencw = x7704;
if expretrefagencw = -2 then neverretrefncw = 1; else neverretrefncw = 0;
if expretrefagencw = 0 then notwrkrefncw = 1; else notwrkrefncw = 0;

expretrefage = expretrefageftw + expretrefageptw + expretrefagencw;

*When obtaining accurate means for this group of reference people;

/*if expretrefage in (-2, 0) then expretrefage = '.';*/

*Expected retirement age for significant other;

expretpartageftw = x7729;
if expretpartageftw = -2 then neverretpartftw = 1; else neverretpartftw = 0;
if expretpartageftw = 0 then nopartornwrkft = 1; else nopartornwrkft = 0;

expretpartageptw = x7731;
if expretpartageptw = -2 then neverretpartptw = 1; else neverretpartptw = 0;
if expretpartageptw = 0 then nopartornwrkptw = 1; else nopartornwrkptw = 0;

expretpartagencw = x7733;
if expretpartagencw = -2 then neverretpartncw = 1; else neverretpartncw = 0;
if expretpartagencw = 0 then nopartornwrkncw = 1; else nopartornwrkncw = 0;

expretpartage = expretpartageftw + expretpartageptw + expretpartagencw;

```

```
*When getting accurate descriptive stats on the expected retirement age of
the existing significant others;
```

```
/*if expretpartage in (-2, 0) then expretpartage = '.';*/
```

```
*Financial situation questions;
```

```
inherit = x5819;
if inherit = 1 then inhyes = 1; else inhyes = 0;
if inherit = 5 then inhno = 1; else inhno = 0;
```

```
access3k = x6443;
if access3k = 1 then accyes = 1; else accyes = 0;
if access3k = 5 then accno = 1; else accno = 0;
```

```
*Debt items;
```

```
amtccowe = x7575;
if amtccowe = 0 then amtccowe = '.';
if amtccowe > 0 then amtccowe = 1; else amtccowe = 0;
```

```
hm1balowe = x805;
if hm1balowe = 0 then hm1balowe = '.';
if hm1balowe > 0 then hm1balowe = 1; else hm1balowe = 0;
```

```
hm2balowe = x905;
if hm2balowe = 0 then hm2balowe = '.';
if hm2balowe > 0 then hm2balowe = 1; else hm2balowe = 0;
```

```
hm3balowe = x1005;
if hm3balowe = 0 then hm3balowe = '.';
if hm3balowe > 0 then hm3balowe = 1; else hm3balowe = 0;
```

```
heloc1balowe = x1108;
if heloc1balowe = 0 then heloc1balowe = '.';
if heloc1balowe > 0 then heloc1balowe = 1; else heloc1balowe = 0;
```

```
heloc2balowe = x1119;
if heloc2balowe = 0 then heloc2balowe = '.';
if heloc2balowe > 0 then heloc2balowe = 1; else heloc2balowe = 0;
```

```
heloc3balowe = x1130;
if heloc3balowe = 0 then heloc3balowe = '.';
if heloc3balowe > 0 then heloc3balowe = 1; else heloc3balowe = 0;
```

```
privateowe = x1044;
if privateowe = 0 then privateowe = '.';
if privateowe > 0 then privateowe = 1; else privateowe = 0;
```

```
othlineowe = x1136;
if othlineowe = 0 then othlineowe = '.';
if othlineowe > 0 then othlineowe = 1; else othlineowe = 0;
```

```

hmimplowe = x1215;
if hmimplowe = 0 then hmimplowe = '.';
if hmimplowe > 0 then hmimplowe = 1; else hmimplowe = 0;

hmimp2owe = x1219;
if hmimp2owe = 0 then hmimp2owe = '.';
if hmimp2owe > 0 then hmimp2owe = 1; else hmimp2owe = 0;

sell1owe = x1318;
if sell1owe = 0 then sell1owe = '.';
if sell1owe > 0 then sell1owe = 1; else sell1owe = 0;

sell2owe = x1337;
if sell2owe = 0 then sell2owe = '.';
if sell2owe > 0 then sell2owe = 1; else sell2owe = 0;

sell3owe = x1341;
if sell3owe = 0 then sell3owe = '.';
if sell3owe > 0 then sell3owe = 1; else sell3owe = 0;

othsellowe = x1342;
if othsellowe = 0 then othsellowe = '.';
if othsellowe > 0 then othsellowe = 1; else othsellowe = 0;

vac1owe = x1715;
if vac1owe = 0 then vac1owe = '.';
if vac1owe > 0 then vac1owe = 1; else vac1owe = 0;

vac2owe = x1815;
if vac2owe = 0 then vac2owe = '.';
if vac2owe > 0 then vac2owe = 1; else vac2owe = 0;

novac1owe = x2006;
if novac1owe = 0 then novac1owe = '.';
if novac1owe > 0 then novac1owe = 1; else novac1owe = 0;

novac2owe = x2016;
if novac2owe = 0 then novac2owe = '.';
if novac2owe > 0 then novac2owe = 1; else novac2owe = 0;

bus1owe = x3126;
if bus1owe = 0 then bus1owe = '.';
if bus1owe > 0 then bus1owe = 1; else bus1owe = 0;

bus2owe = x3226;
if bus2owe = 0 then bus2owe = '.';
if bus2owe > 0 then bus2owe = 1; else bus2owe = 0;

autolowe = x2218;
if autolowe = 0 then autolowe = '.';
if autolowe > 0 then autolowe = 1; else autolowe = 0;

auto2owe = x2318;
if auto2owe = 0 then auto2owe = '.';
if auto2owe > 0 then auto2owe = 1; else auto2owe = 0;

```

```

auto3owe = x2418;
if auto3owe = 0 then auto3owe = '.';
if auto3owe > 0 then auto3owe = 1; else auto3owe = 0;

auto4owe = x7169;
if auto4owe = 0 then auto4owe = '.';
if auto4owe > 0 then auto4owe = 1; else auto4owe = 0;

auto5owe = x2424;
if auto5owe = 0 then auto5owe = '.';
if auto5owe > 0 then auto5owe = 1; else auto5owe = 0;

othveh1owe = x2519;
if othveh1owe = 0 then othveh1owe = '.';
if othveh1owe > 0 then othveh1owe = 1; else othveh1owe =0;

othveh2owe = x2619;
if othveh2owe = 0 then othveh2owe = '.';
if othveh2owe > 0 then othveh2owe = 1; else othveh2owe =0;

othveh3owe = x2625;
if othveh3owe = 0 then othveh3owe = '.';
if othveh3owe > 0 then othveh3owe = 1; else othveh3owe =0;

stud1owe = x7824;
if stud1owe = 0 then stud1owe = '.';
if stud1owe > 0 then stud1owe = 1; else stud1owe = 0;

stud2owe = x7847;
if stud2owe = 0 then stud2owe = '.';
if stud2owe > 0 then stud2owe = 1; else stud2owe = 0;

stud3owe = x7870;
if stud3owe = 0 then stud3owe = '.';
if stud3owe > 0 then stud3owe = 1; else stud3owe = 0;

stud4owe = x7924;
if stud4owe = 0 then stud4owe = '.';
if stud4owe > 0 then stud4owe = 1; else stud4owe = 0;

stud5owe = x7947;
if stud5owe = 0 then stud5owe = '.';
if stud5owe > 0 then stud5owe = 1; else stud5owe = 0;

stud6owe = x7970;
if stud6owe = 0 then stud6owe = '.';
if stud6owe > 0 then stud6owe = 1; else stud6owe = 0;

stud7owe = x7179;
if stud7owe = 0 then stud7owe = '.';
if stud7owe > 0 then stud7owe = 1; else stud7owe = 0;

conslowe = x2723;
if conslowe = 0 then conslowe = '.';
if conslowe > 0 then conslowe = 1; else conslowe = 0;

```

```

cons2owe = x2740;
if cons2owe = 0 then cons2owe = '.';
if cons2owe > 0 then cons2owe = 1; else cons2owe = 0;

cons3owe = x2823;
if cons3owe = 0 then cons3owe = '.';
if cons3owe > 0 then cons3owe = 1; else cons3owe = 0;

cons4owe = x2840;
if cons4owe = 0 then cons4owe = '.';
if cons4owe > 0 then cons4owe = 1; else cons4owe = 0;

cons5owe = x2923;
if cons5owe = 0 then cons5owe = '.';
if cons5owe > 0 then cons5owe = 1; else cons5owe = 0;

cons6owe = x2940;
if cons6owe = 0 then cons6owe = '.';
if cons6owe > 0 then cons6owe = 1; else cons6owe = 0;

cons7owe = x7183;
if cons7owe = 0 then cons7owe = '.';
if cons7owe > 0 then cons7owe = 1; else cons7owe = 0;

margowe = x3932;
if margowe = 0 then margowe = '.';
if margowe > 0 then margowe = 1; else margowe = 0;

polyowe = x4010;
if polyowe = 0 then polyowe = '.';
if polyowe > 0 then polyowe = 1; else polyowe = 0;

ret1owe = x11027;
if ret1owe = 0 then ret1owe = '.';
if ret1owe > 0 then ret1owe = 1; else ret1owe = 0;

ret2owe = x11127;
if ret2owe = 0 then ret2owe = '.';
if ret2owe > 0 then ret2owe = 1; else ret2owe = 0;

ret3owe = x11327;
if ret3owe = 0 then ret3owe = '.';
if ret3owe > 0 then ret3owe = 1; else ret3owe = 0;

ret4owe = x11427;
if ret4owe = 0 then ret4owe = '.';
if ret4owe > 0 then ret4owe = 1; else ret4owe = 0;

othunreowe = x4032;
if othunreowe = 0 then othunreowe = '.';
if othunreowe > 0 then othunreowe = 1; else othunreowe = 0;

```

```

*Calculate if have debt and how much;

havedebt =
amtccowe+hm1balowe+hm2balowe+hm3balowe+heloc1balowe+heloc2balowe+heloc3balowe
+privateowe+othlineowe+hmimlowe+hmimp2owe+
sell1owe+sell2owe+sell3owe+othsellowe+vac1owe+vac2owe+novac1owe+novac2owe+bus
1owe+bus2owe+auto1owe+auto2owe+auto3owe+auto4owe+auto5owe+
othveh1owe+othveh2owe+othveh3owe+stud1owe+stud2owe+stud3owe+stud4owe+stud5owe
+stud6owe+stud7owe+cons1owe+cons2owe+cons3owe+cons4owe+
cons5owe+cons6owe+cons7owe+margowe+polyowe+ret1owe+ret2owe+ret3owe+ret4owe+
othunreowe;
if havedebt = 0 then havedebt = '.';
if havedebt > 0 then havedebt = 1; else havedebt = 0;

amtofdayt =
x7575+x805+x905+x1005+x1108+x1119+x1130+x1044+x1136+x1215+x1219+x1318+x1337+x
1341+x1342+x1715+x1815+x2006+x2016+
x3126+x3226+x2218+x2318+x2418+x7169+x2424+x2519+x2619+x2625+x7824+x7847+x7870
+x7924+x7947+x7970+x7179+x2723+x2740+x2823+x2840+
x2923+x2940+x7183+x3932+x4010+x11027+x11127+x11327+x11427+x4032;

*Assets;

totalassets =
x526+x614+x623+x716+x1310+x1329+x1306+x1325+x1706+x1806+x2002+x2012+x3124+x32
24+x3129+x3229+x3335+x3408+x8166+x8167+x8168+x8188+
x2422+x2506+x2606+x2623+x3506+x3510+x3514+x3518+x3522+x3526+x3529+x6551+x6559
+x6567+x6552+x6560+x6568+x6553+x6561+x6569+x6554+x6562+x6570+
x3721+x3730+x3736+x3742+x3748+x3754+x3760+x3765+x3822+x3824+x3826+x3828+x3830
+x7787+x6704+x3902+x7635+x7637+x7636+x7638+x7639+x6706+x3915+x6577+
x3960+x3930+x4006+x4018+x4022+x4026+x4030+x11032+x11132+x11332+x11432+x5604+x
5612+x5620+x5628+x6997;

*Net worth and income;

networth = totalassets - amtofdayt;
nw = ARSinh(networth);

income = x5729;
loginc = log (income);

if amtofdayt >= 0;
debt = amtofdayt;
logdebt = log (debt + .01);

if totalassets >= 0;
assets = totalassets;
logassets = log (assets + .01);

```

```

*TTM cognitive factors;

*Dramatic Relief;

dramrelief = x301;
if dramrelief = 2 then dramreliefyes = 1; else dramreliefyes = 0;
if dramrelief in (1,3) then dramreliefno = 1; else dramreliefno = 0;

*Environment Reevaluation;

environreeval = x5824;
if environreeval in (1,2) then environreevalyes = 1; else environreevalyes = 0;
if environreeval in (3:5) then environreevalno = 1; else environreevalno = 0;

*Self-Liberation;

selflib = x7556;
if selflib in (7,8,9,10) then selfliberationyes = 1; else selfliberationyes = 0;
if selflib in (-1,1,2,3,4,5,6) then selfliberationno = 1; else
selfliberationno = 0;

*Reinforcement Management;

*Employer match?;

emplmatch = x11047;
if emplmatch = 1 then emplyesmatch = 1; else emplyesmatch = 0;
if emplmatch = 3 then emplsometimesmatch = 1; else emplsometimesmatch = 0;
if emplmatch = 5 then emplnomatch = 1; else emplnomatch = 0;

emp2match = x11147;
if emp2match = 1 then emp2yesmatch = 1; else emp2yesmatch = 0;
if emp2match = 3 then emp2sometimesmatch = 1; else emp2sometimesmatch = 0;
if emp2match = 5 then emp2nomatch = 1; else emp2nomatch = 0;

getmatchref = sum (of emplyesmatch emp2yesmatch);
if getmatchref in (1,2) then getmatchyesref = 1; else getmatchyesref = 0;
sometimesmatchref = sum (of emplsometimesmatch emp2sometimesmatch);
if sometimesmatchref in (1,2) then sometimeyesref = 1; else sometimeyesref = 0;
if getmatchyesref - sometimeyesref > 0 then duplicatematchref = 1; else
duplicatematchref = 0;
if duplicatematchref - getmatchyesref = 0 then refsometimeyes = 1; else
refsometimeyes = 0;
if sometimeyesref - refsometimeyes = 0 then refsometimeonly = 1; else
refsometimeonly = 0;
if sum (of getmatchyesref refsometimeonly) < 1 then nomatchref = 1; else
nomatchref = 0;

```

```

emplmatchso = x11347;
if emplmatchso = 1 then employesmatchso = 1; else employesmatchso = 0;
if emplmatchso = 3 then emplsometimesmatchso = 1; else emplsometimesmatchso = 0;
if emplmatchso = 5 then emplnomatchso = 1; else emplnomatchso = 0;

emp2matchso = x11447;
if emp2matchso = 1 then emp2yesmatchso = 1; else emp2yesmatchso = 0;
if emp2matchso = 3 then emp2sometimesmatchso = 1; else emp2sometimesmatchso = 0;
if emp2matchso = 5 then emp2nomatchso = 1; else emp2nomatchso = 0;

getmatchso = sum (of employesmatchso emp2yesmatchso);
if getmatchso in (1,2) then getmatchyesso = 1; else getmatchyesso = 0;
sometimesmatchso = sum (of emplsometimesmatchso emp2sometimesmatchso);
if sometimesmatchso in (1,2) then sometimeyesso = 1; else sometimeyesso = 0;
if getmatchyesso - sometimeyesso > 0 then duplicatematchso = 1; else
duplicatematchso = 0;
if duplicatematchso - getmatchyesso = 0 then sosometimeyes = 1; else
sosometimeyes = 0;
if sometimeyesso - sosometimeyes = 0 then sosometimeonly = 1; else
sosometimeonly = 0;
if sum (of getmatchyesso sosometimeonly) < 1 then nomatchso = 1; else
nomatchso = 0;

reinman = sum (of getmatchyesref getmatchyesso);
if reinman > 0 then reinforcementmtgtyes = 1; else reinforcementmtgtyes = 0;
if reinman = 0 then reinforcementmtgtno = 1; else reinforcementmtgtno = 0;

*Social Liberation;

stockquest = x7558;
if stockquest = 5 then stockquestcor = 1; else stockquestcor = 0;
if stockquest in (-2,1) then stockquestincor = 1; else stockquestincor = 0;

savquest = x7559;
if savquest = 1 then savquestcor = 1; else savquestcor = 0;
if savquest in (-2,3,5) then savquestincor = 1; else savquestincor = 0;

infquest = x7560;
if infquest = 5 then infquestcor = 1; else infquestcor = 0;
if infquest in (-2,1,3) then infquestincor = 1; else infquestincor = 0;

soclib = stockquestcor + savquestcor + infquestcor;
if soclib = 3 then socliberationyes = 1; else socliberationyes = 0;
if soclib in (0:2) then socliberationno = 1; else socliberationno = 0;

*Temptation versus Self-efficacy;

tempselfeff = x402;
if tempselfeff = 5 then selfefficacyyes = 1; else selfefficacyyes = 0;
if tempselfeff = 1 then selfefficacyno = 1; else selfefficacyno = 0;

ttmcogfac = dramreliefyes + environreevalyes + selfliberationyes +
reinforcementmtgtyes + socliberationyes + selfefficacyyes;
if ttmcogfac in (4:6) then ttmcogfacactmain = 1; else ttmcogfacactmain = 0;
if ttmcogfac in (0:3) then ttmcogfacpreprep = 1; else ttmcogfacpreprep = 0;

```

```

*TTM Behaviors;

conraise = x7562;
if conraise in (1:10) then consciousnessraiseyes = 1; else
consciousnessraiseyes = 0;
if conraise = -1 then consciousnessraiseno = 1; else consciousnessraiseno =
0;

savgoal = x3010;
if savgoal = 1 then savgoalyes = 1; else savgoalyes = 0;
if savgoal = 5 then savgoalno = 1; else savgoalno = 0;

savinproc = x7186;
if savinproc in (1,6) then savinprocyes = 1; else savinprocyes = 0;
if savinproc in (0,5) then savinprocno = 1; else savinprocno = 0;

selfreev = savgoalyes + savinprocyes;
if selfreev = 2 then selfreevalyes = 1; else selfreevalyes = 0;
if selfreev in (0,1) then selfreevalno = 1; else selfreevalno = 0;

countcond = x7510;
if countcond = 3 then counterconditionyes = 1; else counterconditionyes = 0;
if countcond in (1,2) then counterconditionno = 1; else counterconditionno =
0;

source1 = x7112;
if source1 in (7,8,9,10,11,12,13,18,19,24,25) then source1pres = 1; else
source1pres = 0;
if source1 in (1,2,3,4,5,6,14,16,17,20,21) then source1miss = 1; else
source1miss = 0;

source2 = x7113;
if source2 in (7,8,9,10,11,12,13,18,19,24,25) then source2pres = 1; else
source2pres = 0;
if source2 in (1,2,3,4,5,6,14,16,17,20,21) then source2miss = 1; else
source2miss = 0;

source3 = x7114;
if source3 in (7,8,9,10,11,12,13,18,19,24,25) then source3pres = 1; else
source3pres = 0;
if source3 in (1,2,3,4,5,6,14,16,17,20,21) then source3miss = 1; else
source3miss = 0;

source4 = x7115;
if source4 in (7,8,9,10,11,12,13,18,19,24,25) then source4pres = 1; else
source4pres = 0;
if source4 in (1,2,3,4,5,6,14,16,17,20,21) then source4miss = 1; else
source4miss = 0;

source5 = x7116;
if source5 in (7,8,9,10,11,12,13,18,19,24,25) then source5pres = 1; else
source5pres = 0;
if source5 in (1,2,3,4,5,6,14,16,17,20,21) then source5miss = 1; else
source5miss = 0;

```

```

source6 = x7117;
if source6 in (7,8,9,10,11,12,13,18,19,24,25) then source6pres = 1; else
source6pres = 0;
if source6 in (1,2,3,4,5,6,14,16,17,20,21) then source6miss = 1; else
source6miss = 0;

source7 = x7118;
if source7 in (7,8,9,10,11,12,13,18,19,24,25) then source7pres = 1; else
source7pres = 0;
if source7 in (1,2,3,4,5,6,14,16,17,20,21) then source7miss = 1; else
source7miss = 0;

source8 = x7119;
if source8 in (7,8,9,10,11,12,13,18,19,24,25) then source8pres = 1; else
source8pres = 0;
if source8 in (1,2,3,4,5,6,14,16,17,20,21) then source8miss = 1; else
source8miss = 0;

source9 = x7120;
if source9 in (7,8,9,10,11,12,13,18,19,24,25) then source9pres = 1; else
source9pres = 0;
if source9 in (1,2,3,4,5,6,14,16,17,20,21) then source9miss = 1; else
source9miss = 0;

source10 = x7121;
if source10 in (7,8,9,10,11,12,13,18,19,24,25) then source10pres = 1; else
source10pres = 0;
if source10 in (1,2,3,4,5,6,14,16,17,20,21) then source10miss = 1; else
source10miss = 0;

source11 = x6865;
if source11 in (7,8,9,10,11,12,13,18,19,24,25) then source11pres = 1; else
source11pres = 0;
if source11 in (1,2,3,4,5,6,14,16,17,20,21) then source11miss = 1; else
source11miss = 0;

source12 = x6866;
if source12 in (7,8,9,10,11,12,13,18,19,24,25) then source12pres = 1; else
source12pres = 0;
if source12 in (1,2,3,4,5,6,14,16,17,20,21) then source12miss = 1; else
source12miss = 0;

source13 = x6867;
if source13 in (7,8,9,10,11,12,13,18,19,24,25) then source13pres = 1; else
source13pres = 0;
if source13 in (1,2,3,4,5,6,14,16,17,20,21) then source13miss = 1; else
source13miss = 0;

source14 = x6868;
if source14 in (7,8,9,10,11,12,13,18,19,24,25) then source14pres = 1; else
source14pres = 0;
if source14 in (1,2,3,4,5,6,14,16,17,20,21) then source14miss = 1; else
source14miss = 0;

```

```

source15 = x6869;
if source15 in (7,8,9,10,11,12,13,18,19,24,25) then source15pres = 1; else
source15pres = 0;
if source15 in (1,2,3,4,5,6,14,16,17,20,21) then source15miss = 1; else
source15miss = 0;

helprel = source1pres + source2pres + source3pres + source4pres + source5pres
+ source6pres + source7pres + source8pres + source9pres +
source10pres + source11pres + source12pres + source13pres + source14pres +
source15pres;
if helprel >=1 then helprelationyes = 1; else helprelationyes = 0;
if helprel = 0 then helprelationno = 1; else helprelationno = 0;

decbal = x7775;
if decbal in (-7,1,3,4,5) then decbalanceyes = 1; else decbalanceyes = 0;
if decbal in (0,2) then decbalancenno = 1; else decbalancenno = 0;

ttmbehavior = consciousnessraiseyes + selfreevalyes + counterconditionyes +
helprelationyes + decbalanceyes;
if ttmbehavior in (4,5) then ttmbehactmain = 1; else ttmbehactmain = 0;
if ttmbehavior in (0:3) then ttmbehpreprep = 1; else ttmbehpreprep = 0;

*BLC Tenets;
budgethrzn = x3008;
if budgethrzn in (1:3) then shorthrzn = 1; else shorthrzn = 0;
if budgethrzn in (4:5) then longhrzn = 1; else longhrzn = 0;

incvalue = x6789;
if incvalue in (3:5) then incvaluefa = 1; else incvaluefa = 0;
if incvalue in (1:2) then incvalueca = 1; else incvalueca = 0;

decvalue = x7492;
if decvalue in (3:5) then decvaluefa = 1; else decvaluefa = 0;
if decvalue in (1:2) then decvalueca = 1; else decvalueca = 0;

rwleref = expretrefage - agerefcont;
if rwleref in (0:10) then rwlrefsal = 1; else rwlrefsal = 0;
if rwleref in (-97:-1,11:72) then rwlrefnosal = 1; else rwlrefnosal = 0;

rwlepart = expretpartage - agepartcont;
if rwlepart in (1:10) then rwlepartsal = 1; else rwlepartsal = 0;
if rwlepart in (-93:0,11:70) then rwlepartnosal = 1; else rwlepartnosal = 0;

rwlehh = rwlrefsal + rwlepartsal;
if rwlehh in (1:2) then rwlehhsal = 1; else rwlehhsal = 0;
if rwlehh = 0 then rwlehhsal = 1; else rwlehhsal = 0;

*Retirement plan questions;

*Have plan?;

haveiraorkeough = x3601;
if haveiraorkeough = 1 then hhyesirakeough = 1; else hhyesirakeough = 0;
if haveiraorkeough = 5 then hhnoirakeough = 1; else hhnoirakeough = 0;

```

```

haveempplanref = x4135;
if haveempplanref = 1 then jobrefplan = 1; else jobrefplan = 0;
if haveempplanref in (0,5) then jobrefnoplan = 1; jobrefnoplan = 0;

refhastradpen1 = x11001;
if refhastradpen1 = 1 then reftradpen1 = 1; else reftradpen1 = 0;
refhastradpen2 = x11101;
if refhastradpen2 = 1 then reftradpen2 = 1; else reftradpen2 = 0;
if reftradpen1 + reftradpen2 = 2 then dblrefpen = 1; else dblrefpen = 0;
accountrefpen = sum (of reftradpen1 reftradpen2);
if accountrefpen - dblrefpen > 0 then cornumbpenref = 1; else cornumbpenref = 0;

haveplanwotradpenref = jobrefplan - cornumbpenref;
if haveplanwotradpenref = 1 then nopenref = 1; else nopenref = 0;

haveempplanso = x4735;
if haveempplanso = 1 then jobsoplan = 1; else jobsoplan = 0;
if haveempplanso in (0,5) then jobsonoplan = 1; jobsonoplan = 0;

sohastradpen1 = x11301;
if sohastradpen1 = 1 then sotradpen1 = 1; else sotradpen1 = 0;
sohastradpen2 = x11401;
if sohastradpen2 = 1 then sotradpen2 = 1; else sotradpen2 = 0;
if sotradpen1 + sotradpen2 = 2 then dblsopen = 1; else dblsopen = 0;
accountsopen = sum (of sotradpen1 sotradpen2);
if accountsopen - dblsopen > 0 then cornumbpenso = 1; else cornumbpenso = 0;

haveplanwotradpenso = jobsoplan - cornumbpenso;
if haveplanwotradpenso = 1 then nopenso = 1; else nopenso = 0;

haveplanwotradpenref = jobrefplan - cornumbpenref;
if haveplanwotradpenref = 1 then nopenref = 1; else nopenref = 0;

hhhhaveempplan = sum (of jobrefplan jobsoplan);
if hhhhaveempplan in (1,2) then someempplan = 1; else someempplan = 0;

refhaveplan = sum (of hhyesirakeough jobrefplan);
if refhaveplan in (1,2) then refretplan = 1; else refretplan = 0;

sohaveplan = sum (of hhyesirakeough jobsoplan);
if sohaveplan in (1,2) then soretplan = 1; else soretplan = 0;

hhhhaveplan = sum (of refretplan soretplan);
if hhhhaveplan in (1,2) then yeshhplan = 1; else yeshhplan = 0;

empprovplanref = x4136;
if empprovplanref = 1 then job2refplan = 1; else job2refplan = 0;
if empprovplanref in (0,5) then job2refnoplan = 1; job2refnoplan = 0;

empprovplanso = x4736;
if empprovplanso = 1 then job2soplan = 1; else job2soplan = 0;
if empprovplanso in (0,5) then job2sonoplan = 1; job2sonoplan = 0;

run;

```

```

Proc freq data= out.datasetworking;
table /*male marmarried marsepdivwid marsepdivwid marnever hhsizel hhsizeto4
hhsiz5plus nodepchd depch1or2 depch3ormore
jobrefwork jobrefret jobrefnowknoret jobstatnpart jobpartwork jobpartret
jobpartnowknoret milrefserve edurefhsorless edurefsomecollorassoc
edurefbac edurefgrad edunopart eduparthsorless edupartsomecollorassoc
edupartbac edupartgrad racewhite raceblack racehisplatino raceother
ownsyes ownsno ownsother owndyes owndno hltrefex hltrefgd hltreffr hltrefpr
hltnopart hltpartex hltpartgd hltpartfr hltpartpr refsmoke sosmoke
inhyes inhno accyes accno have debt yeshhplan;*/ refselfemp partselfemp;
run;
Proc freq data= out.datasetworking;
table dramreliefyes environreevalyes selfliberationyes reinforcementmgtyes
socliberationyes selfefficacyyes ttmcogfacactmain
consciousnessraiseyes selfreevalyes counterconditionyes helprelationyes
decbalanceyes ttmbehactmain
shorthrzn incvaluefa decvaluefa rwlehhsl rwlepartsal rwlerefsal;
run;
*coding for various age means testing removing nonresponses or missing
significant others;
Proc means data= out.datasetworking n mean median std;
var agerefcnt agepartcnt subreflife subpartlife expretrefage expretpartage;
run;
Proc means data= out.datasetworking n mean median std; weight nwgt;
var amtofdebt totalassets networth income;
run;
proc univariate data= out.datasetworking ;
var dramrelief environreeval selflib reinman soclib tempselfeff conraise
selfreev countcond helprel decbal;
run;
proc univariate data= out.datasetworking; weight nwgt;
var dramrelief environreeval selflib reinman soclib tempselfeff conraise
selfreev countcond helprel decbal;
run;
proc univariate data= out.datasetworking;
var ttmcogfac ttmbehavior budgethrzn incvalue decvalue rwlehh;
run;
proc univariate data= out.datasetworking; weight nwgt;
var ttmcogfac ttmbehavior budgethrzn incvalue decvalue rwlehh;
run;
proc corr data= out.datasetworking ;
var dramrelief environreeval selflib reinman soclib tempselfeff;
run;
proc corr data= out.datasetworking ;
var conraise selfreev countcond helprel decbal;
run;
proc corr data= out.datasetworking ;
var ttmcogfac ttmbehavior budgethrzn incvalue decvalue rwlehh;
run;
proc corr data= out.datasetworking ; weight nwgt;
var dramrelief environreeval selflib reinman soclib tempselfeff;
run;
proc corr data= out.datasetworking ; weight nwgt;
var conraise selfreev countcond helprel decbal;
run;
proc corr data= out.datasetworking ; weight nwgt;
var ttmcogfac ttmbehavior budgethrzn incvalue decvalue rwlehh;

```

```

run;
proc logistic data= out.datasetworking descending;
model yeshhplan = ttmcogfacactmain ttmbehactmain shorthrzn incvaluefa
decvaluefa rwlehhsal
female agerefcont agepartcont marsepdivwid marnever hhsiz2to4 hhsiz5plus
depchl2 depchl3ormore jobrefret jobrefnowknoret
jobstatnpart jobpartret jobpartnowknoret milrefnoserve edurefhsorless
edurefbac edurefgrad eduparthsorless edupartbac edupartgrad
raceblack racehisplatin raceother ownsno ownsother owndyes hltrefex hltreffr
hltrefpr hltpartex hltpartfr hltpartpr refsmoke sosmoke
subreflife subpartlife expretrefage expretpartage inherit access3k havedebt
nw loginc logdebt logassets/ rsq;
run;
proc logistic data= out.datasetworking descending; weight nwgt;
model yeshhplan = ttmcogfacactmain ttmbehactmain shorthrzn incvaluefa
decvaluefa rwlehhsal
female agerefcont agepartcont marsepdivwid marnever hhsiz2to4 hhsiz5plus
depchl2 depchl3ormore jobrefret jobrefnowknoret
jobstatnpart jobpartret jobpartnowknoret milrefnoserve edurefhsorless
edurefbac edurefgrad eduparthsorless edupartbac edupartgrad
raceblack racehisplatin raceother ownsno ownsother owndyes hltrefex hltreffr
hltrefpr hltpartex hltpartfr hltpartpr refsmoke sosmoke
subreflife subpartlife expretrefage expretpartage inherit access3k havedebt
nw loginc logdebt logassets/ rsq;
run;

```

Appendix B - Means Results for Age Counts Removing Zeroes

The SAS System

The MEANS Procedure				
Variable	N	Mean	Median	Std Dev
agerefcont	24340	49.6140099	50.0000000	14.7400592
agepartcont	15960	48.7694236	49.0000000	13.7120849
subreflife	24340	84.7791701	85.0000000	11.5696418
subpartlife	15800	86.6244937	87.0000000	10.2023738
expretrefage	7590	69.1519104	70.0000000	7.3868131
expretpartage	5577	65.4030841	65.0000000	8.1269503

```
Proc means data= out.datasetworking n mean median std;
var agerefcont agepartcont subreflife subpartlife expretrefage expretpartage;
run;
```

Appendix C - Weighted Logistic Regression Output Log

The SAS System

The LOGISTIC Procedure

Model Information

Data Set	OUT.DATASETWORKING
Response Variable	yeshhplan
Number of Response Levels	2
Weight Variable	nwgt
Model	binary logit
Optimization Technique	Fisher's scoring

Number of Observations Read	24340
Number of Observations Used	24140
Sum of Weights Read	5082.861
Sum of Weights Used	5057.22

Response Profile

Ordered Value	yeshhplan	Total Frequency	Total Weight
1	1	14932	2826.4308
2	0	9208	2230.7893

Probability modeled is yeshhplan=1.

Note: 200 observations were deleted due to missing values for the response or explanatory variables.

Model Convergence Status

Convergence criterion (GCONV=1E-8) satisfied.

Model Fit Statistics

Criterion	Intercept Only	Intercept and Covariates
AIC	6942.478	4439.487
SC	6950.569	4868.343
-2 Log L	6940.478	4333.487

R-Square 0.1024 Max-rescaled R-Square 0.4097

Testing Global Null Hypothesis: BETA=0

Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	2606.9908	52	<.0001
Score	2038.6246	52	<.0001
Wald	1225.9925	52	<.0001

Analysis of Maximum Likelihood Estimates

Parameter	DF	Estimate	Standard Error	Wald Chi-Square	Pr > ChiSq
Intercept	1	-10.8970	1.0221	113.6703	<.0001
ttmcogfacactmain	1	1.2342	0.0868	202.0399	<.0001
ttmbehactmain	1	0.1731	0.0824	4.4110	0.0357
shorthrzn	1	0.0204	0.0836	0.0597	0.8070
incvaluefa	1	0.0477	0.0953	0.2505	0.6168
decvaluefa	1	0.0485	0.0812	0.3570	0.5502
rwlehhsal	1	-0.0591	0.1484	0.1584	0.6906
female	1	0.2955	0.1235	5.7280	0.0167
agerefcont	1	-0.00434	0.00447	0.9434	0.3314
agepartcont	1	-0.00574	0.00518	1.2254	0.2683
marsepdivwid	1	-0.4613	0.1510	9.3372	0.0022
marnever	1	-0.0803	0.1415	0.3225	0.5701
hhsize2to4	1	-0.2984	0.1345	4.9250	0.0265
hhsize5plus	1	-0.4592	0.2519	3.3229	0.0683
depch1or2	1	0.1464	0.1022	2.0526	0.1519
depch3ormore	1	-0.1827	0.2231	0.6710	0.4127
jobrefret	1	-0.7099	0.2046	12.0369	0.0005
jobrefnowknoret	1	-1.1817	0.1283	84.8941	<.0001
jobstatnopart	1	-1.8233	0.4978	13.4183	0.0002
jobpartret	1	-0.6761	0.2488	7.3808	0.0066
jobpartnowknoret	1	-0.5121	0.1167	19.2720	<.0001
milrefnoserve	1	-0.0581	0.1165	0.2489	0.6178

Analysis of Maximum Likelihood Estimates

Parameter	DF	Estimate	Standard Error	Wald Chi-Square	Pr > ChiSq
edurefhsorless	1	0.0361	0.0972	0.1377	0.7106
edurefbac	1	0.1307	0.1126	1.3482	0.2456
edurefgrad	1	0.5462	0.1467	13.8556	0.0002
eduparthsorless	1	-0.1231	0.1296	0.9028	0.3420
edupartbac	1	0.1135	0.1446	0.6159	0.4326
edupartgrad	1	0.1459	0.1847	0.6239	0.4296
raceblack	1	-0.0283	0.1127	0.0630	0.8017
racehisplativo	1	-0.8399	0.1207	48.4273	<.0001
raceother	1	-0.3796	0.1711	4.9229	0.0265
ownsno	1	0.4595	0.1300	12.4875	0.0004
ownsother	1	-0.2009	0.1737	1.3376	0.2475
owndyes	1	-0.0586	0.0940	0.3887	0.5330
hltreref	1	-0.0653	0.1005	0.4221	0.5159
hltrreffr	1	-0.0508	0.1041	0.2384	0.6254
hltrrefpr	1	-0.6728	0.2336	8.2952	0.0040
hltpartex	1	-0.1037	0.1314	0.6236	0.4297
hltpartfr	1	0.1352	0.1454	0.8648	0.3524
hltpartpr	1	0.0648	0.2684	0.0582	0.8093
refsmoke	1	0.0200	0.1000	0.0400	0.8415
sosmoke	1	-0.2241	0.1473	2.3152	0.1281
subreflife	1	0.000500	0.00350	0.0204	0.8863
subpartlife	1	-0.0153	0.00510	9.0558	0.0026
expretrefage	1	0.00296	0.00124	5.6576	0.0174
expretpartage	1	0.00260	0.00162	2.5751	0.1086
inherit	1	0.0850	0.0280	9.2285	0.0024
access3k	1	-0.0264	0.0216	1.4972	0.2211
havedebt	1	0.5936	0.5146	1.3305	0.2487
nw	1	0.00958	0.00688	1.9359	0.1641
loginc	1	0.7301	0.0728	100.4864	<.0001
logdebt	1	-0.0205	0.0351	0.3424	0.5585

Analysis of Maximum Likelihood Estimates

Parameter	DF	Estimate	Standard Error	Wald Chi-Square	Pr > ChiSq
logassets	1	0.3666	0.0443	68.4648	<.0001

Odds Ratio Estimates

Effect	Point Estimate	95% Wald Confidence Limits
ttmcogfacactmain	3.436	2.898 4.073
ttmbehactmain	1.189	1.012 1.397
shorthrzn	1.021	0.866 1.202
incvaluefa	1.049	0.870 1.264
decvaluefa	1.050	0.895 1.231
rwlehhsal	0.943	0.705 1.261
female	1.344	1.055 1.712
agerefcont	0.996	0.987 1.004
agepartcont	0.994	0.984 1.004
marsepdivwid	0.630	0.469 0.848
marnever	0.923	0.699 1.218
hhsize2to4	0.742	0.570 0.966
hhsize5plus	0.632	0.386 1.035
depch1or2	1.158	0.948 1.414
depch3ormore	0.833	0.538 1.290
jobrefret	0.492	0.329 0.734
jobrefnowknoret	0.307	0.239 0.394
jobstatnopart	0.161	0.061 0.428
jobpartret	0.509	0.312 0.828
jobpartnowknoret	0.599	0.477 0.753
milrefnoserve	0.944	0.751 1.186
edurefhsorless	1.037	0.857 1.254
edurefbac	1.140	0.914 1.421
edurefgrad	1.727	1.295 2.302
eduparthsorless	0.884	0.686 1.140

Odds Ratio Estimates

Effect	Point Estimate	95% Wald Confidence Limits	
edupartbac	1.120	0.844	1.487
edupartgrad	1.157	0.806	1.662
raceblack	0.972	0.779	1.212
racehisplatino	0.432	0.341	0.547
raceother	0.684	0.489	0.957
ownsno	1.583	1.227	2.043
ownsother	0.818	0.582	1.150
owndyes	0.943	0.784	1.134
hltrefex	0.937	0.769	1.141
hltreffr	0.950	0.775	1.166
hltrefpr	0.510	0.323	0.807
hltpartex	0.901	0.697	1.166
hltpartfr	1.145	0.861	1.522
hltpartpr	1.067	0.631	1.805
refsmoke	1.020	0.839	1.241
sosmoke	0.799	0.599	1.067
subreflife	1.001	0.994	1.007
subpartlife	0.985	0.975	0.995
expretrefage	1.003	1.001	1.005
expretpartage	1.003	0.999	1.006
inherit	1.089	1.031	1.150
access3k	0.974	0.934	1.016
havedebt	1.811	0.660	4.964
nw	1.010	0.996	1.023
loginc	2.075	1.799	2.394
logdebt	0.980	0.914	1.049
logassets	1.443	1.323	1.574

Association of Predicted Probabilities and Observed Responses

Percent Concordant	86.2	Somers' D	0.723
Percent Discordant	13.8	Gamma	0.723
Percent Tied	0.0	Tau-a	0.341
Pairs	137493856	c	0.862

Appendix D - Unweighted Logistic Regression Output Log

The SAS System

The LOGISTIC Procedure

Model Information

Data Set	OUT.DATASETWORKING
Response Variable	yeshhplan
Number of Response Levels	2
Model	binary logit
Optimization Technique	Fisher's scoring

Number of Observations Read 24340

Number of Observations Used 24140

Response Profile

Ordered Value	yeshhplan	Total Frequency
1	1	14932
2	0	9208

Probability modeled is yeshhplan=1.

Note: 200 observations were deleted due to missing values for the response or explanatory variables.

Model Convergence Status

Convergence criterion (GCONV=1E-8) satisfied.

Model Fit Statistics

Criterion	Intercept Only	Intercept and Covariates
AIC	32096.876	21181.347
SC	32104.967	21610.203
-2 Log L	32094.876	21075.347

R-Square 0.3665 **Max-rescaled R-Square** 0.4984

Testing Global Null Hypothesis: BETA=0

Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	11019.5289	52	<.0001
Score	9286.6590	52	<.0001
Wald	5921.5165	52	<.0001

Analysis of Maximum Likelihood Estimates

Parameter	DF	Estimate	Standard Error	Wald Chi-Square	Pr > ChiSq
Intercept	1	-1.1026	0.3370	10.7029	0.0011
ttmcogfacactmain	1	1.1577	0.0384	906.9907	<.0001
ttmbehactmain	1	0.1932	0.0371	27.1133	<.0001
shorthrzn	1	-0.0408	0.0374	1.1865	0.2760
incvaluefa	1	0.0548	0.0428	1.6448	0.1997
decvaluefa	1	-0.0267	0.0369	0.5247	0.4688
rwlehhsal	1	-0.1588	0.0634	6.2753	0.0122
female	1	0.2233	0.0569	15.3886	<.0001
agerefcont	1	-0.00625	0.00208	9.0025	0.0027
agepartcont	1	-0.00219	0.00239	0.8435	0.3584
marsepdivwid	1	-0.3657	0.0705	26.9089	<.0001
marnever	1	-0.2003	0.0674	8.8452	0.0029
hhsize2to4	1	-0.4093	0.0634	41.6051	<.0001
hhsize5plus	1	-0.4474	0.1206	13.7563	0.0002
depch1or2	1	0.1841	0.0467	15.5165	<.0001
depch3ormore	1	-0.1100	0.1075	1.0469	0.3062
jobrefret	1	-0.3859	0.0836	21.3152	<.0001
jobrefnowknoret	1	-1.3353	0.0596	501.8785	<.0001
jobstatnopart	1	-1.9724	0.2367	69.4496	<.0001
jobpartret	1	-0.4668	0.1060	19.3918	<.0001
jobpartnowknoret	1	-0.7169	0.0506	200.7908	<.0001
milrefnoserve	1	0.00443	0.0539	0.0067	0.9345
edurefhsorless	1	-0.1693	0.0459	13.5835	0.0002
edurefbac	1	0.2348	0.0513	20.9762	<.0001

Analysis of Maximum Likelihood Estimates

Parameter	DF	Estimate	Standard Error	Wald Chi-Square	Pr > ChiSq
edurefgrad	1	0.6660	0.0614	117.5965	<.0001
eduparthsorless	1	-0.3138	0.0606	26.8541	<.0001
edupartbac	1	-0.0750	0.0636	1.3903	0.2384
edupartgrad	1	0.2944	0.0794	13.7451	0.0002
raceblack	1	-0.0147	0.0541	0.0736	0.7861
racehisplativo	1	-0.7789	0.0569	187.6256	<.0001
raceother	1	-0.3872	0.0751	26.5568	<.0001
ownsno	1	-0.0624	0.0555	1.2628	0.2611
ownsother	1	-0.5707	0.0808	49.9328	<.0001
owndyes	1	0.0669	0.0436	2.3535	0.1250
hltrerefex	1	-0.1354	0.0449	9.1105	0.0025
hltrreffr	1	-0.1420	0.0480	8.7696	0.0031
hltrrefpr	1	-0.7915	0.1069	54.8333	<.0001
hltpartex	1	-0.1757	0.0560	9.8530	0.0017
hltpartfr	1	0.0172	0.0679	0.0638	0.8006
hltpartpr	1	0.1393	0.1315	1.1209	0.2897
refsmoke	1	-0.0293	0.0479	0.3750	0.5403
sosmoke	1	-0.2977	0.0713	17.4302	<.0001
subreflife	1	-0.00348	0.00166	4.3662	0.0367
subpartlife	1	-0.0123	0.00241	25.9387	<.0001
expretrefage	1	0.00253	0.000569	19.7824	<.0001
expretpartage	1	0.00271	0.000749	13.0305	0.0003
inherit	1	0.0183	0.0126	2.1154	0.1458
access3k	1	-0.0439	0.0100	19.2231	<.0001
havedebt	1	1.1079	0.2078	28.4140	<.0001
nw	1	0.0183	0.00316	33.5165	<.0001
loginc	1	0.1032	0.0227	20.6445	<.0001
logdebt	1	-0.0433	0.0136	10.1921	0.0014
logassets	1	0.1758	0.0151	135.0377	<.0001

Odds Ratio Estimates

Effect	Point Estimate	95% Wald Confidence Limits	
ttmcogfacactmain	3.183	2.952	3.432
ttmbehactmain	1.213	1.128	1.305
shorthrzn	0.960	0.892	1.033
incvaluefa	1.056	0.971	1.149
decvaluefa	0.974	0.906	1.047
rwlehhsal	0.853	0.753	0.966
female	1.250	1.118	1.398
agerefcont	0.994	0.990	0.998
agepartcont	0.998	0.993	1.002
marsepdivwid	0.694	0.604	0.797
marnever	0.818	0.717	0.934
hhsize2to4	0.664	0.586	0.752
hhsize5plus	0.639	0.505	0.810
depch1or2	1.202	1.097	1.317
depch3ormore	0.896	0.726	1.106
jobrefret	0.680	0.577	0.801
jobrefnowknoret	0.263	0.234	0.296
jobstatnopart	0.139	0.087	0.221
jobpartret	0.627	0.509	0.772
jobpartnowknoret	0.488	0.442	0.539
milrefnoserve	1.004	0.904	1.116
edurefhsorless	0.844	0.772	0.924
edurefbac	1.265	1.144	1.398
edurefgrad	1.947	1.726	2.196
eduparthsorless	0.731	0.649	0.823
edupartbac	0.928	0.819	1.051
edupartgrad	1.342	1.149	1.568
raceblack	0.985	0.886	1.096
racehisplatino	0.459	0.410	0.513
raceother	0.679	0.586	0.787

Odds Ratio Estimates

Effect	Point Estimate	95% Wald Confidence Limits	
ownsno	0.940	0.843	1.048
ownsother	0.565	0.482	0.662
owndyes	1.069	0.982	1.165
hltnrefex	0.873	0.800	0.954
hltnreffr	0.868	0.790	0.953
hltnrefpr	0.453	0.368	0.559
hltnpartex	0.839	0.752	0.936
hltnpartfr	1.017	0.890	1.162
hltnpartpr	1.149	0.888	1.487
refsmoke	0.971	0.884	1.067
sosmoke	0.743	0.646	0.854
subreflife	0.997	0.993	1.000
subpartlife	0.988	0.983	0.992
exprefrefage	1.003	1.001	1.004
exprefpartage	1.003	1.001	1.004
inherit	1.018	0.994	1.044
access3k	0.957	0.938	0.976
havedebt	3.028	2.015	4.550
nw	1.018	1.012	1.025
loginc	1.109	1.060	1.159
logdebt	0.958	0.932	0.983
logassets	1.192	1.157	1.228

Association of Predicted Probabilities and Observed Responses

Percent Concordant	86.5	Somers' D	0.729
Percent Discordant	13.5	Gamma	0.729
Percent Tied	0.0	Tau-a	0.344
Pairs	137493856	c	0.865