The association between time preference and net worth: Incentivized choice and scaled approach using the NLSY79

by

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B.S., Long Island University, C. W. Post, 1986
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AN ABSTRACT OF A DISSERTATION

submitted in partial fulfillment of the requirements for the degree

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Abstract

Americans seem to be financially vulnerable and lack sufficient net worth to overcome financial obstacles such as unforeseen medical issues, temporary job loss, or changing economic conditions. Americans aren't saving enough, have too much debt, and tend to have a short-sighted view on their finances. Wealth is a primary indicator of financial and economic security and maintaining and improving standard of living are two important financial goals. Aggregate net worth can be used to gauge the financial well-being of Americans because it includes both assets and liabilities.

It is hypothesized that part of the instability which results in the lack of accumulating adequate wealth, is time preference. Time preference is an important psychological construct which examines the ability to defer gratification. Time preference represents the intertemporal choice between immediate versus delayed utility. A low rate of time preference implies a low rate of intertemporal discounting. Individuals with low discounting do not heavily discount the future and are able to defer gratification. A high rate of time preference or a high rate of intertemporal discounting, suggests that individuals are more present oriented, heavily discount the future, prefer immediate gratification.

This research study takes a unique approach to examining time preference since the experimental community lacks a clear consensus on how to best measure this construct. Standard risk and time preferences measures are typically achieved through responses to financially incentivized choice questions. Researchers have argued that incentivized choice questions may be common but they lack precision. Therefore, combining behaviors that involve intertemporal tradeoffs into a scale to measure time preference is believed to be a more accurate indicator of time preference. However, there is little research that has reliably developed and tested its use.

This research examines time preference by comparing incentive choice questions as a proxy for time preference as well as an additive scale of intertemporal behaviors using a national representative sample.

Regression analysis revealed that that time preference measured using an additive scale of intertemporal behaviors was significantly associated with net worth. The incentive choice questions as a measure of time preference were not significantly associated with net worth. The respondents with a high rate of intertemporal discounting as measured by the time preference scale accumulated less net-worth than respondents with a lower rate of intertemporal discounting. In addition, in the regression model when individual behaviors involving intertemporal tradeoffs such as smoking, drinking, and not taking physical exams were added as individual behaviors, the model was the preferred predictor of net worth.

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Thanks to the Institute of Personal Financial Planning at Kansas State University for allowing me to be a part of this program and providing me with an amazing experience.

Dedication

I dedicate this body of work to my parents Francesco and Antonietta Canale, who despite not being able to get an education of their own, are still two of the smartest people I know.

Thank you for helping me realize the time value of family.

Preface

Remember that time is money.

-Benjamin Franklin

Chapter 1 - Introduction

Trends in household wealth have a direct effect on the well-being of individual households and should be of a topic of interest to the American public (Wolff, 2017). According to Wolff, the early part of the 21st century has seen a struggling middle-class despite somewhat robust growth in the U. S. economy. Millions of families who once enjoyed upward mobility and financial security are now sliding down the economic ladder (Billitteri, 2009). According to a Pew Research Center study in 2008, more than half the respondents said that they either made no progress in life or had fallen backwards over the past five years. In addition, almost 80% of survey participants said it was more difficult for the middle class to maintain their standard of living compared with five years earlier (Billitteri, 2009).

Purpose

The purpose of this research is to develop a clearer understanding of why Americans are financially vulnerable and lack sufficient net worth to overcome financial obstacles like a medical issue, temporary job loss, or changing economic conditions. This study will focus on the economic construct of time preference and its effect on net worth. The main hypothesis is that within the general phenomenon of delay discounting, time preference is associated with net worth.

There is a consensus that rising debt has made American families increasingly vulnerable to unemployment, divorce, and illness (Sullivan, Warren, & Westbrook, 2000; McCloud & Dwyer, 2011). While there are many reasons behind this financial vulnerability, according to Ameriks, Caplin, Leahy, and Tyler (2004) self-control problems represent a link between psychological forces and economic behavior. They further stipulated that standard self-control

problems impede wealth accumulation. Their results support a theory that the link between wealth accumulation and the propensity to plan is through what they called "effortful self-control." Wittman and Paulus (2007) added that for effective functioning, one must postpone impulsive urges for immediate gratification and persist in goal-oriented behavior to achieve positive outcomes in the future. For example, the process of accumulating net worth, requires a patient and thoughtful methodical approach of delaying immediate gratification for future benefits. While there are practical reasons why Americans aren't accumulating wealth, this research will attempt to look beyond the practical and explore the latent reasons why accumulating wealth has escaped many Americans.

The Great Risk Shift

The fortunes of the middle class have garnered a lot of political and media attention since the presidential election in 2012 and throughout the presidential campaign of 2016 (Wolff, 2017). American families face increasing risks of job loss, declines in income, and housing insecurity (Dwyer & Phillips Lassus, 2015). Decades of economic restructuring, deregulation, and the declining role of government in social insurance programs have created what Hacker (2006) referred to as the "great risk shift." According to Hacker (2006), the great risk shift is an economic transformation with massive long-term transfers of economic risk. The notion is that government and businesses have transferred the burden of providing healthcare, income security, and retirement saving onto working class Americans leaving them vulnerable to economic catastrophe (Billitteri, 2009). This risk shift has affected most major aspects of American economic life such as jobs, healthcare, work and family balance, assets, and retirement (Hacker.

2011). Hacker argued that this shift has fundamentally changed the relationship between individuals, their employer, and their government.

The Outlook

The prospects of American financial well-being have declined over the recent past. Sixty percent of households saw their wealth decline between 2007 and 2009 and 25% lost more than half their wealth over that period (Bricker, Bucks, Kennickell, Mach, & Moore, 2011). Those declines were widespread affecting households across all age, income, and education groups (Deaton, 2011). According to a 2015 survey conducted by Bankrate.com, 29% of Americans reported that they had no emergency savings, which was the highest level in five years. Another 21% said they had some savings but not enough to cover even three months of living expenses, and 13% didn't know how much they had or declined to answer (Herron, 2015). Despite tax incentives to promote saving for retirement, 57% of Americans surveyed by Gallup in January 2013 reported that they were worried about outliving their savings after they retire (Topoleski, 2013). In addition, nearly half of American families have no retirement savings and that figure is even lower for lower-income families (Morduch & Schneider, 2017). To make matters worse the household saving rate declined from 10% in 1980 to less than 1% by 2006 (Dwyer, McCloud, & Hodson, 2012).

Saving

According to the U.S. government's National Income and Products Accounts (NIPA) the savings rate in the U.S. from 2007 to 2010 was only 3.9% and a mere 4.8% from 2010 to 2013. Campbell and Weinberg (2015) reported that after 2006, the savings rate has hovered around

zero percent. Campbell and Weinberg further stipulated that NIPA, which uses after tax income minus spending to measure personal saving, is the most widely cited measure of personal saving.

Data reported by Wolff (2017) however, showed that between 2010 and 2013 the savings rate was a negative 30.8%. What accounts for the huge discrepancy in the data is due to the way in which the savings rates are measured. Since the NIPA savings rate is defined as income minus consumption expenditures, if a household withdrew cash from a savings account or sold an asset, it was not considered dissavings. Wolff's data however, along with the Survey of Consumer Finances (SCF), acknowledges those activities as dissaving. In addition, NIPA computes savings rates from annual data whereas Wolff used pseudo-panels over time accounting for additional discrepancies in the savings rates.

Although the authors noted several shortcomings of the NIPA savings rate, they argued that it was impossible to ignore the negative trend of the savings rate over the past two decades and noted that it had fallen more sharply than in most other developed countries. It should also be recognized that other savings rate estimates range from zero to five percent depending on the technique employed in its measurement, but these measures all indicate savings rates which are woefully low.

Debt

Asset building is the fulfillment of the American dream for millions of poorer Americans. Recently, the cost of those assets and consequently the price of that dream has become record levels of household debt (Boshara, 2012). According to Sullivan, Warren, and Westbrook (2000), the American middle class is in trouble and increases in consumer debt is a prominent cause. The ratio of household debt to GDP in 2007 reached levels not seen since the Great Depression. Americans also accumulated more debt between 2001 and 2007 than the previous 45

years (Boshara, 2012). From 2007 to 2010 there was a modest reduction of 4.4% in average debt in constant dollars and over the 2010 to 2013 period there was a major retrenchment in average debt of 12.6%. This however, did not translate into positive saving (Wolff, 2017).

In 2010, overall indebtedness increased with the debt to net worth ratio climbing from 15% in 1983 to 21%, and then falling to 18% in 2013. According to Wolff (2017), the large rise in indebtedness from 2007 to 2010 could be due to a rise in absolute level of debt or a reduction in net worth and income. In contrast, from 2010-2013 relative indebtedness declined due to reductions in mortgage and household debt among other forms of debt. This reduction in debt however, led to dissaving over this period because of a reduction in asset ownership and a decline in the value of assets (Wolff, 2017).

The Wolff (2017) data indicated that the debt to income ratio peaked in 2010 and then came down in 2013, while the debt to net worth ratio peaked in 2007 and then fell in 2010 and 2013. There was a sharp rise in the debt to net worth ratio of the middle class from 37% in 1983 to 46% in 2001 and then to 61% in 2007. The increase was particularly steep between 2001 and 2004 mainly due to rising mortgage debt.

In 2013, the debt to net worth ratio of the top 1% was only 2.6%, while the next 19% of wealth holders had a debt to net worth ratio of 11.8%. The middle three quintiles of wealth holders however did not fare as well. They experienced a debt to net worth ratio of 64% in 2013. This was referred to by Wolff (2017) as a vivid demonstration of the "middle-class squeeze."

What these data show is that the top quintile of wealth holders in the United states had not taken on nearly as much debt as the middle three quintiles which essentially make up the middle class. Part of this increase in debt can be explained by families borrowing against their homes which had appreciated in value. This is evidenced by mortgage debt increasing from 29%

of total assets in 1983 to 47% in 2007, while home equity as a share of assets actually fell. Another reason for the increased debt was a large run up of credit card debt that occurred because of the increased availability and ease of acquiring credit. In addition, it is important to mention that during this time, middle-class families experienced stagnating incomes and increased their debt to finance normal consumption expenditures (Wolff, 2017).

The U.S. has transitioned from being a nation of savers to a nation of borrowers (Carruthers & Ariovich, 2010). For many families borrowing has replaced saving. Dwyer, McCloud, and Hodson (2012) reported that median income families spent about 18% of their earnings on debt service. The new debt society extends the economic insecurity from the less well off to the middle class, most of whom have no assets or have debts that exceed their assets (Wheary, Shapiro, & Draut, 2007). Boshara and Emmons (2015) reported that excessive household debt played a large role in the financial crisis and Great Recession.

Financial Security

Typically, ways to gauge financial security has been to measure one's bank account or level of income. However, a primary indicator of household financial security and prospects in the United States is wealth. Fitzsimmons and Leach (1994) suggested that net worth is a more inclusive measure of a family's financial situation than asset ownership or level of savings. This is because it includes both assets and liabilities. Studies that use assets or savings levels ignore the demands that liabilities place on financial security (Wakita, Fitzsimmons, & Liao, 2000).

Family economists are generally in agreement that maintaining or improving standard of living and maintaining or improving financial security are the two most important goals held by individuals and families (Wakita et al., 2000). Perhaps more importantly according to

Gottschalck, Vornovytskyy, and Smith (2013), aggregate net-worth can be used to gauge the financial well-being of Americans.

Net Worth

Accumulating wealth is an essential step in the process of creating household financial security (Gutter & Fontes, 2006) and it is important to understand the composition of wealth in the United States to be better prepared to analyze it. In 2013, owner-occupied housing was the most important asset of the average portfolio accounting for 29% of total assets. Other real estate accounted for 10% and business equity another 18%. Cash equivalents made up 7.6%, pension accounts 16.5%, bonds and other financial securities 1.5%, corporate stock and mutual funds 12.7%, trusts made up 3.2%, and miscellaneous assets were 1.5%.

From 2007 to 2010 median wealth fell by a staggering 44% (Wolff, 2017). The inflation adjusted median and mean net worth fell dramatically during this period. The median fell 38.8% and the mean by 14.7% (Bricker, Kennickell, Moore, & Sabelhaus, 2012). These declines in net worth were substantially higher than the decreases in family income. This contrasted with the two previous surveys which showed substantial increases in the median and mean net worth (Bricker et al., 2012). The decreases in median net worth were driven largely by the collapse in housing prices although the decline in the value of financial assets and businesses were also important factors in the reductions of wealth. Median household net worth decreased by $5,046 or 6.8% between 2000 and 2011 (Vornovitsky, Gottschalck, & Smith, 2014).

Americans had reached the highest rate of home ownership ever recorded in 2004 despite weak economic growth. In 2005, they had the highest concentration of wealth in homeownership since records were kept. From 2007 to 2010 house prices collapsed by 24% in real terms (Wolff, 2017). Housing wealth jumped to 34% in 2004 and declined to 29% in 2013 (Wolff, 2017).

Americans however, also had the highest ratio of household liabilities to income ever recorded in 2007, and in 2005 had the lowest personal savings rate since 1934. Most of the people suffering devastating losses in net worth had their worth tied up in the value of their home, which in many cases contained mortgage debt (Emmons & Noeth, 2013).

In 1989, the average prime working age family had accumulated only enough wealth to sustain normal consumption patterns for a period of 3.6 months in case of the loss of income. The next lowest 20% had only enough to sustain one month at 125% of the poverty level, while the bottom 20% had no reserves at all. By 2013, the average working age family had even lower reserves. They had accrued enough to sustain normal consumption for 0.2 months (Wolff, 2017). These statistics point out the tenuous levels of net worth accumulated by many Americans and this recent loss of wealth for many Americans is problematic. The fraying of the private and public safety net may have led to the increasing insecurity of the middle class (Wolff, 2017).

The average net worth of a family younger than 40 was 26% lower in 2010 than in 1989 (Emmons & Noeth, 2013). The financial struggles suffered by many young people during the financial crisis and recent recession reinforced a trend of growing wealth disparity across age groups over the past 20 years. Between 1989 and 2010, the average inflation adjusted net worth of a middle-aged family increased by 38%, compared to a 68% for older families. A large increase in the level of mortgage debt held by young families facilitated the destruction of wealth when the housing bubble burst. Younger families were especially vulnerable to the effects of the severe housing downturn. Post-crash evidence confirmed that the debt burdens were a significant predictor of financial distress and losses in wealth. These losses of wealth continued a two-decade trend where the wealth of younger families failed to keep pace with their middle aged and older counterparts (Emmons & Noeth, 2013).

Wealth losses for young families were so severe that on average, their net worth in 2010 was significantly lower than in 1989 after adjusting for inflation. The largest portion of the changes in net worth for all families was the decline in the average value of residential real estate (57.5%). The decline in value of business and financial assets also contributed about 45.6% of the change in net worth between 2007 and 2010 (Emmons & Noeth, 2013). While the loan-to-home value had little change from 2004-2007, broader measures of debt such as the total debt-to-total assets ratio and the total debt-to-family income ratio were not consistent with historical norms during the mid-2000s. The debt to net worth ratio reached 69% in 2010 (Wolff, 2017).

Net worth and saving are an important element of economic security (Wolff, 2016). The importance of net worth as an indicator of financial well-being is well documented. The recent fluctuations in net worth coupled with the decreasing number of traditional pension plans and the increasing emphasis on individual responsibility for retirement income cannot be understated. In the field of financial planning there are few elements of a financial position as important as net worth in determining financial well-being and financial security. There is sufficient justification for examining the level of net worth in more detail in any context.

Fluctuations in net worth in net worth have real world implications. The mean wealth of the top one percent increased to 18.6 million dollars in 2013. The percentage increase in net worth from 1983 to 2013 was much greater for the top wealth groups than for those in the lower distribution. Between the same period the top one percent amassed 41% of the total growth in net worth and the top 20% received 100% (Wolff, 2017).

Looking Ahead

It has become quite clear that Americans aren't saving enough, have too much debt, aren't building net worth, and tend to have a short-sighted view on their finances. Households with similar socioeconomic characteristics have savings and wealth that vary considerably (Bernheim, Skinner, & Weinberg, 2001; Lusardi, 2000; Venti & Wise, 1998). Venti and Wise (2000) found that at all levels of lifetime income there was a huge disparity in the accumulated wealth of families nearing retirement. In their study, Venti and Wise found households with low incomes that saved very little of their income but also found a significant proportion of high income households that also saved very little. The researchers also found that there were a significant proportion of low income households that saved quite a bit. Life cycle models attribute these variations among other things to time preference rates. The rate at which people discount the utility of a future benefit. It stands to reason that as Bernheim, Skinner, and Weinberg (2001) pointed out, if households are shortsighted, express bounded rationality, are dynamically inconsistent, impulsive, or prone to regret, then the sufficiency of savings becomes an important empirical question. One that requires further examination.

Why Americans Don't Build Wealth

Dissaving

During the Great Recession, the middle class was highly leveraged and were highly concentrated in the value of their homes. Median net worth declined steeply between 2007 and 2010 mainly because of the high negative rate of return on net worth in the middle three wealth quintiles. This was due to the fall in home prices and their high degree of leverage. However, this

should have accounted for 27% of the fall in median wealth. According to Wolff (2017), dissaving was responsible for the remaining 17% of the fall in median net worth.

The lack of improvement in net worth from 2010 to 2013 was likely due to dissaving during that period as well. This was evidenced by the fact that there was a recovery in asset prices (except for the housing market) but no change in net worth during that period. Based on the rates of return for the middle three wealth quintiles, median net worth should have increased by 36% from 2010 to 2013. Since there was relatively little change in net worth over that period, it appears the lack of increase was due to significant dissaving over this period (Wolff, 2017).

Income Volatility

To be sure some American families appear to be living for today rather than thinking about the long term (Morduch & Schneider, 2017). However, according to Morduch and Schneider that assessment appears to be incomplete. There were many Americans that had experienced significant monthly income volatility over the course of their study. For about five months a year, household incomes were not even close to their average. The spikes and dips in income were often quite large. The average spike in income was 52% above the average monthly income and the average monthly dip was 46% below the average. Some of the fluctuations in income were due to job loss, unstable households, self-employment income, and variations in pay (Morduch & Schneider, 2017). Under those circumstances it might be difficult to accumulate any real savings.

Spending Variability

Another issue which made it hard for American families to accumulate wealth was the variability of spending patterns (Morduch & Schneider, 2017). In addition to income volatility, Morduch and Schneider found that among their participants, spending was nearly as variable as

income. Households experienced about five months per year when spending was a least 25% above or below its average. Federal Reserve data also showed that only about half of Americans reported steady month to month spending while 44% said their spending bounces up and down each month. The spending fluctuations can be attributed to households living paycheck to paycheck, unexpected expenses, increases in health care costs, housing costs, and education costs. These issues have been exacerbated by stagnant wages (Morduch & Schneider, 2017).

Myopic Behavior

According to Sass, & Ramos-Mercado (2015), Americans seem to be short-sighted about their finances and seem incapable on their own to devote much effort to addressing distant financial problems. This is despite becoming increasingly responsible for saving a substantial portion of their income for their financial needs due to the great risk shift (Sass & Ramos-Mercado, 2015). Sass, Belbase, Cooperrider, and Ramos-Mercado (2015) found that a household's financial satisfaction is intensely present minded. Even though Americans are required to save more for their own retirement, Sass et al. (2015) pointed out that people will focus more on day-to-day needs creating an obstacle to saving for retirement. Individuals who don't save enough for the future will eventually be dependent on the government and their families for their future expenses (Griesdorn & Durband, 2015).

Millions of American families were exposed to the inevitable market fluctuations which ultimately decimated their balance sheets during the financial crisis of 2008. According to Boshara and Emmons (2015) this was due in large measure to too much housing and too much debt, in combination with too little savings.

This Study

Time Preference

This research will examine another area that may contribute to financial instability. The study will focus on the concept of time preference as its primary area of interest. The literature points out that having a low rate of time preference is synonymous with a low discount rate and suggests that a person is patient, has self-control, and values the future. In contrast, having a high rate of time preference or a high discount rate implies that a person prefers current satisfaction, is impatient, or lacks self-control, and greatly discounts the future (Smith, Bogin, & Bishai, 2005). Since wealth, as indicated by net worth is one of the primary bellwethers of household financial security and prospects in the United States (Gottsschalck, Vornovytskyy, & Smith, 2013), it is useful to keep net worth central to the analysis as the key dependent variable of interest.

The income volatility and variable spending patterns experienced by Americans exacerbate the lack of sufficient savings and overspending. However, the rate of time preference, or the rate at which intertemporal discounting occurs can determine whether an individual chooses saving for the future or chooses to consume more of their current income. The hypothesis is that those who continuously choose future benefits over current consumption would be more likely to accumulate a higher net worth. Since the hyperbolic discount model indicates that the longer the time delay the lower the discount rate, this suggests that someone faced with a consumption versus savings decision in the short term will discount the immediate future more heavily than the distant future.

This research study examines the relationship between time preference and the level of net worth accumulated by the participants. It is hypothesized that those who exhibit behaviors associated with low discount rates will accumulate more wealth than those who exhibit behaviors

that are associated with high discount rates. The study takes a unique approach to examining time preference since the experimental community lacks a clear consensus on how to best measure this construct. Standard risk and time preferences measures are typically achieved through responses to financially incentivized choice questions. It is common to ask respondents what dollar amount in the future would they need to make them forego receiving money in the present (Finke & Huston, 2013). Some researchers argued that incentivized choice questions may be common but they lack precision. According to Finke and Huston (2013) a combination of intertemporal behaviors as a liner scale may serve as a more accurate measure of individual time preference.

The concept of developing and using a scale to measure time preference is a viable one. However, there is little research that has reliably developed and tested its use. Finke and Huston (2004) developed and used a scale to proxy time preference, but it was used on a sample of college students and reliability and validity testing could not be found. The authors also recreated a very similar scale in a 2013 with responses from an email survey of students at a large midwestern university in the United States.

This study will attempt to replicate a similar time preference scale concept using a national dataset which contains the variables of interest. The use of a national representative sample will add to the research of Finke and Huston and provide more generalizable results. More importantly, the national dataset affords the opportunity to measure the construct of time preference using incentivized choice questions also in addition to a scale. This approach will allow the comparison of two different methods to measure time preference among the same participants as they relate to net worth. The approach of comparing incentivized choice and a time preference scale within the same sample was attempted by Finke and Huston (2013),

however that study focused on the willingness to save for retirement among a college student sample. Testing these two methods with a national representative sample will augment the work of Finke and Huston and will be a valuable addition to the field.

The first research question is to determine whether time preference as measured by incentivized choice is associated with net worth. The second question is to determine if time preference as measured by a time preference scale is associated with net worth. The third research question is to determine which method of measuring time preference was a better predictor of net worth. It is hypothesized that there is an association between time preference and net worth, but that use of a time preference scale will be a better measure of the construct. The hyperbolic discounting model will be used as the theoretical framework to guide the study.

Theoretical Guide

Hyperbolic discounting refers to the tendency for people to choose a sooner smaller reward over a larger-later reward as the delay occurs sooner in time (Redden, 2006). The hyperbolic discounting model is used to frame this research by applying the model to accumulating wealth versus current consumption decision choices.

There is a common strategy in the elicitation of discounting rates in individuals. One is a choice between a present value choice (PV) now, and a future value choice (FV) later. It is presumed that the FV is discounted to its net present value (NPV) and compared to the PV choice. Individuals will choose the FV choice if its discounted value is greater than the PV choice (Doyle, 2013). Those who are impulsive are thought of as having high internal discounting rates. Those who are more measured in their approach are thought of as having low internal discount rates. The model suggests that people will spend and save according to how much they discount the future benefit of saving relative to current consumption. When offered a

larger reward in exchange for waiting some set time, people act less impulsively and choose to wait (Redden, 2006). People avoid waiting more as the wait is closer to the present. Based on this concept any choice that delays a reward appears less attractive and people will tend to discount it.

In a savings and consumption context, this implies that those with a high discount rate would discount the FV of savings to a relatively smaller NPV so that when compared to immediate consumption, those individuals would choose a current consumption choice. It stands to reason that those with a low discount rate would not discount the FV of savings as much, so the NPV of saving would be higher when compared to the PV of the current consumption choice. As the model suggests, if the NPV of saving is greater than the PV of current consumption, a consumer would choose the future benefit of saving over current consumption. The hyperbolic discounting model also indicates that as the time-period or the length of the time delay increases, the lower the NPV of the future choice.

Key Dependent Variable

Most studies have examined the distribution of well-being and changes over time in relation to income. However, according to Keister (2000), using income by itself as an indicator of financial well-being may not be adequate since income and wealth are not highly correlated. According to Kim, Aldrich, and Keister (2004), this suggests that using income alone as an indicator of financial well-being captures only part of a household's financial position. Ignoring assets gives a distorted picture of life especially at the bottom of the income distribution (Conley, 1999).

The primary dependent variable of interest in this research is net worth. Net worth was chosen as the focus of the research because net worth is of vital importance to the financial

health and stability of individuals and families. What makes the difference for families that do well financially and those that do not, are simple straightforward behaviors like developing spending plans, keeping records, save regularly and practicing wise and practical consumption (Fitzsimmons & Leach, 1994). This is important because decisions involving tradeoffs among costs and benefits not only affect one's health, wealth, and happiness but may also determine the prosperity of a nation (Frederick, Loewenstein, & O'Donoghue, 2002).

Significance

One of the most important issues in personal finance is net worth. Building and maintaining sufficient net worth is vitally important to the financial well-being of all people. Most are aware that they should not spend more than they earn but they don't seem to be doing so. Despite the organizational tools and financial literacy programs that are out there, Americans are still not building enough net worth to support themselves through their retirement. This puts additional pressure on others and the federal government for financial support. An understanding of how and why some individuals are successful in building significant net worth, despite earning only average amounts of money income over their lifetime, and why others are not will be a significant addition to the field. Few if any studies have examined building net worth through the lens of time preference. Analyzing the association between an individual's net worth and their time preference will expand the base of knowledge and help understand the reasons why people fail to adequately prepare for their financial futures.

Time, is one of our most important and fleeting resources known to man. Understanding more about the relationship between time and the way in which people perceive time, can be an integral part of identifying why consumers make consumption and savings decisions. People

who have a more present oriented time preference and heavily discount the future may be prone to greater current consumption, while those who have a preference for the future, may be more likely to avoid certain consumption behaviors in favor of saving and building wealth. Ultimately, these preferences may lead to higher or lower levels of net worth and affect one's ability to have and maintain a healthy financial life through retirement.

Frederick et al. (2002) argued that reintroducing the multiple motives approach to intertemporal choice will help understand and explain the intertemporal choices observed in the real world. It also provides a greater scope for understanding individual differences in people, such as, why one person is a spendthrift and another is a miser. They further reported that people differ in the way they experience anticipatory utility or are influenced by visceral factors. According to Fredrick et al. (2002), understanding of intertemporal choices will progress more rapidly by importing insights from psychology. This research is designed to bring that very same idea to the field of personal finance.

There is some evidence in the literature that time preference, discount rates, and individual perceptions of time can be altered. The literature suggests that through education, exposure to violence, interventions in childhood, and learned techniques one can potentially alter their time preference. This may be an opportunity for financial planners, therapists, and counselors. If financial professionals can understand more about their client's time preference, in situations where high rates of time preference are discovered steps can be developed and implemented to help enable people with high time preferences to moderate their preference so that they will be better equipped to build net worth. Finding new ways to measure time preference and discovering issues that influence net worth would be significant to the field, since individuals and families are woefully underprepared for the future. In addition, it will help

practitioners in the field of personal finance to develop and implement new and additional techniques to help clients achieve their financial goals.

Chapter 2 - Literature Review

Time in the Literature

Benjamin Franklin once said that time is money (Franklin, 1748). However, time and money are qualitatively distinct. There are some noteworthy differences between time and money that are particularly important. For example, money can be compounded which increases its value over time. Money can also be subjected to inflation which will in effect, decrease its value over time. Money can also be exchanged or traded and one can acquire more of it. Time on the other hand, does not possess those characteristics (Doyle, 2013). The difference is that anything that can be possessed for the most part can be replenished, but time cannot. Time that is lost or misspent cannot be regained and more importantly, no one can accrue any more moments of time no matter how hard they try. As time passes it is gone forever (Zimbardo & Boyd, 2008).

Time, according to Carstensen, Isaacowitz, and Charles (1999) is a structure by which people plan and implement all long- and short-term goals. Carstensen et al. (1999) suggested that time is fundamental to human motivation and therefore social goals depend on one's assessment of time. A limited view of time leads to an emotional state rather than a pragmatic state. With this perspective, people tend to focus subjectively and intuitively on the present rather than on the planned analytical objective of the future. The Carstensen et al. (1999) theory of socio-emotional selectivity is a life span theory that hypothesized that social goals compete with one another on a day-to-day basis and the assessment of time plays a critical role in the execution of behaviors.

To understand time in general, Zimbardo and Boyd (1999) referred to the Lewin (1951) life space model which integrates all temporal frames that people have at any given moment. This idea runs contrary to the Western conception of time as flowing at a constant linear rate and

is more in line with Eastern Zen philosophy which asserts that time runs in a circular fashion (Zimbardo & Boyd, 1999). The study of the perception of time is not new and can be traced back to Kant (1781/1965) where it was reported that time perception is an innate ability and affects the way in which we view the world.

According to Zimbardo and Boyd (2008), one's emotional state, personal time perspective, and the pace of their lives, influences the way in which they experience time. This is important because time is relative. Viewing the world through one particular time perspective may result in success while another may lead to failure (Zimbardo & Boyd, 2008). Nuttin (1964/1985) indicated that the future and the past experiences of one's life had an impact on their present behavior. The perception of time is strongly linked to subjective well-being, but depending on one's emotional state, the perception of time varies considerably among individuals (Wittmann & Paulus, 2007).

Time as such, should be a topic for active research in disciplines such as personal finance to develop an understanding of time and one's perception of time and how it might affect their financial behavior.

The Economics of Time

In economic terms, time is a scarce resource and because of its scarcity, it may be our most precious resource. This makes time much more valuable than money. In 1997, Robinson and Godbey wrote "Time has become the most precious commodity and the ultimate scarcity" (p. 25). No matter how one decides to invest their time, the opportunity cost of doing so can be thought of as limitless. In contrast, with money one always has the conservative option of keeping money in the bank and saving it for future use. This is not possible with time (Zimbardo

& Boyd, 2008). The investment of time carries with it huge opportunity costs and recognizing this notion should make people more conscientious about how they spend it.

Rational human beings seek to maximize their utility by engaging in activities or expenditures that bring the most satisfaction relative to their cost. However, decisions involving tradeoffs between cost and benefits occur at different times. In 1937, Samuelson used the term time preference to refer to the preference between immediate utility over delayed utility. Frederick et al. (2002) took this further by implying that such decisions can apply to health, wealth, and happiness.

Economic theories suggest that those who are less patient are less likely to exert energy or spend money and resources now, to receive benefits in the future (Bradford, Courtemanche, Heutel, McAlvanah, & Ruhm, 2014). Standard economic models assume that individuals make consistent intertemporal decisions. However, there is growing evidence from behavioral economics that individuals exhibit a more present bias on consumption decisions now. This suggests that the weight placed on consumption now relative to tomorrow is greater than the weight placed on consumption one year from now relative to one year and one day from now (Bradford et al., 2014).

Since preferences for current utility versus future utility involve a tradeoff, individuals that prefer current utility are said to be present oriented or having a high rate of time preference. Those who prefer utility in the future, are said to be future oriented and have a low rate of time preference. Consequently, the rate at which a person will discount future utility is referred to as their time preference.

Time Preference

Background

Every animal that builds a nest or burrow is deferring immediate consumption for a future reward. Thus, time preference has an ancient evolutionary history (Rogers, 1994). Böhm-Bawerk (1891) and Fisher (1930) equated time preference with the marginal rate of substitution between current and future consumption (Becker & Mulligan, 1997). Both Böhm-Bawerk and Fisher separated time preference into two distinct effects. First, they emphasized that the relative value placed on present versus future consumption depends on the relative consumption levels (Becker & Mulligan, 1997) and why Fisher's indifference curves are not linear. Secondly, they pointed out that present and future consumption does not need to be valued equally. This distinction led Friedman (1976) and Stigler (1987) to use the "rate of time preference," "impatience," and "discount factor" to refer to the marginal rate of substitution interchangeably (Becker & Mulligan, 1997).

The psychology literature has traditionally used the term time perspective which according to Brown and Biosca (2016), is similar to time preference in that they both relate to delayed gratification. However, time perspective, they claimed may be more holistic because it includes how individuals orientate themselves and think about the future. Guthrie, Butler, and Ward (2009) defined time perspective as a measure of the degree to which an individual's thinking is motivated by considerations of the past, present, or future. Lewin (1951) defined time perspective as a combination of the views of one's own psychological future and psychological past at a given point in time.

Zimbardo and Boyd (1999) identified time perspective as the non-conscious process where social and personal experiences are assigned to temporal categories that the possessor will

use to encode, store, and recall experienced events. These frames may reflect repetitive patterns or unique nonrecurring events in people's lives. The categories are then used in forming expectations, goals, contingencies, and imaginative scenarios. Time perspective, as noted by Zimbardo and Boyd, exerts a dynamic influence on many important judgments, decisions, and actions. Further, time perspective reflects the manner by which individuals and cultures partition the human experience into distinct temporal categories of past, present, and future (Zimbardo, Keough, & Boyd, 1997; Drake, Duncan, Sutherland, Abernathy, & Henry, 2008).

Zimbardo et al. (1997) created a scale to measure time perspective called the Zimbardo Time Perspective Inventory (ZTPI) where the past present and future temporal frames are subdivided into five subscales (a) past negative, which reflects a pessimistic attitude about the past and likely the result of traumatic life events, (b) past positive, which is more of a sentimental or positive view of the past, (c) present hedonistic, which is associated with the desire for immediate pleasure with little regard to risk or concern for the future, (d) present fatalistic, a lack of hope and the feeling that the future is uncontrollable, and (e) future, the belief that influencing the future is possible by working hard in the present (Guthrie et al., 2009; Zimbardo & Boyd, 1999).

Although time perspective can be affected by situational forces, it can become a relatively stable personality trait when a particular temporal bias comes to predominate one's outlook and behavior. People frequently will come to exhibit one dominate temporal orientation (Zimbardo & Boyd, 1999).

Time preference describes the natural tendency to enjoy goods now and pay later (West, McNabb, Thompson, Sheldon, & Grimley Evans, 2003; Guthrie et al., 2009). Since the future is uncertain, goods available for consumption now should be more highly valued than goods

available at some future date. Consequently, the value of the future goods should be discounted. The degree to which a person discounts the value of the future good, could be used as a measure of how much they value the present relative to the future (Guthrie et al., 2009).

Becker and Mulligan (1997) made four observations about time preference. First, people are not all equally patient. Second, the differences in many people can be explained. For example, patience seems to be associated with income, development, and education. Jevons (1931) illustrated a prime example of this point in his work of 1931. Jevons wrote "The untutored savage, like the child, is wholly occupied with the pleasures and troubles of the moment…" (p. 35). This seems to imply that as one develops and becomes more educated, they are better able to look past the immediate and focus more on the future Third, heavily discounting the future is viewed by many as undesirable or irrational. The common perception is that impatience is a weakness and needs to be overcome (Becker & Mulligan, 1997). The fourth observation made about time preference, was that people are often aware of their weaknesses and may expend energy and resources to overcome them. The authors surmised that the present is easy for people to experience through their own senses. For example, they cite, crying for food when hungry occurs even to an infant. The future however, must be anticipated by forming a mental picture of what the state of our wants, needs, and feelings will be at any particular point in time. Another set of anticipations must be formed to determine the consequences of the measures we take in the present and how they will affect our view of the future (Becker & Mulligan, 1997).

Thinking about why people discount the future more heavily than others is not new. Böhm-Bawerk (1891) posited that people excessively discount the future because they are not willing to put forth all the necessary effort to think about it. This suggests that the reason people

don't think about the future is because they are not willing to exert the effort to do so. This added to the notion as set forth by Senior (1836) when he wrote "...to seek distant rather than immediate results, are among the most painful exertions of the human will" (p. 60). Based on these articles, the authors seemed to indicate that not only do people avoid thinking about the future, but that it is also painful to do so.

When faced with decisions between immediate and delayed outcomes, several approaches have been identified (Daugherty & Brase, 2010). Social psychology uses the term delay of gratification (Mischel & Ebbesen, 1970) impulsivity (Ainslie, 1975), and time perspective (Zimbardo & Boyd, 1999). The willingness to postpone an immediate reward for additional benefits in the future is known as temporal discounting (Read, Frederick, Orsel, & Rahman, 2005).

Delay Discounting

Cognitive psychology and behavioral economics have used the terms delay discounting (Kirby & Maraković, 1996), temporal discounting (Read et al., 2005), and intertemporal choice (Berns et al., 2007) to describe decisions made between immediate and delayed outcomes, all of which have been used interchangeably (Daugherty & Brase, 2010). This perceived benefit of receiving an immediate reward vs. a future reward has been identified as leading to self-control problems and may increase the probability of negative outcomes like overconsumption, obesity, addiction, reduced human capital accumulation and diminished retirement savings (Kirby, Petry, & Bickel, 1999; Frederick et al., 2002, Bernheim & Rangel, 2004; Ameriks, Caplin, Leahy, & Tyler, 2007; Benhabib, Bisin, & Schotter; 2010; Ifcher & Zarghamee, 2011).

Delay discounting is the idea of immediate rewards being preferable to future rewards. The general principle in delay discounting is that people prefer money now rather than at some

point in the future. Therefore, when evaluating timed rewards people subjectively discount future payments by the delay in receiving them (Doyle, 2013). When faced with the option of a present choice and a future choice, it is presumed that the future choice is discounted to its net present value (NPV) and then compared to the present choice. People will choose the future choice if its discounted value is greater than the value of the present choice (Doyle, 2013).

The amount of incentive required to equal the value of an immediate reward is an individual decision influenced by the amount of time (or the delay) until the future reward is received (Daugherty & Brase, 2010). Individuals who exhibit a preference for a smaller more immediate reward to a larger delayed reward are said to have a steep discounting rate (Kirby & Maraković, 1996; Cheng, Shein, & Chiou, 2011). A steep discounting rate suggests that the value of a future reward depreciates quickly so that only larger future rewards will offset the value of the present reward (Daugherty & Brase, 2010). Those who prefer receiving a greater benefit in the future are said to have a shallow discount rate. A shallow discounting rate indicates that the value of future rewards depreciates slowly, so only small additional future rewards are required to offset the value of the present reward (Daugherty & Brase, 2010). It has been demonstrated that delay discounting can affect one's health, wealth, and happiness (Cherukupalli, 2010; Daugherty & Brase, 2010; Dittmar & Bond, 2010; Frederick et al., 2002; Cheng et al., 2011).

Since people would prefer to receive money now rather than later, and future payments are described as discounted by the fact that there is a delay in receiving the money, the most commonly described shape of discount behavior across time is hyperbolic. This suggests that delayed rewards are discounted by functions that are inversely proportional to the delay. Humans

have been shown to discount the future hyperbolically (Berns et al., 2007) which includes the characteristic of being more impatient in a short run tradeoff than in a long run tradeoff.

Intertemporal Choice

Intertemporal decision making has been the foundation of many economic models since Samuelson (1937) and a significant feature in human capital theory where it is believed that people with a high discount rate invest less in their future than others (Mincer, 1958; Becker, 1964; Golsteyn, Grönqvist, & Lindahl, 2014). Intertemporal choices are decisions that involve tradeoffs between costs and benefits occurring at different times. Temporal choice has also been a tenet of human capital theory where it was reasoned that people with high discount rates invest less in the future than those with low discount rates (or more future oriented thinkers) (Mincer, 1958; Becker, 1964). These decisions not only affect one's health, wealth, and happiness but may also determine the prosperity of a nation (Frederick et al., 2002).

A premise underlying temporal choice is that individuals devote their attention to the past, present, and future which affects how they incorporate perceptions about their past experiences, current situations, and future expectations into their attitudes, cognitions, and behavior (Shipp, Edwards, & Lambert, 2009). The perception of time is strongly linked to subjective well-being, but depending on emotional states, the perception of time varies considerably among individuals (Wittmann & Paulus, 2008). For effective functioning, one must postpone impulsive urges for immediate gratification and persist in goal-oriented behavior to achieve positive outcomes in the future (Wittmann & Paulus, 2008).

Associations

Associations have been found between time preference and: BMI (Golsteyn, et al., 2014; Komlos, Smith, & Bogin, 2004; Chabris, Laibson, Morris, Schuldt, & Taubinsky, 2008; Weller,

Cook, Avsar, & Cox, 2008; Sutter, Kocher, Rutzler, & Trautmann, 2013; Courtemanche, Heutel, & McAlvanah, 2014), exercise (Chabris et al., 2008; Bradford, 2010), smoking (Bradford et al., 2014; Harrison, Lau, & Rutström, 2010; Khwaja, Sloan, & Salm, 2006; Bradford, 2010; Sutter et al., 2013), drinking (Bradford et al., 2014; Sutter et al., 2013), cocaine and heroin abuse (Kirby & Petry, 2004), preventive health care utilization and medical screening (Bradford, 2010; Bradford et al., 2014; Picone, Sloan, & Taylor Jr., 2004), healthy behaviors among hypertensive patients (Axon, Bradford, & Egan, 2009), and overall self-assessed health (van der Pol, 2011). There is also research indicating that present bias is related to smoking (Burks, Carpenter, Gotte, & Rusticini, 2012), credit card borrowing (Meier & Sprenger, 2010), BMI (Ikeda, Kang, & Ohtake, 2010; Courtemanche et al., 2014), and underwater mortgages, a term used to describe a situation where the balance of the mortgage loan is greater than the fair market value of the property (Toubia, Johnson, Evgeniou, & Delquié, 2013).

In addition, high time preference has been associated with alcohol abuse (Bishai, 2001; Becker & Murphy, 1988), not having any life insurance (Della Vigna & Passerman, 2005; Drago, 2006), and low levels of education (Fersterer & Winter-Ebmer, 2000; Becker & Mulligan, 1997; Lawrance, 1991), not owning a home (Evans & Montgomery, 1994; Donkers & Soest, 1999). Poor health has been linked to high time preference (Fuchs, 1980; Becker & Mulligan, 1997; Komlos, Smith, & Bogin, 2003), along with low income (Lawrance, 1991), job displacement (Belzil & Hansen, 1999) and parental divorce (Compton, 2009; Booth & Amato, 2001).

Time Preference and Self-Control Behaviors

According to Smith, Bogin, & Bishai (2005), having a high time preference means a person has a high rate of intertemporal discounting. This implies that they value immediate satisfaction (i.e. is impatient and lacks self-control) and greatly discount the future. Therefore, a high time preference generally means a person is impatient or impulsive and has been linked to a number of behaviors and outcomes that involve self-control including smoking (Munasinghe & Sicherman, 2000; Compton, 2009; Evans & Montgomery, 1994; Becker & Murphy, 1988; Fersterer & Winter-Ebmer, 2000).

Having low time preference means a low rate of intertemporal discounting. This implies that a person is patient and has good self-control and values the future. Laibson (1997) noted that many individuals place a premium on self-control and those who have the capacity for it can follow through on exercise regimens, show up to work on time, and live within their means. Becker and Mulligan (1997) concluded that patience is associated with income, development, and education. As an example, since something like one's weight requires a person to forgo current consumption in favor of future potential health benefits, the rate at which the future benefits are discounted influences food consumption decisions (Smith, Bogin, & Bishai, 2005). All else equal, the authors argued that higher rates of time preference will lead to less investment in exercise and greater intake of calories, resulting in weight gain and an increased risk of obesity.

The literature suggests that sophisticated consumers may be aware of self-control issues and choose ways to pre-commit themselves and circumvent their time inconsistent preferences. Unsophisticated consumers on the other hand are unaware of their self-control problems or believe that they can overcome their self-control issues in the future (Ashraf, Karlan, & Yin,

2006; Scharff, 2009; Thaler & Shefrin, 1981; Wong, 2008; O'Donoghue & Rabin, 1999). These individuals, according to Klawitter, Anderson, and Gugerty (2012) would be less likely to seek out methods designed to commit them to future savings.

Time preference is believed to lead to self-control problems and may increase the likelihood of negative outcomes such as overconsumption, obesity, addiction, reduced human capital accumulation, and diminished retirement saving (Ifcher & Zarghamee, 2011).

There is some evidence for a neurological explanation for time discounting. Decisions concerning outcomes in the more distant future appear to be made in the prefrontal cortex part of the brain while decisions involving short-run outcomes are made in the more emotional limbic region of the brain (Berns et al., 2007; Finke & Huston, 2013). The ability of humans to resist temptation involves moderating emotional responses through cognitive effort (Finke & Huston, 2013). This reveals the importance of self-control in moderating short-run behaviors associated with long-run goals. The Finke and Huston 2013 study modelled time preference empirically as a predictor of retirement accumulation behavior.

Link Between Smoking and Time Preference

There is evidence in the literature that supports the view that smokers differ from non-smokers in their characteristics relevant to economic decisions. A high time preference or discount rate indicates a person is impatient or impulsive and has been linked to several behavior and outcomes including smoking (Munasinghe & Sicherman, 2000; Compton, 2009; Evans & Montgomery, 1994; Becker & Murphy, 1988; Fersterer & Winter-Ebmer, 2000), and not owning a home (Evans & Montgomery, 1994; Donkers & Soest, 1999). Preferences over the timing of an outcome will influence how individuals make intertemporal choices of whether to invest in education, whether to save or borrow, and whether to engage in health behaviors such as

smoking, drinking and drug use (van der Pol, 2011). Those who smoke, drink excessively, work in dangerous occupations, live a sedentary lifestyle, or consume an unhealthy diet involves a decision to weigh present satisfaction against the risk of a reduction in future satisfaction (Finke & Huston, 2013). As such, Finke and Huston pointed out that it would be irrational to sacrifice future utility in one set of decisions such as smoking, drinking, and having unprotected sex, while sacrificing present utility to increase future consumption in another like saving or investing for the future.

Research also suggests that intertemporal behaviors that involve time preference such as smoking and exercise are associated with wealth accumulation (Lusardi, 2003, Finke & Huston, 2013). According to Benjamin, Brown and Shapiro (2006) evidence from the NLSY indicated that individuals who scored higher in cognitive ability exhibited higher rates of financial market participation, asset accumulation, and lower rates of obesity and smoking. Adams, Bose, and Rustichini (2014) found that smokers make poor decisions and experience worse outcomes with personal finance as compared to non-smokers. According to Takagi, Kondo, Takada, & Hashimoto (2016) the time discount rate is the best predictor of behavioral outcomes such as smoking and credit card debt. A high discount rate is associated with a higher prevalence of risky behaviors (Becker & Murphy, 1988; Chaloupka, 1991; Takagi et al., 2016).

Fuchs (1982) found that time preference is positively correlated to years of smoking. Other studies similarly concluded that smokers discount future values at a higher rate than non-smokers (Bickel, Odum, & Madden, 1999; Mitchell 1999; Reynolds, 2006; Khwaja, Sloan, & Salm, 2006) and reported that those who are more impulsive and plan less for the future are more likely to smoke. Scharff and Viscusi (2011) concluded that smokers have high rates of time

preference with respect to years of life. Studies such as these, reveal why smoking has often been used as a proxy for time preference.

Adams et al. (2014) looked at the possible association between smoking status and personal finance decisions. They found that smoking is negatively correlated with willingness to delay rewards and conscientiousness. Smoking was also found to be positively correlated with willingness to take risks. That study also supplemented their data using the NLSY79 which was the first attempt to use population survey data to link smoking status to financial outcomes. The researchers related one's smoking status to financial outcomes such as being denied credit, missing a payment on a credit card or other bills, carrying the maximum balance on credit card, as well as filing for bankruptcy. Results indicated that smokers are different than non-smokers in financial decisions and outcomes even after controlling for factors affecting both financial decisions and the decision to smoke (Adams, et al., 2014).

Time Preference and Health Behaviors

Grossman (1972) modelled health behavior as an investment in health. As Grossman pointed out, health can be viewed as a durable capital stock that produces an output of healthy time and can be increased by investment as it depreciates with age. Grossman equated choices of investments in health to the expected discounted utility over a lifetime. Those who are more impatient or have higher time preference rates, may be less likely to invest in activities with low levels of instant gratification such as exercise and healthy eating (Brown & Biosca, 2016). The tendency of people to prefer immediate gain to later reward explains the limited self-control of individuals in making health related choices (Takagi et al., 2016).

Golsteyn et al. (2014) found that an adverse relationship exists between high discount rates, and school performance, health, labor supply, and lifetime income. Teuscher and Mitchell

(2011) suggested that steep delay discounting and short future time perspective are associated with health damaging and problematic behaviors such as addictive disorders, risky behavior, poor school performance, and delinquency.

One motivational construct that shows considerable promise in predicting health related risk and protective behaviors is time perspective. Present time perspective refers to the primary orientation for the here and now and the tendency to form goals and behaviors that satisfy immediate desires. Some studies have reported that individuals with different health related characteristics like substance abuse, gambling, risky behavior, delinquency, eating disorders, and obesity tend to exhibit steeper delay discounting functions and less future time perspectives (Teuscher & Mitchell, 2011). Future time perspective represents the tendency to refrain from immediate pleasure for long term reward (Henson, Carey, Carey, & Maisto, 2006). Since obesity is a public health concern and is associated with increased risk of specific health conditions such as diabetes, coronary heart disease, and stroke among others, it has been used in the literature in many time preference related contexts (Brown & Biosca, 2016).

Health and education decisions involve trade-offs of outcomes over time. This represents an individual's preference for current over future outcomes. Individuals with a high time preference will tend to invest in less healthy behavior and less education.

Health related behaviors that put one at risk such as smoking and excessive drinking may result in negative health consequences. In contrast, health protective behaviors such as condom use and driving with a seat belt may improve health status (Henson et al., 2006).

The rate of time preference may affect the demand for preventative care since individuals with a low discount rate should invest more in health (Picone, Sloan, & Taylor Jr., 2004). Picone,

Sloan, and Taylor (2004) found that individuals with higher life expectancy and lower time preference are more likely to undergo health conscious behaviors such as cancer screening.

Research has established a link between time perspective and risky behavior. For example, future time perspective has been associated with increased protective behavior and decreased risky health behaviors. Present fatalistic time perspective is associated with health destructive behavior (Henson et al., 2006). Present-hedonistic time perspective has been related to unhealthy risky behaviors such as alcohol and drug use, tobacco use, lack of seat belt use when driving, and increased sexual partners (Henson et al., 2006). Present orientation is associated with a limited sense of control, fatalism, immediate reward behavior, risky sexual behavior, substance abuse, and risky driving (Crockett, Weinman, Hankins, & Marteau, 2009; Rothspan & Read, 1996). Future orientation is associated with physical activity and healthy eating (Luszczynska, Gibbons, Piko, & Tekozel, 2004). Those with high future time perspective are more likely to delay gratification, tend to be in better health, have less impulsivity, and have an increased level of optimism (Joireman, Sprott, & Spagenberg, 2005). These findings establish a link between time perspective and choices between current enjoyment and future gratification.

Time Preference and Education

There has been research relating time preference to education. Fuchs (2004) found that education may be correlated with time preference. For example, individuals with low rates of time preference may be more likely to stay in school. Harber, Zimbardo, and Boyd (2003) found that time preference predicted when students sign up for their required class research projects and how well students meet their further research obligations. De Bilde, Vansteenkiste, and Lens (2011) discovered that students with future oriented time perspective adopt a more positive attitude about their schooling. This may have been a result of the fact that students with future

time perspective were more focused and as a result were better able to manage their time among their studies and social life. In addition, this was also reflected in their grades. College students with a future time perspective reported higher GPAs and students with present time perspective reported lower GPAs. These factors can also be carried into adult life and careers. According to Guthrie et al. (2009) higher scores on future time perspective scale were associated with more formal education and professional occupation and lower future time perspective scores was associated with less formal education and non-professional occupations.

Benjamin, Brown, and Shapiro (2013) examined two groups to understand the relationship between time preference and cognitive ability. One group was made up of Harvard University undergraduates and the other a group of Chilean high school students. The measurement of cognitive ability for the Harvard students was their SAT math scores. The Chilean students' math scores from national standardized practice tests were used to determine cognitive ability. Time preference was measured by asking students if they would prefer an amount of money today or some greater amount a week later. The researchers found that cognitive ability was inversely related to their discount rate. Students with higher cognitive ability were more patient.

Golsteyn et al. (2014) found that a higher discount rate was linked to weaker performance in both compulsory and secondary school, lower educational attainment and lower scores on military tests. The authors found a substantial negative relationship between high discount rates and school performance. Mischel, Yuichi, Shoda, and Rodriguez (1989) found that preschoolers' ability to delay gratification was a strong predictor of SAT scores over 10 years later. Happier respondents were less likely to agree with a live for today attitude (Mischel et al., 1989).

Time Preference and Financial Behaviors

Time Preference and Pension Participation

A link between time preference and pension participation has been established by several studies (Curme, & Even, 1995; Ippolito,1997; Samwick, 2000). Samwick (2000) found evidence that workers differ in the rate of time preference and less patient workers are less willing to forgo current income for pension contributions. Ippolito (1997) argued that individuals with low rates of time preference will seek out jobs that have pensions suggesting that more patient workers would be more likely to take a job with a pension and more likely to stay with the same firm until retirement to receive the pension payments. Curme and Even (1995) found that workers that have been denied credit are less likely to have jobs with pension plans supporting the hypothesis that workers with a high rate of time preference who discount the future greatly, will avoid jobs with pensions because pension savings cannot be borrowed against without cost. Workers with high intertemporal discount rates will also be less likely to join a defined benefit plan than a defined contribution plan because defined benefit plans have less flexibility in the savings rate.

Evidence of the relationship between participation in a pension and time preference can also be found from the 2004 data of the Survey of Consumer Finance (SCF). Planning horizons and pension acquisition were found to have a positive association. A greater percentage of households with long time horizons had pension plans than those households with short time horizons (Gouskova, Chiteji, & Stafford, 2010).

Gustman and Steinmeier (2002) looked at how time preference influenced a retiree's decision to collect social security payments. The Gustman and Stienmeier model examined the effect of heterogeneous time preference on deciding when to retire. The researchers found that either retirees with a high rate of time preference had not saved enough to wait until 65 or they

simply discounted the future benefit increases so much, that retiring at 65 reduced their overall consumption (Zumwalt, 2008).

Time Preference and Matched Savings Programs

Matched savings programs have emerged as an important way to build savings in low to moderate income (LMI) populations. Matched savings programs typically provide a dollar for dollar match up to a specified amount, as a way to incentivize continued saving. Individual Development Accounts (IDA) are a common example of a matched savings plan. Evidence from IDA programs have shown that participants in the program tend to save (Manturuk, Dorrance, & Riley, 2012). A field experiment with H & R Block found that providing a match on IRA accounts increased the participation rate from three percent to 14% (Duflo, Gale, Liebman, Orszag, & Saez, 2005).

In 2008, the New York City Department of Consumer Affairs Office of Financial Empowerment launched the $aveNYC matched savings program to leverage tax refunds into savings accounts to helps individuals save and build greater financial stability. A unique aspect of the program was that it incorporated several behavioral economic principles including mental accounting by splitting tax refunds into separate accounts; eliminating the hassle of opening accounts, and discounting since the matching funds are worth more as time passes.

Klawitter et al. (2012) examined the impact of time preference on saving in IDA programs and consistent with their expectations, found that participants with higher discount rates saved less than those participants with lower discount rates and saved more in the first year and were more also more likely to complete the program than those with higher discount rates.

Time Preference and Investment Behavior

Smith, Bogin, and Bishai (2005) described time preference as the rate at which a person would be willing to trade current utility for a future benefit and is often used in economics to explain savings and investment behavior. Time preferences they argued, are generally considered a precursor of economic decision making and are predicted to affect behavior across many dimensions (Bradford et al., 2014). Rogers (1994) wrote that the marginal rate of time preference varies with age of the investor and the delay between investment and return on investment (Rogers, 1994).

Time preference plays a fundamental role in theories of saving, investment, economic growth, interest rates, asset pricing, addiction and many other issues that get attention from economists (Becker & Mulligan, 1997). Trostel and Taylor (2001) argued that at the time of their writing an adequate explanation as to why people discount the future had not been provided. The authors cited Friedman's (1969) comment that discounting the future relative to the present seemed a satisfactory explanation in the absence of any other. Rogers (1994) argued that societies that discount the future will be long run survivors while Hansson and Stuart (1990) contended that societies that do not have intrinsic preferences for current consumption will be evolutionary winners.

Posner (1995) added that discounting occurs because people have "multiple selves" that weigh their present consumption more heavily than their future consumption. Becker and Mulligan (1997) reported that discounting occurs because of a defective recognition of future utilities. Ultimately, Trostel and Taylor (2001) found that the instantaneous utility function is expected to vary with age. The ability to enjoy consumption deteriorates over the life cycle and causes people to devalue future consumption.

Finke and Huston (2004) looked at the relationship between time preference and investment behavior. The authors hypothesized that time preference may affect investment behavior and other decisions. They believed that individuals engaging in present oriented behaviors were more likely to choose present oriented investments. They used respondent's choice between holding a $1000 savings bond to maturity, cashing it in for $500 in one year, or having $400 immediately. The authors created a proxy for time preference by constructing a scale of eight variables. Risky or myopic health related behaviors were cigarette smoking, use of alcohol, marijuana, and an unhealthy diet. Considered as preventative measures were vaccinations, doctor visits, and protected sex. Gambling frequency was used as a proxy for those that received present utility from immediate gratification.

Finke and Huston (2004) stipulated that the inability to focus on consequences that are not in the present may strongly influence the willingness to consider the benefits of long term investing or to maintain financial discipline in the near term. The authors reported that maximizing utility requires the application of temporal discounting. Finke and Huston (2004) further hypothesized that people who engage in risky behaviors are more likely to make myopic financial decisions.

The Finke and Huston (2004) study found that a present utility orientation was associated with myopic financial decisions. The study also reported that participants with higher time preference scores (higher rate of utility discounting), had greater odds of being in the group that wanted to cash in savings bonds immediately. The findings confirmed a strong association between more myopic individual behaviors and a preference for money now versus in the future. The results supported the hypothesis that savings and investment behavior are strongly and consistently related to the willingness to defer gratification.

Time Preference and Socio-economic Status

Griskevicius, Tybur, Delton, and Robertson (2011) held a series of experiments examining how mortality cues influenced decisions involving risk preference and temporal discounting. The mortality cue was a fictitious story describing recent trends toward violence and death in the United States that participants read before answering questions. The effect of mortality depended on if people were raised in a resource-scarce or resource-plentiful environment. The experiments found that those from poorer backgrounds took significantly more risk when primed with mortality cues. Conversely, participants from wealthier backgrounds took significantly less risk when primed with mortality cues. This mortality cues led to different patterns of risk taking as a function of a childhood socio-economic status (SES) environment. For individuals that grew up relatively poor, mortality cues led them to value the present and gamble for big immediate rewards. Individuals that grew up relatively wealthy, mortality cues led them to value the future and avoid risky gambles. The mortality cues appeared to steer individuals toward diverging life history strategies as a function of childhood SES. This suggested a strong implication for how environmental factors influence economic decisions and risky behaviors.

Some studies have found that persons of higher SES are more likely to be future oriented than persons of lower SES (Verdugo, Fraijo-Sing, & Pinheiro, 2006; D'Alessio, Guarino, DePascalis, & Zimbardo, 2003; Epel, Bandura, & Zimbardo, 1999; Fuchs, 1982; Lamm, Schmidt, & Trommsdorff, 1976).

Time Preference and Consumer Credit

Bryant (1990) stated that the willingness of consumers to borrow represents a time preference effect on the household debt. Adapting life cycle theory, Bryant proposed that the

factors that affect credit card balances are consumption needs, resources, interest rates, and consumer preferences. However, Bryant also pointed out that there are psychological factors that affect consumers' willingness to borrow. Zhu and Meeks (1994) also indicated that a consumer's willingness to borrow was based on psychological factors. Norum (2008) reported that consumers desiring immediate satisfaction rather than future gratification become short sighted in their thinking and become more short-sighted as their time preference for the present become greater.

Ottaviani and Vandone (2011) reported that the decision to use consumer credit is informed by the hyperbolic discount factor and pushes consumers to opt for an immediate purchase when faced with a buying decision. This occurs despite the fact that the consumer is rationally able to determine that the debt is unsustainable (Ottaviani & Vandone, 2011). According to Ottaviani and Vandone this is an indication that individuals "adopt impatient short-sighted behavior patterns which make it difficult for them to be fully aware of the consequences of their spending decisions for the sustainability of personal debt" (Ottaviani & Vandone, 2011, p. 755).

Meier and Sprenger (2010) found a correlation between present bias and credit card borrowing. This provided support for the behavioral economics models of time perspective bias in consumer choice. Meier and Sprenger reported that present-biased individuals were more likely to have credit card debt, and when controlling for disposable income, socioeconomic demographics, and credit constraints, had significantly higher amounts of credit card debt. This is consistent with other researchers that suggested that present bias impacts credit card borrowing (e.g., Laibson, 1997; Fehr 2002; Heidhues & Koszegi, 2010).

Previous research has used aggregate debt measures to assess present bias and credit card debt. Present bias was somewhat useful in explaining why consumers held credit card debt while also holding the low-yield assets to repay. However, it did not allow for the evaluation of individual behavior (Meier & Sprenger, 2010). To evaluate individual behavior, Meier and Sprenger used tax returns and credit reports to objectively determine income and credit card debt because these are items frequently misrepresented. Time preferences were measured using incentivized choice experiments where individuals were asked to make a series of choices between a smaller reward in a period and a larger reward in a later period. The choice experiments enabled measure of individual discount factors, and identification of individuals who exhibit inconsistent time preferences. Arguments have been made that experimental responses are affected by extra-experimental borrowing and lending opportunities (Coller & Williams 1999; Harrison et al., 2002; Cubitt & Read, 2007) and may be associated with credit, liquidity constraints, and credit experience.

The literature provides some evidence that time perspective influences consumer decision making, the use of credit card borrowing, and household debt however, the extent to which the broad dimensions of time preference can affect consumer behavior requires additional investigation.

Time Preference and Lifetime Outcome

Golsteyn et al. (2014) investigated the relationship between time preferences and lifetime social and economic outcomes. Their study revealed a substantial adverse relationship between high discount rates and school performance in addition to health, labor supply, and lifetime income. These relationships operate through early human capital investments. Time preference was measured by questionnaire in which children were asked to rate the extent they would prefer

SEK 900 ($138 USD) over SEK 9,000 ($1,380 USD) in five years. In addition, how time preferences were related to human capital investment were documented. The children were followed throughout life observing their education, military enlistment test results, fertility decision, health indicators, labor market success and lifetime income. The results indicated that time preferences were strongly associated with lifetime outcomes. A higher discount rate was linked to weaker performance in compulsory and secondary school, lower educational attainment, and lower scores on military achievement tests at age 19. That study also documented adverse relationship with lifetime income, unemployment, welfare utilization, early death, obesity, and teenage childbearing Golsteyn et al. (2014).

Time Preference and Retirement Wealth

Martin, Guillemette, and Browning (2016) found that an individual's willingness to accumulate wealth for retirement is influenced by their preference for intertemporal consumption. They report a negative association between high discount rates and retirement wealth. People with a strong preference for current consumption or a high discount rate, may choose to save less and suffer decreased retirement preparedness (Martin et al., 2016). The authors also found that this negative relationship could be reduced by engaging in some form of retirement planning.

Bernheim, Skinner, and Weinberg (1997) examined the wide disparity in wealth held in retirement accounts. Bernheim et al. estimated the role of time preference in wealth accumulation by examining the consumption profiles of retirees before and after retirement (Bernheim et al., 1997). The authors hypothesized that by saving for retirement and delaying consumption, retirees with accumulated wealth would increase consumption expenditures after they retired. This was based on the idea that the motivation to save for someone with low time

preference would be to enjoy increased future consumption (Zumwalt, 2008). Bernheim et al. concluded that time preference did not account for changes in wealth. However, their study did not examine time preference and the variations in wealth before retirement.

Hurst (2004) identified time preference as one of the possible reasons why families didn't save enough for retirement. Hurst compared households that retired with low levels of wealth to other households with similar characteristics. In the examination of consumption and income for less wealthy individuals, low wealth households had the same opportunities to save as did the households that had greater wealth at retirement but could not, or chose not to save (Zumwalt, 2008).

Finke and Huston (2013) posited that saving for retirement early in life is motivated by the desire to increase consumption in the future. In their 2013 study, they suggested that there was a theoretical relationship between the economic construct of time preference and the desire to save for retirement. They further indicated that time preference is difficult to measure empirically. Finke and Huston (2013) found similar links to Lusardi (2003) between intertemporal behaviors like smoking and exercise and wealth accumulation.

Net Worth as a Dependent Variable

Net Worth as an Indicator of Wealth

Family wealth is an indicator of well-being (Wolff, 2017). According to Wolff, using family wealth as an indicator of well-being is independent of whatever income it may provide (Wolff, 2017). Wolff cited several reasons for this. First, in terms of assets, owner occupied housing directly provides services to the owner. Second, wealth is source of consumption independent of what income it provides. Since assets can be converted into cash directly, they

can provide for immediate consumption needs. Third, financial assets can provide liquidity during times of financial stress such as unemployment, sickness, or family breakdown. Fourth, wealth is a main source of retirement security. Fifth, wealth can be used as a measurement for poverty. Sixth, wealth can have effects on household behavior over and above income. For example, families with nothing to lose in the form of assets may easily fall into welfare dependency or marital discord (Conley, 1999). Seventh, income that is generated by wealth does not require the same tradeoffs with leisure as earned income (Spilerman, 2000). Eighth, in a representative democracy, the distribution of power is often directly related to the distribution of wealth (Wolff, 2010).

In addition, Keister and Deeb-Sossa (2000) posited that wealth provides its owners with educational and occupational opportunities and social advantages that accumulate across generations. This is particularly significant because wealth, not income, can be passed on to future generations. Wolff (2017) makes clear that it is important to consider developments in personal wealth along with income and poverty when evaluating well-being over time.

Wealth Trends

The Federal Reserve Board's Financial Accounts Report indicated that the net worth of U.S. households had returned to its pre-recession levels in the first quarter of 2013. However, as pointed out by Dunn and Olsen (2014), there were concerns about drawing conclusions about net worth using this dataset. Dunn and Olsen (2014) found that although the Federal Reserve data showed net worth had returned to its pre-recession level, when adjusted for inflation, household data indicated that net worth was still below the 2006 peak level. This was true for any span of years since the start of the recession and for any age breakdown. It is also important to recognize

that much of the recovery in net worth which occurred since the recession, can be attributed to higher valuations of financial assets. Through the Federal Reserve policy of quantitative easing, large amounts of long term bonds were purchased which increased their prices. According to Dunn and Olsen (2014), without quantitative easing household balance sheets would probably have shown even lower levels of net worth.

Wolff (2017) reported robust growth in wealth from 1983 to 2007 however between 2007 and 2010 median wealth plummeted by 44%. The percentage of households with zero or negative net worth increased to 17.9% in 1989, by 18.6% in 2007, and sharply to 21.8% in 2010 and remained into 2013. Mean net worth grew 3.02% per year from 1989 to 2001. From 2001 to 2007 mean net worth grew by 3.1% annually largely due to a 19% increase in housing prices. Mean wealth grew at twice the rate of the median between 1983 and 2007. This indicated a widening inequality of wealth over this period (Wolff, 2017). During the Great Recession, mean wealth fell by 16%. The faster growth in mean wealth than in median wealth was also due to rising wealth inequality. From 2010 to 2013, the Survey of Consumer Finances (SCF) reported no change in mean wealth. However, aggregate data from the Financial Accounts of the United States (FFA) indicated a 27% jump in mean net worth over that period. Wolff argues that the SCF data understate average wealth gains for this period.

Factors Affecting Net Worth

Housing Prices

Trends in household wealth have a direct effect on household well-being and should be of general interest to the public (Wolff, 2017). The last 20 years have seen some remarkable results in wealth. According to Wolff (2017), perhaps the most notable was the housing value cycle

which featured an explosion and collapse in housing prices which affected net worth and helped to precipitate the Great Recession. In December of 2007, the financial crisis and recession ensued with the recession officially ending in June 2009 (Wolff, 2017). Real Gross Domestic Product (GDP) had fallen 4.3% and the unemployment rate went as high as 10% by October 2009. However, from the second quarter of 2009 to the second quarter of 2013, GDP gained a modest 9.2% and another 6.8% through third quarter 2016. By October of 2016, the unemployment rate was down to 4.9%.

One consequence of these issues was that asset prices fell dramatically. From 2007 to 2010 the median home price plummeted by 24%, while the share of homeownership fell to 65.1%. Much of the problem in the housing market was fueled by the generous expansion of credit for home purchases and refinancing, and the subsequent housing bubble in the years leading up to 2007. Mortgage debt per household expanded by 59% between 2001 to 2007 (Wolff, 2017).

Stock Market

The stock market boomed during the 1990s with the Standard and Poor's (S & P) 500 index surging 159% between 1989 and 2001. The stock market peaked in 2000 and was down 11% by 2004. By 2001, over 50% of the U. S. households owned stocks directly or indirectly. From 2004 to 2007, the market rebounded with the S & P 500 index rising 19%. Stock prices crashed from 2007 to 2009 during the Great Recession and partially recovered in 2010 however, the stock ownership rate declined to 47%. The stock ownership rate continued to drop reaching 46% in 2013 while the market was up by 39% from 2010 levels (Wolff, 2017).

Real Wages

According to the Bureau of Labor Statistics (BLS) after stagnating for many years, real mean hourly earnings grew 8.3% between 1995 and 2001. From 2001 to 2004, mean hourly earnings were up only 1.5% and median household income dropped by 1.6%. From 2004 to 2007, real wages rose by only 1%. Real wages grew by 3.6% from 2007 to 2010 (Wolff, 2017).

Debt

Consumer debt became a factor in leading up to the Great Recession. Between 1989 and 2001, total consumer credit outstanding increased by 70% and increasing by another 17% from 2001 to 2007 (Wolff, 2017). This was due to credit cards becoming more available, and relaxed credit standards while credit was generously increased (Wolff, 2017).

In addition to consumer debt, the rising household debt of the middle-class was particularly notable. Over the recession, the indebtedness of American families continued to rise from 2007 to 2010. It is also important to mention that it did fall from 2010 to 2013.

Student Loans

Another form of household indebtedness was the increase in student loan debt. The share of households reporting educational loans rose 13.4% in 2004 to 15.2% in 2007 and then to 19.9% in 2013. The mean value of educational loans in 2013 dollars increased by 17% between 2004 and 2007, another 14% between 2007 and 2010, and an additional 5% in 2013 (Wolff, 2017). The median value of education loans was up 19% from 2004 to 2007, another 3% between 2007 and 2010, and then another 22% in 2013. These loans had a heavy concentration among younger households and was one of the factors that led to a precipitous decline in their net worth from 2007 to 2010.

Pension System Overhaul

Another issue affecting household wealth was the major overhaul of the private pension system in the 1990s and 2000s. In 1989, 46% of all households reported having a defined benefit (DB) pension plan which guaranteed a steady flow of income in retirement. By 2007, those having DB pensions was down to 34%. Younger households especially those under 46 years old experienced a drop in DB plans from 38% to 23%. Middle aged households saw a decrease in DB pensions from 57% to 39% (Wolff, 2017).

Defined benefit pensions were replaced with defined contribution (DC) plans such as 401(k) or individual retirement accounts (IRAs). These plans differed from DB plans allowing participants to accumulate savings from retirement in tax favored ways but without a guarantee of a steady flow of income in retirement. The share of DC plans skyrocketed from 24% in 1989 to 53% in 2007. Younger households experienced a rise in share of DC plans from 31% to 50% and middle-aged households saw an increase from 28% to 64%.

The transformation of these retirement plans is of interest because the average value of pension wealth in DB plans went up by 8% from $63,500 to $68,800 in 2007, while the average value in DC plans increased more than seven times from $11,900 to $86,300 in 2013 dollars (Wolff, 2017). What makes these changes so important in understanding net worth, is that DB wealth is not included in the standard measure of marketable household wealth, whereas DC wealth is. The movement away from DB plans to DC plans likely lead to an overstatement in the true gains in household wealth.

Importance of Net Worth

The importance of net worth has been accentuated as people have come to recognize the problems that the federal government has in funding Social Security and Medicare programs. The Social Security Act was amended in 1983 increasing the normal retirement age from 65 to 67 and will reach 69 by 2027. The Senior Citizens Freedom to Work Act of 2000 eliminated the earnings test for those who retire between ages 65 to 69. In addition, the delayed retirement credit had been three percent per year for those who reached 65 between 1982 and 1989, but reached eight percent for those reaching normal retirement age in 2009 (Ozawa & Yeo, 2011). Social Security payments are projected to exceed payroll tax revenues in less than 10 years and by 2041, benefits will have to be reduced or the government will have to borrow more.

A similar fate faces the Medicare system where necessary changes are expected as soon as 2019. These trends present long-term ramifications for the economic well-being of American households (Campbell & Weinberg, 2015). According to Ozawa and Yeo (2011), these conditions send a clear message that saving, investing and accumulating net worth must be a priority for American families. They further argued that this was evidenced by the federal government's support of employer sponsored pension plans, individual retirement accounts (IRA), Roth IRAs, and health savings accounts (HSA).

Time Preference and Net Worth

Bernheim et al. (1997) attempted to explain the wide variations in household savings and wealth in time preference rates, risk tolerance and other factors incorporated in an individual life-cycle model. Lawrance (1991) hypothesized that time preference varies systematically with socioeconomic variables like education and income. Lawrance used the Euler equation to

estimate the subjective rates of time preference for different income classes. Controlling for age, family make up, education and race, the author found that families with very low levels of income had higher subjective time preference than those of the richest families (Zumwalt, 2008). Lawrance (1991) identified two possible explanations for the negative correlation between income and time preference. One, because of difficulty in borrowing future income, individuals with higher time preference may prefer careers with flat wage trajectories as compared to careers with steeper wage profiles and high initial human capital investment (Lawrance, 1991; Zumwalt, 2008). Two, Lawrance pointed out that time preference may be acquired through societal and cultural influences.

Benjamin et al. (2013) found a positive net worth indicated a low discount rate. In their study using the National Longitudinal Survey of Youth, Benjamin et al. (2006) found evidence that individuals who scored higher in cognitive ability tests exhibited higher rates of financial market participation, and asset accumulation. Holden, Shiferaw, and Wik (1998) found a negative relationship between discount rates and income or wealth (Klawitter et al., 2012).

Slovic (1972) pointed out that financial theory, which indicated how people should make financial decisions, made no provisions for human emotions which are important drivers on how people actually behave (Howard, 2012). In standard finance theory, comparing choices requires discounting expected future benefits to the present at the rate of return required to delay consumption to some future date (Samuelson, 1937). Cognitive psychology has shown that people deviate from the theory that the discount rate or time preference is constant, by employing hyperbolic discounting when deciding to take a reward sooner rather than later. People tend to overweight the preference for immediate consumption. The further in time that an event takes place, the less people care about it and the less it is affected by hyperbolic discounting (Howard,

2012). There is no comprehensive theory or paradigm that explains or predicts financial decision-making behaviors on a consistent basis (Howard, 2012).

Beverly et al. (2008) discussed a model of saving and indicated that among others psychological variables were critical to building assets. The psychological variables that affect one's willingness to save was future orientation or their discount rate, motives for saving, and perceived ability to successfully save. Ameriks, Caplin, and Leahy (2002) argued that there is an attitude toward saving that is not captured by standard decision models, and that is important in understanding wealth accumulation (Knowles & Postelwaite, 2004).

Time Preference Measure

Theoretical Models

Discount Utility Model

Samuelson (1937) proposed the Discount Utility (DU) model which became the dominant theoretical framework for modeling intertemporal choice. The DU model intended to provide a generalized model of intertemporal choice over multiple time periods since the Fisher indifference curve analysis was difficult to extend to more than two time periods (Frederick et al., 2002). The Samuelson DU model compressed all the psychological concerns discussed in the previous century into a single parameter, the discount rate. Samuelson's assumption was that individuals maximize the present value of a stream of current and future utility (Bradford, et al., 2014). People calculate a present value by discounting future enjoyment by a constant amount for each time period. As compared to present utility, future utility is weighted less heavily but in a manner which does not produce preference reversals (Bradford et al., 2014). For example, a person willing to accept one dollar to delay consumption by one day, that person would be

willing to accept one dollar to delay the same consumption by one day at any time in the future (Bradford et al., 2014). According to Samuelson, individuals were assumed to choose their consumption levels in each time period, $x_{t,}$ in order to maximize the present value of a stream of current and future utility in accordance with the following equation:

Equation 1

$$U(x_0, \dots, x_T) = \sum_{t=0}^{T} \delta(t) u(x_t)$$

subject to their income and wealth constraints. In this model, the exponential weighting function $(t) = \delta^t$ implies that there is constant discounting in each time period. According to Bradford et al. (2014) this is the basis for the most common understanding of a discount rate in economics.

Every assumption underlying the DU model was at least in some situations found to be descriptively invalid since the DU model assumed that people were characterized by a single discount rate. Frederick et al. (2002) found tremendous variation in discount rates across and within studies. This variation, the authors claimed, stemmed from the faulty assumption that varied consideration relevant to intertemporal choice apply equally to different choices and can be represented by a single discount rate (Frederick et al., 2002).

Some studies for the most part have rejected the idea of time consistent discount rates in response to hypothetical questions (Andersen, Harrison, Lau, & Rutström, 2008; Anderson, Dietz, Gordon, & Klawitter, 2004; Anderson & Gugerty, 2009; Benhabib et al., 2010; Benzion, Rapoport, & Yagil, 1989; Harrison, Lau, & Williams, 2002; Loewenstein & Prelec, 1992; van Praag & Booij, 2003; Thaler, 1981). Other studies have rejected the notion of time consistent

discount rates based on the observation of actual behavior (Gouskova, Chiteji, & Stafford, 2010; Lawrance, 1991; Shapiro, 2005; Warner & Pleeter, 2001; Wong, 2008).

Due to the flaws in the DU model, new theories emerged which resurrected the work of John Rae, who had been examining sociological and psychological determinants of intertemporal choice. Like Adam Smith (1776), Rae sought to determine why wealth differed among nations. Smith had argued in the Wealth of Nations that wealth was created by the amount of labor that was added to the production of capital. Rae (1834) recognized that Smith had failed to explain the determinants of this allocation. Rae identified that the missing element in Smith's analysis was the "effective desire of accumulation" which Rae described as the psychological factor that varied among different countries and determined their level of savings and investment (Frederick et al., 2002).

Rae (1834) believed that intertemporal choice behavior was the product of factors that either promoted or limited the effective desire of accumulation. Two factors that promoted the effective desire of accumulation were the bequest motive, and the propensity to exercise self-restraint. The two limiting factors were the uncertainty of human life, and the excitement generated by the idea of immediate consumption and the associated discomfort with deferring immediate gratification.

According to Frederick et al. (2002), Rae's work could be viewed in two fundamentally different ways. One of the factors that Rae identified as a determinant of time preference assumed that people only care about immediate utility. Rae (1834) explained farsighted behavior by the acquisition of utility from the anticipation of future consumption (Frederick et al., 2002). Based on this idea, deferring gratification would only occur if it produced an increase in anticipated utility which more than compensated for the decrease in immediate consumption

utility. Another view assumed equal treatment of present and future discounting as the baseline for behavior. This view attributes the overweighting of the present to the miseries of the self-denial that is necessary to be able to defer gratification (Frederick et al., 2002).

The anticipated utility and abstinence concepts, imply that intertemporal tradeoffs depend on immediate feelings. In one case, on the immediate pleasure of anticipation and in the other case the immediate discomfort of self-denial. The anticipatory utility perspective attributes variations in intertemporal choice behavior to the differences in people's ability to imagine the future, and to the situations that affect their ability to create mental images. The abstinence perspective, explains variations in intertemporal choice behavior by the psychological discomfort associated with self-denial (Frederick et al., 2002). In this perspective, one would expect high rates of time discounting from people who find it painful to delay gratification.

Chung and Herrnstein (1967) found that the rate at which pigeons would peck was directionally proportional to the reciprocal of the time delay. This led Ainslie to propose the first hyperbolic model (Mazur, 1987). The word "hyperbolic" is often used to describe discount rates that are higher at shorter delays than they are at longer delays (Doyle, 2013).

Hyperbolic Discounting Model

Some researchers following the work of Strotz (1955), created an alternative framework that suggested individuals may exhibit systematic biases in decision making (Bradford et al., 2014). Ainslie (1975) and Laibson (1997) assumed that individuals maximize a discounted utility stream that puts disproportionately higher weighting on the present relative to the future. The "quasi-hyperbolic" discounted utility function took the form:

Equation 2

$$U(x_0, \dots, x_t) = u_0 + \beta \sum_{t=1}^{T} \delta^t u(x_t)$$

Where β corresponds to a time-inconsistent preference for current satisfaction (present bias when $\beta < 1$) and δ is the long-run time-consistent component of temporal preferences. This implies that people discount future rewards by a constant factor that reflects the presence of a delay. They also discount by an exponential factor that grows at a constant rate with the length of the delay (Redden, 2007). This formula indicated greater impulsivity in the short term and captured the aspects of hyperbolic discounting while not being truly hyperbolic.

Hyperbolic discounting explains why people tend to choose a smaller sooner reward over a larger later reward increasingly as the delay occurs sooner rather than later in time (Redden, 2007). Redden points out that people act less impulsively as the delay is further out into the future. People will avoid waiting longer as the wait gets closer to the present. Therefore, any choice that delays a reward appears less attractive to people and thus are discounted.

Neoclassical economics assumes that the discount of a future reward occurs by a fixed percentage for each unit of time they must wait (Redden, 2007). Redden indicated that assuming a discount rate of 10% per year, a person should equally like a $100 reward now and $110 a year from now. That same person should also equally like $100 now and $110 two years from now. According to this exponential discounting view, the discount rate is constant across different wait times. This, however does not reflect people's choices. People make choices as if they discount future rewards more heavily when the delay is sooner in time. Many prefer $100 now over $110 in a day, but few prefer $100 in 30 days to $110 in 31 days (Redden, 2007). People would be willing to wait a day for $10 if that wait occurs 30 days from now, but they would prefer not to wait if the wait were to occur now.

Individual investment behavior is consistent with hyperbolic discounting. People maintain sizable credit card balances at high interest rates while having savings that are growing at a lower interest rate. Investors build up credit card debt while also accumulating wealth in their homes and retirement plans. Laibson (2000) explained this behavior using hyperbolic discounting. The reward of buying something today often outweighs the discounted displeasure of the future payments leading to higher credit card debt. When focused on retirement savings far into the future, people use a much smaller discount rate for delayed rewards. This makes it more attractive to invest in something that provides a higher expected return in the long run (Redden, 2007). In general, hyperbolic discounting will discount future rewards more than exponential discounting for short delays and less than exponential discounting for long delays (Redden, 2007).

Time Preference Measurement Techniques

Challenge

Delay of gratification literature was influenced by the work of Walter Mischel who showed that a young child asked to choose between one cookie now and two in 15 minutes, could predict achievement later in life (Mischel et al., 1989; Burks, Carpenter, Götte, & Rustichini, 2012). Standard risk and time preference measures are financially incentivized choice questions where time preference "myopia" is indicated by preference for a smaller amount of money at a sooner date over a larger amount at a later date (Conell-Price & Jamison, 2015).

Time preferences are important elements of theoretical and applied studies of decision making and are critical to economic analysis (Andreoni, Kuhn, & Sprenger, 2013). The experimental community however lacks a clear consensus on how to best measure time

preferences (Andreoni et al., 2013; Frederick et al., 2002). One of the challenges is the confounding effect of utility function curvature. Rabin (2000) argued that in typical scenarios linear utility is assumed for identification, which invokes expected utility's necessity of linearity for decisions with small stakes. Andersen et al. (2008) showed that if utility is assumed to be linear in experimental payoffs when it really is concave estimated discount rates will be biased upwards. The authors offered the use of risk taking to incorporate utility function curvature referred to as Double Multiple Price List (DMPL).

Convex Time Budget

Andreoni and Sprenger (2012) used variations in linear budget constraints over early and later consumption to identify convexity of preferences which they called Convex Time Budgets (CTB). Their econometric methods were criticized by Harrison, Lau, and Rutström (2013) because their ad hoc econometric attempts to model the truncation of choices at the boundaries failed to account for the economics of the observed behavior (Andreoni et al., 2013).

Temporal Focus Scale

Shipp et al. (2009) created a temporal focus scale (TFS) which defined temporal focus as the allocation of attention to the past, present, and future. The researchers attempted to capture the notion that people can shift their attention among different time periods and that focusing on one does not prevent thinking about the others. They believed that categorizing people into a single category imposed an artificial boundary between each type and prohibited a balanced emphasis on all three. Temporal focus in their estimation reflected the idea that people can have multiple temporal foci allocating attention to each in varying degrees. They felt this was necessary because of the shortcomings of the Zimbardo Time Perspective Inventory (ZTPI) and

the predominate focus on either past, present, or future without allowing for the allocation of attention to more than one time period.

Consideration of Future Consequences

Personality and the individual differences that influence present and future choices have been attempted to be assessed using self-reported measures. One is the Consideration of Future Consequences Scale (CFCS), which measures the degree to which individuals contemplate the immediate and future consequences of their behavior (Strathman, Gleicher, Boniger, & Edwards, 1994). Another is the ZTPI which measures the degree to which temporal information about the past, present, and future influences behavior (Zimbardo & Boyd, 1994).

Incentivized Choice

The most common method of measuring time preference has been asking participants to choose between receiving money now and some higher amount in the future (Frederick et al., 2002). Within economics it is now standard to obtain a discount factor via incentivized experiment. Lawless, Drichoutis, and Nayga Jr. (2013) pointed out that elicitation mechanisms that involve monetary tradeoffs can be made non-hypothetical since researchers can make the choices binding. The preference for $100 now rather than $110 in one year implies a discount rate of at least 10 percent (Finke & Huston, 2013). It is also common to ask respondents for a dollar amount in the future that would make them forego receiving money in the present.

Experimental economists have used this approach to compute a proxy for time preference (Fuchs, 1982; Bickel et al., 1999; Kirby, Petry, & Bickel, 1999; Petry & Casarella, 1999; Kirby & Petry, 2004; Shapiro, 2005; Ashraf et al., 2006; Reuben, Sapienza, & Zingales, 2007; Hardisty & Weber, 2009; Benjamin, Choi, & Fisher, 2010; Finke & Huston, 2013). The established determinants of time preference are the magnitude of the future payment and the length of time

over which discounting occurs (Ifcher & Zarghamee, 2011). Discount rates elicited from monetary tasks have the advantage of being elicited under real circumstances with real economic consequences (Lawless et al., 2013). A review of the literature reveals that most of the elicitation studies have used students as the sample population (Andersen, Harrison, Lau, & Rutström, 2014).

Individual time preference measured by comparing dollar values over time and through a combination of intertemporal behaviors that may be the most theoretically appropriate measure of the discount rate for utility over time (Finke & Huston, 2013).

Time Preference Scale

When faced with decisions involving a possible change in utility across time, there is a tendency to discount utility in the future more heavily than utility in the present (Finke & Huston 2003). Decisions involving utility maximization across different domains involve the consistent application of temporal discounting. Finke and Huston wrote that it would be irrational to sacrifice future utility in one domain while sacrificing present utility to increase future consumption in another. Finke and Huston (2003) illustrated this by suggesting that it would be unusual for someone who is smoking, drinking, having unprotected sex, or eating an unhealthy diet, would exert the effort to save and invest for the future. They concluded that it is possible that a tendency toward myopic decisions in health translates into financial decision making (Finke & Huston, 2003).

Attempts to measure time preference in empirical studies have most commonly been numerical. Chabris et al. (2008) suggested combining behaviors that involve intertemporal elements into a single score or factor analysis. Chabris et al. used the compiled score as an

outcome variable but Finke and Huston (2014) used it as predictor variable because they felt that the latent concept of time preference was inherent in all the intertemporal behavior indicators.

According to Finke and Huston (2013), the combination approach assumes that behavioral patterns across domains theoretically linked by time preference can be used to proxy the rate at which individuals make exchanges of utility over time. The authors based this off prior research into the predictors of smoking, drug use, and alcohol abuse which supported the importance of time preference in explaining the likelihood of engaging in behaviors that compromise future health. In addition, decisions to exercise require a choice between leisure time and the gains of longevity and quality of life in the future. Further, the decision to consume a healthy diet, requires an equilibrium tradeoff of reduced current utility and the expected increase in future utility.

Finke and Huston (2004) felt that actual behaviors, particularly if combined to create an index rather than using a single behavior, would be a more accurate indicator of time preference. They used four scale items focused on risky health-related behaviors such as cigarette smoking, substantial alcohol use, use of marijuana, and engaging in unprotected sex. Three preventive health behaviors such as vaccinations, medical checkups, and healthy diet choice were also included as part of the time preference scale. Gambling frequency was also included as an indicator of those who experience present utility by seeking potential instant gratification.

Finke (2006) hypothesized that a strong saving motive indicated a desire to increase future consumption at the expense of present consumption and that this represented a low time preference. Proxies for time preference were constructed by comparing two numerical dollar amounts in time, the natural log of the previous dollar amount, and the behavioral scale method. The numerical method asked respondents to determine how much they would require in one year

to forgo $150 today. The behavioral scale contained eight questions designed to measure an individual's time preference using how often they chose healthy foods that reduce diet related illness. In addition, how often they engaged in exercise, how often they selected foods based on a nutrition label, and the frequency of unprotected sex, seat belt use, cigarette use, marijuana or other controlled substance use. Regression models were used to determine the influence of time preference on the motive to save for retirement. The study found that healthy eating and exercise were a stronger predictor of the willingness to save for retirement than risky myopic behaviors.

Most measurements of time preference employ the discounted utility model which assumes that individuals apply a subjective rate of discounting to future utility when faced with decisions that involve consequences in different time periods (Finke & Huston, 2003). Absent a rate of future discounting, people would be indifferent to receiving a dollar now versus receiving a dollar, 10 years from now assuming purchasing power parity (Finke & Huston, 2003).

Frederick et al. (2002) questioned whether time preference should be regarded as a unitary construct. Frederick et al. (2002) however, also argued that the low cross behavior correlations does not disprove the existence of time preference. If someone displays low discount rates on a conventional elicitation task but indicates that they rarely exercise, it is possible that the inconsistency reflects the heterogeneity in the degree to which they discount different types of utility. It could be that they don't exercise because they are too busy earning money for the future, or because they care more about future finances than future health concerns. Frederick et al. (2002) indicated that additional research is necessary to evaluate if time preference is best viewed as a unitary construct or a composite of more basic constituent motives.

According to Finke and Huston (2004), it may be that actual behaviors combined to create an index are more accurate as an indicator of time preference as opposed to using a single

behavior, such as smoking as a proxy. Use of a scale to measure time preference is advantageous over using a single variable because it provides more information and avoids the bias that might be associated with an aversion to a specific behavior unrelated to time preference (Finke & Huston, 2004). Finke and Huston (2013) reported that measuring time preference by comparing dollar amounts across time proves to be a much weaker predictor than a combination of intertemporal behaviors measured either as a linear scale or as factors.

Empirical Guides

This study modeled the work of Chabris et al. (2008) and Finke and Huston (2004/2013) as an empirical guide. Chabris et al. (2008) provided an analysis of the importance of time preference in predicting individual differences in behavior. Chabris et al. used a laboratory task to find that individual discount rates predicted inter-individual variation in field behaviors such as exercise, body mass index (BMI), and smoking. Although they found little correlation between the discount rate and field behaviors, they submitted that the discount rate had at least as much predictive power as the other variables in their data. Their research also indicated that the correlation between the discount rate and field behavior rises when field behaviors are aggregated.

Chabris et al. (2008) measured time preference by asking for binary choice responses between immediate monetary reward and a delayed larger monetary reward. They created an intertemporal discount function for each participant. A correlation was calculated between participant discount rate and their field behaviors. They focused on behaviors that involve intertemporal tradeoffs that would likely be associated with intertemporal preferences including smoking, drinking, exercise, nutrition, saving, borrowing, wealth, and gambling. They found that

the effects of time preferences were statistically significant for exercise frequency, BMI, and cigarette consumption. They also found that on average the discount rate based on the delayed reward questions explained the most variance in the individual variables studied. The researchers also looked at eight relevant health behaviors and found that discounting had a significant effect when used to predict an index of behaviors that involve intertemporal tradeoffs. They concluded that the discount rate was the most important variable they had in explaining the individual differences in behaviors they believed demonstrated intertemporal tradeoffs.

The 2008 study by Chabris et al. (2008) prompted Finke and Huston (2013) to continue this methodology. Finke and Huston (2013) modeled the importance for saving for retirement as a function of time preference using a sample of students. Time preference was measured by the more traditional comparison of choices method and an additive scale and a factor analysis method similar to Chabris et al. (2008). Finke and Huston's additive predictor scale compiled intertemporal behaviors with the following questions: (a) Do you smoke every day? (b) Alcohol drink consumption last month? (c) Used marijuana in the last year? (d) Choose foods to reduce diet related disease risk? (e) Vaccination to reduce chance of getting sick? (f) Visit the doctor for check-ups? (g) Unprotected sex during the last year? (h) How frequently have you visited a casino or other gambling establishment in the last year?

The Finke-Huston incentive choice question was: "if you were given the opportunity to either accept $150 now or a larger amount in one year, how much would we need to pay you to wait a year." It was assumed that the rate of time preference varies inversely with the dollar amount the respondent chose (Finke & Huston, 2013) so that a respondent who chose a relatively high dollar amount, displayed a low rate of time preference, and individuals who chose a relatively low dollar amount displayed a high rate of time preference. With few exceptions the

time oriented behaviors correlated with one another in the theoretically predicted direction. They found that the importance of saving for retirement correlated significantly with seven of the eight intertemporal behaviors. The numerical measure of time preference (incentive choice) did not significantly correlate with the dependent variable importance of saving for retirement. A key finding was that when time preference was measured as an additive scale of risk related behaviors, it was statistically significant and the strongest predictor of retirement savings importance in the model.

These works by Chabris et al. (2008) and Finke and Huston (2004/2013) were used as the empirical guide to this research project. Building upon the work of these researchers, a similar approach for this was used but with a nationally representative sample. Time preference was measured in similar ways to those three studies. The measurement techniques where taken directly from Finke and Huston building upon the work of Chabris et al. (2008). Time preference was operationalized in two ways. First, using incentive choice questions and similar to the variables used by both Chabris et al. and Finke and Huston. In addition, a time preference scale was created for this study modeled directly from Fink and Huston (2004).

Chapter 3 - Theoretical Framework

Hyperbolic Discounting

People constantly make decisions that involve whether to take a gain or loss now or at some time in future. How people decide this is of active research in psychology, economics, marketing, decision analysis, and neuroscience (Doyle, 2013). Psychologists and economists have presented many models of time preference and delay discounting to explain why people trade off time and money. According to Doyle (2013), there are three main components to any discounting model: subjectively perceived money; subjectively perceived time; and how these two are combined.

Exponential discounting has been widely used in economics. However, Redden (2007) reported that evidence suggests that it does not explain people's choices. Exponential discounting is time insensitive but the rate at which people actually discount future rewards declines as the length of the delay increases. This phenomenon was termed hyperbolic discounting by Harvard psychologist Richard Hernnstein (Redden, 2007).

According to Herrnstein and Mazur (1987), the failure of utility maximization theory to account for temporal myopia comes from its formula for discounting time. The theory assumes that behavior is always consistent with underlying preferences and discounts time at a constant rate. Economists have known that intertemporal choices are only time consistent if agents discount exponentially using a discount rate that is constant over time (Thaler & Benartzi, 2004). There is considerable evidence that people display time-inconsistent behavior weighing near term consumption especially heavily (Thaler & Benartzi, 2004). In practice, time discounting is a hyperbolic phenomenon which indicates that rewards not only assume different values at different distances, but they also lose value at different rates.

Self-control and procrastination are of growing interest to behavioral economists (Laibson, 1997; O'Donoghue & Rabin, 1999). Modern models of these problems use the concept of hyperbolic discounting (Thaler & Benartzi, 2004). Thaler and Benartzi considered a choice between two rewards, a small one at time t (S_t), and a big one at time $t + 1$ (B_{t+1}). When t is far off, agents prefer B_{t+1}, since the difference in the value of the prizes exceeds the perceived cost of waiting. However, as t approaches zero, the ratio of discounted values increases causing people to switch their preferences.

Although people choosing prizes do not consciously compute hyperbolic discounting, the values determined by hyperbolic functions are consistent with actual behavior. The benefit of looking at time discounting as a hyperbolic function is that it generates predictions that match the fickle nature of human beings (Herrnstein & Mazur, 1987).

If the winner of a raffle is given a choice between $100 today and $120 next week. Many of the people surveyed would choose the smaller more immediate prize of $100. When the same person who chooses the immediate $100 over $120 in one week is offered $100 in one year or $120 in one year and one week, they will usually choose the $120 in a year and a week over the $100 in one year. Based on when the choice occurs people will change their preferences. Using fixed rate discounting, the perceived value of a future reward must decline by a fixed percentage every week which is clearly not what happens in practice.

Such present-based preferences can be captured with models that employ hyperbolic discounting (Thaler & Benartzi, 2004). As such, the hyperbolic discounting model was used to frame this research. This study models Chabris et al. (2008) in using the hyperbolic function to model time preferences. In hyperbolic discounting, the rate of discounting depends on the length of the delay and when the delay occurs. The rate people discount future rewards goes down as

the length of the delay increases. This is the concept known as hyperbolic discounting. To illustrate hyperbolic discounting, Doyle (2013) presented the equation:

Equation 3

$$P = F[1/(1 + hT)]$$

This equation has a hyperbolic form which contains the discount factor;

Equation 4

$$Discount\ Factor = [1/(1 + hT)]$$

where h = the rate of growth, F = future choice, P = present choice, and T = time or number of periods. The equation illustrates that as the number of time periods increases, the discount factor becomes smaller so that ultimately when applied to the future choice, the present choice is smaller than it would have been with a lower number of periods. This equation implies that the immediate future will be discounted more heavily in the hyperbolic model (Doyle, 2013).

Hyperbolic discounting has been applied to a wide range of phenomena. Hyperbolic discounting has been linked to personal well-being, problems with addiction, and self-control issues (Redden, 2007). This includes lapses in willpower, health outcomes, consumption choices over time, and personal finance decisions (Redden, 2007).

Chapter 4 - Methods/Results

Data

The data used for this research study come from the National Longitudinal Survey of Youth (NLSY) 1979. The U.S. Department of Labor Bureau of Labor Statistics funded a nationwide survey of young adults born between 1957 and 1964. The data come from a nationally representative sample of 12,686 respondents. The survey was mainly conducted with face to face interviews every year from 1979 to 1994 and every two years thereafter. The individuals interviewed were between the ages of 14 and 22 in 1979. These data contain a wealth module which was added in 1985 when the youngest respondent was 21 years old (Zagorsky, 2000).

The NLSY79 is a complex longitudinal survey comprised of multiple nationally representative samples. Data collected from the NLSY79 enables researchers to analyze the disparate life course experiences of women, Hispanics, blacks, and economically disadvantaged. There are three subsamples that make up the NLSY79:

1. A cross sectional sample of 6,111 youths designed to be representative of noninstitutionalized civilian youth in 1979 born between January 1, 1957 and December 31, 1964.
2. A supplemental sample of 5,295 youths designed to oversample civilian Hispanic, black, and economically disadvantaged nonblack/non-Hispanic youth born between January 1, 1957 and December 31, 1964.
3. A military sample of 1,280 youth born between January 1, 1957 and December 31, 1961 and enlisted in one of the four branches of the military as of September 30, 1978.

Each round of the NLSY79 had core sets of questions regarding labor force experiences, training investments, education, geographic areas of residence, environmental characteristics household composition, and marital and fertility histories. Data on these topics were collected on a regular basis, in selected years the survey included additional sets of questions potentially affecting labor force attachment. Questions on subjects such as job search methods, migration, school discipline, health, childcare, self-esteem, time use, delinquency, knowledge about AIDS, attitudes toward work, childhood residences, neighborhood problems, drug and alcohol use, educational/occupational aspirations, and prenatal and postnatal health behaviors.

Interviews with NLSY79 respondents were conducted on an annual basis 1979 through 1994. After that the survey was conducted on a biennial schedule.

Variables

Dependent Variable

The dependent variable for the study was net worth. Respondents were asked approximately 20 questions regarding their asset and debt holdings. In most of the years, respondents estimated values of their home, cash, savings, stock and bond portfolio, estate, business, and automobile. Respondents were also asked to estimate how much mortgage debt, property debt, and other debt they had accumulated. The total net worth in 2012 was created by summing all assets and subtracting all debts (T40458.00). Missing assets and debt values were imputed. The top 2% of all values were topcoded. The net worth variable (NetWorth12) was transformed by taking the inverse hyperbolic sine (IHS) of the net worth value (IHSNetWorth12). This transformation was necessary to account for zero and negative values for net worth.

Independent Variables

Employment

Employment status was determined by labor force status of survey year 2012 (W12583.00). A dummy variable Employed12 was created. If respondent reported having a job then Employed12 was coded 1. If participant responded that they were not working, unemployed, or out of the labor force then Employed12 was coded as 0.

Income

Total net family income provided a composite income figure from many income values for household members related to the respondent by blood or marriage. Income received in the previous calendar year from various sources including (a) earned income of the respondent and spouse, (b) unemployment compensation, ADFC, food stamps, and other public assistance, (c) income from other family members, and (d) other. An income variable was created (Income12) from the income variable (T41123.00) for income level from 2012.

Homeownership

Homeownership tends to represent a large proportion of a person's net worth. The NLSY79 data collected information about the type of residence the respondent was living in (T31957.00). If participant responses in 2012 indicated that the respondent owned their dwelling unit, then HomeOwner12 variable was coded as 1 otherwise coded as 0. This variable was used to determine whether the respondent owned the home they were living in.

Region of Residence

The region that respondents live in can affect income, cost of living, and real estate values. The region of residence in 2012 of participants in the NLSY79 survey was documented by a question regarding region of current residence (T41127.00). The response choices included

northeast, north central, south, and west. Regions were coded as RegionNEast = 1 if they lived in the northeast region of the country, RegionNCent = 1 if they lived in the northcentral region, RegionSouth = 1 if they lived in the southern region, and RegionWest = 1 in they lived in the western region of the country. RegionNEast was used as the reference group in the analysis.

Education Level

Education level was determined by using the question in the 2012 survey year regarding what the highest grade or year of regular school participants had received and gotten credit for (T32129.00). Responses included first grade to eight years of college or more. An education variable was created for the years of schooling respondents had achieved in 2012 (EducLev12).

Filed for Bankruptcy

If a person has filed for bankruptcy in the past, they would experience a certain impact on their net worth. In examining net worth, bankruptcies in one's past would be an important issue to consider and therefore prior bankruptcy was added to the model. In 2012, the survey asked if the respondent or their spouse had ever declared bankruptcy with a yes or no response choice (T40926.00). If the answer was yes, then Bankruptcy was coded as 1. If the answer was no, then the Bankruptcy variable was coded as 0.

Inheritance

Inheritances are a significant determinant of net worth. Respondents were asked to provide the total market value of estates, trusts, or inheritances that the respondent or their spouse had received in a specific year. Inheritance data from before 1987 to 2007 were aggregated to create a continuous total inheritance received variable (TotalInherit).

Family Poverty Status

The participant's family poverty status was recorded for many different years using the family's net family income. The variable R02179.10 from 1978 was used because this variable was intended to capture the association between growing up in poverty and net worth. Using the year 1978 put respondents between the ages of 13 and 21. Using any years beyond that would be capturing the respondent's poverty status and not the family poverty status. If the family was in poverty status in 1978, FamPovStat78 was coded as 1. If the family was not in poverty status during that time, FamPovStat78 was coded as 0.

Age

The age of the participant in 2012 was determined from variable T41132.00. A variable Age was created with an age range of 47-56.

Mother's Education

The highest grade completed by respondent's mother was recorded as variable R00065.00. The range was from zero to eighth year of college or more. A variable, HiGradMot was created with a range of responses from 0-20 with 0 = none to 20 = eighth year of college or more.

Father's Education

The highest grade completed by respondent's father was recorded as variable R00079.00. The range was from zero to eighth year of college or more. A variable, HiGradFat was created with a range of responses from 0-20 with 0 = none to 20 = eighth year of college or more.

Marital Status

Marital status was included as a variable in the analysis T41129.00. Responses included 0 = never married, 1 = married, 2 = separated, 3 = divorced, 6 = widowed. If marital status was

recorded as 1, 2, or 6, a variable MarStatMarried was coded as 1. If marital was recorded as 0 or 3, MarStatMarried was coded as 0.

Number of Spouses

If a respondent was previously married this could potentially impact their net worth. The number of spouses a respondent had had in 2012 was recorded as variable R99113.00 with a range of 0-8. A variable was created NumSpouse with a range of 0-8.

Number of Children in Household

Raising children is expensive and can have an impact on net worth. The number of biological, step, or adopted children living in the respondent's household in 2012 was recorded as variable T41203.00. A variable NumChildren was created with a range of 0-10.

Race

The race of respondents was recorded in 1979 as variable R01727.00 with a range of 1 = white, 2 = black, and 3 = other. A Race variable was created with a range of 1-3.

Gender

The participant's gender was recorded from variable R02148.00 and a Gender variable was created. If the gender response was entered as male, Gender was coded as 1. If the gender response was female then Gender was coded as 2.

Time Preference Variables

Incentive Choice

A time preference variable was created by using incentive choice questions. The dataset contained time preference/impatience questions which were similar to incentive choice questions used to proxy time preference found in the literature. The first impatience question (T09617.00) asked respondents if they had won a prize of $1,000, how much would be the smallest amount

acceptable to wait one month to receive the prize? A second question (T09620.00) asked what the smallest amount would be to wait one year for the prize? The assumption is that the rate of time preference varies inversely with the dollar amount the respondent chooses (Finke & Huston, 2013). If the person required smaller amounts to wait, then the person was considered to have a high rate of time preference which indicates more impatience, values immediate gratification, and a more present oriented time preference. Someone who required higher amounts to wait indicates a low rate of time preference, more patience, and values the future.

Chabris et al. (2008) reported that measuring an individual's impatience has advantages over traditional personality tests. The authors argued that personality tests ask participants to introspectively state and evaluate their own dispositions while incentive choice questions have participants demonstrate and implicitly disclose them through a series of decisions with real life consequences.

Finke and Huston (2013) used a logged approach to the incentive choice questions as well as the raw variable. Since the matching technique required individuals to compare utility from money received now versus money received in the future, the future utility derived from the additional money was assumed to be non-linear. The variable was transformed by taking the natural logarithm of the response. As such, in this study, a variable was created that transformed the incentive choice responses to the natural logarithm of the responses as well (logIncentChoiceMth and logIncentChoiceYr).

Time Preference Scale Items

Smoking Status

Smoking has been a proxy for time preference throughout the literature and often part of a time preference scale. Smoking status variable T39757.00 recoded responses to smoking status

as 3 = not at all, 2 = occasionally, or 1 = daily. A variable Smokes was created with a range of 1-3. These responses were reverse coded so that 1 = not at all, 2 = occasionally, and 3 = daily.

Alcohol Use

Respondents were asked if they consumed alcohol in the last 30 days. If the answer was no then NoDaysDrank was coded as 0. If the answer was yes, they were then asked on how many days did they drink alcoholic beverages including beer, wine, or liquor. Responses ranged from 1-30 days. The range for NoDaysDrank was therefore 0-30 days.

Marijuana Use

In 1998, respondents were asked on how many occasions they had used marijuana in their lifetime via variable R64304.00. Response choices ranged from 0 = never, 1 = 1 or 2 times, 2 = 3 to 5 times, 3 = 6 to 10 times, 4 = 11 to 49 times, 5 = 50 to 99 times, and 6 = 100 or more times. A variable TimesUsedMari98 was created with a range of responses of 0-6.

Read Nutrition Labels

Participants in the NLSY79 were asked if they read nutritional information when they buy a food item for the first time in 2012. The variable T39581.00 had response choices ranging from 0 = don't buy food, 1 = always, 2 = often, 3 = sometimes, 4 = rarely, 5 = never. A variable NoReadNutLab12 was created with response choices from 0-5.

Take Physical Exams

Survey participants were asked how long it had been since their last physical exam or routine checkup with a doctor or other health professional, variable T39567.00. Response choices ranged from 0 = never, 1 = a year ago or less, 2 = more than 1 year but not more than 2 years, 3 = more than 2 years but not more than 3 years, 4 = more than 3 years but not more than 5 years, and 5 = over 5 years ago. A NoHadPhysical12 was created with response choices from

0-5 where the larger the number, the longer the time the respondent went without a physical exam.

Willingness to Take Financial Risk

In 2010, variable T30949.01 asked participants to rate their willingness to take risks in financial matters. Response choices were based on a scale of 0-10 with 0 being unwilling to take any risks and 10 being fully prepared to take risks. A variable Risk10 was created with responses ranging from 0-10.

Use of Contraception

Variable R67944.00 was a question that asked respondents if they or their partner had used any form of birth control in the last 30 days. Response choices were 1 = yes and 2 = no. A variable NoContra was created and coded as 0 if they had used birth control and 1 if they had not.

Flu Shot

Participants were asked questions in 2012 to determine if they had received a flu shot in the past 24 months. Yes responses were recorded as 1, and no responses were recorded as 0. If respondents did not receive a flu shot, a variable NoFluShot was created and coded as 1. If respondents had received a flu shot then NoFluShot was coded as 0.

Time Preference Scale

An additive scale was created combining the eight intertemporal behaviors of Smokes, NoDaysDrank, TimesUsedMari98, NoReadNutLab12, NoHadPhysical12, Risk10, NoContra, NoFluShot. All responses were coded as 0 if the respondent did not exhibit the behavior and a 1 if they did. A summated score was calculated with a possible score range of 0 – 8. The

Cronbach's Alpha Coefficient on the scale was .27. An alpha coefficient of .70 would be recommended.

Factor Analysis

Time preference has been an important psychological construct that has been measured using different techniques and proxies. Since there has been no clear consensus identified in the literature on how to best measure the construct, Finke and Huston (2004) developed a scale as a measurement technique contending that a scale may be a more precise way to examine the construct. The scale was developed and used to measure the time preference of a sample of Psychology students at a large midwestern university. Since this was a sample of convenience, applying the scale to a larger national representative sample serves to test its reliability and validate it for future research. In addition, the NLSY79 dataset affords the opportunity for testing the scale against an alternative measure of time preference. The dataset contains traditional incentivized choice questions which are typically used for time preference measurement. Having these questions allows the comparison of two different time preference measurement techniques for a more robust analysis. The dataset contained variables which were similar to those used by Finke and Huston with some notable differences. Variables regarding cigarette use, alcohol use, and marijuana use were used by Finke and Huston and found within the NLSY79. The authors used diet choice as a variable which asked participants if they choose foods to reduce diet related disease risks like cancer or heart disease. That specific question was not available in the NLSY79 data however, a question that asked how often a respondent read nutrition labels when buying food was available.

Poor diet choice has a strong intertemporal component since it involves the willingness to sacrifice future consumption to increase present consumption (Finke & Huston, 2004). This was

an adequate replacement since individuals who frequently read nutrition labels engaged in healthier dietary practices than those who read labels infrequently (Graham & Laska, 2012). In addition, nutrition labels on packaged food lead to a reduction of high calorie, high fat food purchases (Cioffi, Levitsky, Pacanowski, & Bertz, 2015).

Finke and Huston asked a general question about use of vaccinations to reduce chances of getting sick, whereas the NLSY79 data provided one question on whether or not individuals got a flu shot. Although these variables are not identical, the reception of a flu shot provides an excellent proxy given the logical consistency between the two decisions.

Finke and Huston asked participants how often they visited the doctor for checkups. The NLSY79 asked a similar question about the last time the respondent had a physical exam. Finke and Huston also asked participants if they had had unprotected sex in the last year. The best proxy for this in the NLSY79 data was the use of contraception. Finally, the Finke and Huston scale had a question about how often one had visited a gambling establishment in the last year. This was not a question available in the NLSY79 data however, a question about how willing a respondent was in taking financial risk was. Since gambling inherently involves financial risk, this was an adequate replacement.

In the development of the scale all eight variables were established with dichotomous responses. A yes answer = 1, an indication of exhibiting the behavior, and a no answer = 0, indicating not exhibiting the behavior. As such, a higher score (maximum of eight) on the scale would indicate a higher rate of discounting future utility. In the initial phase of the factor analysis the correlation matrix was analyzed and revealed very low correlations among the eight variables. A correlation matrix table is included as Table 5.1.

Since the variable responses were dichotomous and there are complications in doing factor analysis with binary variables, tetrachoric correlations were calculated but were not demonstrably better. This was not unusual since Chabris et al. (2008) reported that field behaviors and discount rates were weakly correlated with many correlations close to zero.

The next step was to run the analysis using the raw variables since they did not have dichotomous response choices and use those for the factor analysis. Most variables had responses moving in the same direction except smoking. Higher responses indicated more of the behavior and therefore a higher discount rate of future utility. The variable for smoking was reverse coded with smoking daily = 3, occasionally = 2, and not all = 1.

There was an additional concern that the response scales for the raw variables were not the same for all eight variables. Principal Component Analysis (PCA) was used to locate the underlying dimensions of the data and because it is a "psychometrically sound procedure" (Field, 2010, p. 550). Using PCA, all variance was assumed to be common variance. Final communality estimates were all above .3. Examination of the correlation matrix using the raw variables revealed that the correlations among the scale variables were very low also (see Table 5.1). The KMO for sampling adequacy was mediocre at .59 and each of the individual measures of sampling adequacy were above the minimum of .5 (Hassan & Bakar, 2008). The Bartlett's test of sphericity was significant χ^2 (28) 496.56, $p < .0001$.

There were three of the eight variables that had Eigenvalues greater than one. An examination of the scree plot and the Eigenvalues matrix indicated that there were three factors to be retained. According to the Kaiser criterion (1960), it is recommended that all factors with Eigenvalues greater than one be retained. Next, the factor loadings were examined. Based on the factor loadings, there were four variables that loaded on the first factor. Smokes,

NoReadNutLab12, NoHadPhysical12 and NoFluShot. The first factor seemed to represent unhealthy behaviors and was labeled UnHealthBeh. The first factor explained 18.6% of the total variance. The second factor contained the variables NoDaysDrank and TimesUsed Mari98. This factor seemed to represent substance abuse and was labeled SubsAbuse. Factor two explained 15.3%. The third factor included Risk10 and NoContra which seemed to indicate risky behavior. A subscale was labeled RiskyBeh. Factor three explained 12.7% of the total variance.

After Varimax rotation the Orthogonal Transformation Matrix was examined and was not symmetrical. The Rotated Factor Pattern was not demonstrably different than the unrotated solution and did not change the factor loadings substantially. The items that clustered on the same components suggested that there were three subcomponents within the eight-item scale. Component one seemed to represent unhealthy behaviors such as smoking, not reading nutrition labels when purchasing food, not having physical exams, and not getting flu shots. Component two seemed to indicate substance abuse behaviors like the consumption of alcohol and the use of marijuana. Finally, component three tended to reflect risky behaviors such as willingness to take financial risks and not using contraception when having sex.

The three subcomponents were combined to form three new variables unhealthy behaviors (UnHealthBeh), substance abuse (SubsAbuse), and risky behaviors (RiskyBeh). To test the reliability of these subscales, reliability analysis was done on each individually. The Cronbach's alphas were low; UnHealthBeh α=.38, SubsAbuse α=.16, RiskyBeh α=.01. After estimation using these components, it became clear that their ability to predict net worth was not useful which is consistent with the reliability analysis.

Several options were available to analyze the scale and its ability to predict the outcome of net worth. The eight scale items were used individually as predictors of net worth. In addition,

the incentive choice questions found in the data could be used as predictors of net worth. A scale was developed that included the eight items like those used by Finke and Huston (2004). These scale items contained binary responses. An additional scale was created using the raw version of the time preference scale variables with response choices on a more continuous range. These would be used to compare to the incentive choice questions typically used as a time preference measurement.

Regression

Four regression models were constructed to analyze the association of time preference and net worth. The values on the net worth distribution of this sample range from -$254,800 to $3,690,789 and was positively skewed. The skewness in the distribution of net worth often leads researchers to apply data transformation to achieve a more normal distribution so as not to violate the assumption of normality required for many statistical procedures. Researchers across many disciplines apply the natural log transformation (log[x]) to adjust for skewness (Conley & Thompson, 2012). The natural log transformation truncates values from a skewed distribution and pulls values closer to the mean to achieve a normal distribution (Friedline, Masa, & Chowa, 2011). Since the natural log cannot be taken of zero and negative values and net worth is prone to these values, the inverse hyperbolic sine (IHS) was used to transform the net worth variable. The IHS transformation can be expressed as:

$$ihs(x) = \log(\sqrt{x^2 + 1} + x)$$

Equation 5

In addition to the IHS, a scale parameter of .0001 was applied to adjust the proportion of the values on the x-axis into a linear function (Pence, 2006). The effect of the IHS transformation and the addition of the scale parameter effectively smoothed out the distribution of net worth and did not fundamentally change the nature of the net worth variable. The minimum net worth of the sample was reduced to -$39,314 and the maximum to $66,041. All negative and zero values were retained. The IHS transformation equation with scale parameter was applied in SAS as follows:

Equation 6

$$IHSNetWorth12 = \log\left(.0001 * NetWorth12 + sqrt\left((.0001 ** 2 * NetWorth12 ** 2 + 1)\right)\right)/.0001$$

The sample (N=1,685) was made up of respondents between the ages of 47 – 56. About half of the respondents were male (49.3%) and 50.7% female. Sixty-one percent of the participants were married. The sample population was predominately white (70.5%) with 29.5% non-white. Sixteen percent of participants lived in the northeast United States, 26% north central, 40% from the south and 18% from the western region of the United States. Over half the sample had a high school education (56.3%), 41.8% college and less than two percent (1.96%) less than a high school education. Thirty-one percent of the participants had annual income of $50,000 or less in 2012 while about nine percent (9.2%) had annual household income of $150,000 or higher. Most of the sample were employed in 2012 (71.1%) and slightly less than twenty percent (19.6%) had filed for bankruptcy in the past. Almost all the participants owned their own home

(96.2%). Descriptive statistics of the sample are included in Table 4.1. Sample statistics are included in Table 4.2.

It should be noted that although the data is a large nationally representative dataset with 12,686 respondents, many of the variables necessary for this analysis contained non-interview questions. For example, the smoking and alcohol use questions had 5,385 respondents that were deemed non-interview. This resulted in a large loss of individual participants. In addition, variables that were added for a more robust picture of the sample, also resulted in a significant loss of potential respondents. As an example, when the family poverty status variable was added, close to 500 participants were lost. This process eventually led to a sample size of 1,685.

Table 4.1

Demographic Variables: Descriptive Statistics (N = 1,685)

Variables	*M*	*SD*	Range
Age	51.30	2.21	47 – 56
Race	1.33	.56	1 – 3
EducLev12	13.02	2.36	4 –20
HiGradMot	11.00	2.98	0 – 20
HiGradFat	10.96	3.80	0 – 20
Gender[a]	1.51	.50	1 – 2
Income12	70.24k	74.33k	0 – 497.76k
NetWorth	227.96k	493.45k	-254.8k–3690.8k
HomeOwner12[b]	0.96	0.19	0 – 1
MarStatMarried[c]	0.61	0.49	0 – 1
Employed12[d]	0.71	0.45	0 – 1
WasBankrupt[e]	0.20	0.40	0 – 1
RegionNEast	0.16	0.37	0 – 1
RegionNCent	0.26	0.44	0 - 1
RegionSouth	0.40	0.49	0 - 1
RegionWest	0.18	0.39	0 - 1

[a]Gender: 1 = *male,* 2 = *female*. [b]HomeOwner12: 0 = *does not own home,* 1 = *owns home*.

[c]Marital status: 0 = *not married,* 1 = *married.* [d]Employed12: 0 = *not employed,* 1 = *employed.*

[e]WasBankrupt: 0 = *never declared bankruptcy,* 1 = *has declared bankruptcy*.

Table 4.2

Demographic Variables: Sample Statistics (N = 1,685)

Variables	*Percent of Sample*
Gender: Male/Female	49%/51%
Race: White/Non-White	71%/29%
Married/Non-Married	61%/39%
Annual Income < 50k/ > 50k	47%/52%
Own Home/Do not Own	96%/4%
Employed/Not Employed	71%/29%
Filed Bankruptcy/Never Bankrupt	20%/80%
Resident Northeast	16%
Resident North Central	26%
Resident South	40%
Resident West	18%
Smoker/Non-Smoker	34%/66%
Drink/Don't Drink Alcohol	60%/40%
Use Marijuana/Don't Use	34%/66%
Read Nutrition Label/Don't Read	50%50%
Have Physicals/Don't Have	83%/17%
Risk Taker/Don't Take Risks	20%/80%
Use Contraception/Don't Use	55%/45%
Get Flu Shot/Don't Get	57%/43%

The key independent variable of time preference was entered into the four regression models along with income, employment status, value of total inheritances, the family poverty status in 1978, whether or not a participant had ever declared bankruptcy, age, education level, the highest grade achieved by the respondent's mother and father, marital status, the number of spouses the participant had, number of children, homeownership status, race, gender, and the region of the United States the respondent resided in.

The four models were comprised of the transformed net worth variable (IHSNetWorth12) as the dependent variable. Each model contained a different time preference proxy for comparison purposes. The first model used the eight items that made up the time preference scale but rather than using a summated score, the variables were entered individually. The second model used the incentive choice questions as the time preference proxy. There were two incentive choice questions within the NLSY79. These questions are used quite often in research to proxy time preference. The questions asked participants what the least amount of money they would have to receive to wait one month or one year to receive a $1,000 prize. The third model used the summated time preference scale (TPScale1). This scale contained a summated scale using eight variables with binary responses and a maximum possible score of eight if a respondent exhibited all the behaviors. The fourth model used a time preference summated scale of the eight variables using the raw version that had more continuous responses.

Model 1

The first model contained eight variables that comprised the scale added individually to the regression. One of the eight variables of interest that comprised the time preference scale was if the respondent smoked cigarettes (SMOKES, response choices were 1 = never, 2 = occasionally, and 3 = daily) (M = 1.78). Another was if the respondent drank alcohol in the last

30 days (NODAYSDRANK a continuous variable with a range of 1-30) (M = 5.54). The third was the number of times a participant had used marijuana in their lifetime in 1998 (TIMESUSEDMARI98 a continuous variable 0 = never, 1 = one or two times, 2 = three to five times, 3 = six to ten times, 4 = 11-49 times, 5 = 50 to 99 times, and 6 = 100 or more times) (M = 3.07). The fourth item in the scale was how often a respondent reads the nutrition label when purchasing food (NOREADNUTLAB12, 1 = always read, 2 = often read, 3 = sometimes, 4 = rarely, 5 = never) (M = 2.69). The fifth item asked respondents how long since their last physical exam NOHADPHYSICAL12, 0 = never, 1 = a year ago or less, 2 = more than one year, 3 = more than two years, 4 = more than three years, 5 = over five years ago) (M = 1.64). The sixth item that made up the scale was one's willingness to take risks in financial matters on a scale of 0-10 (RISK10), with 10 being fully prepared to take financial risks (M = 3.54). The seventh variable for time preference item was if a participant used contraception when having sex in the last month. If respondent used contraception then NOCONTRA = 0, if respondent did not use contraception then NOCONTRA = 1 (M = .45). Finally, the eighth item of the scale was if the respondent received a flu shot in the last 24 months. If respondent had received a flu shot then NOFLUSHOT = 0, if respondent had not received a flu shot then NOFLUSHOT = 1 (M = .57).

This model was statistically significant with moderate predictive power $F(26, 1684) = 36.38$, $p < .0001$, see Table 4.3. As expected, smoking (SMOKES) was negatively associated with net worth, $\beta = -0.10$, $t(1684) = -4.81$, $p < .0001$. This negative association suggests that as compared to someone who doesn't smoke cigarettes, those who smoke occasionally or those who smoke daily have lower levels of net worth than those who never smoke. This finding is consistent with what was found in the literature. Since smoking status is one of the stronger

predictors within the scale, it supports the idea of using smoking status as potential viable proxy for time preference.

Table 4.3

Summary of Regression Analysis for Variables Predicting Net Worth (N = 1,685)

	Model 1			Model 2		
Variable	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Smokes	-2337.95	486.24	-.10***	-	-	-
NoDaysDrank	176.01	53.70	.07***	-	-	-
TimesUsed Mari98	-249.53	190.96	-.03	-	-	-
NoReadNutLab12	-274.76	299.74	-.02	-	-	-
NoHadPhysical12	-748.24	344.54	-.05*	-	-	-
Risk10	190.54	159.58	.02	-	-	-
NoContra	-1091.17	858.60	-.03	-	-	-
NoFluShot	-1075.45	873.39	-.03	-	-	-
IncentChoiceMth	-	-	-	-.002	.01	-.005
IncentChoiceYr	-	-	-	.002	.002	.03
Income12	.10	.01	.34***	.11	.01	.37***
Employed12	4159.09	999.41	.09***	4896.41	1001.57	.11***
TotalInherit	.01	.003	.07***	.01	.003	.07***
FamPovStat78	-5391.27	1127.89	-.10***	-5443.8	1139.75	-.10***
Bankruptcy	-5679.10	1062.15	-.11***	-5893.9	1072.63	-11***
Age	388.21	192.16	.04*	451.70	194.07	.05*
EducLev12	89.41	217.37	.01	348.85	214.0	.04
HiGradMot	123.98	187.52	.02	49.77	189.17	.01
HiGradFat	-42.96	147.24	-.01	26.58	148.60	.01

MarStatMarried	5237.49	947.64	.12***	5510.63	953.52	.13***
NumSpouse	-189.52	417.40	-.01	-372.69	420.40	-.02
NumChildren	-860.21	449.77	-.04	-829.60	452.42	-.04
HomeOwner12	5066.58	2226.63	.05*	4798.64	2249.83	.04*
Race	-2850.52	811.89	-.08***	-2659.2	814.16	-.07**
Gender	-269.90	884.85	-.01	1.95	854.79	.00
RegionNCent	-1981.41	1347.23	-.04	-2206.2	1357.99	-.05
RegionSouth	-2428.80	1249.58	-.06	-2594.4	1260.66	-.06*
RegionWest	-1316.37	1440.09	-.02	-1007.6	1452.63	-.02
Adjusted R^2			.35***			.34***

Note: Model 1 = Time Preference Scale variables individually. Model 2 Incentive Choice. Dependent variable IHSNetWorth12.

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

The number of days that a respondent drank alcohol (NODAYSDRANK) was positively associated with net worth and also significant, $\beta = 0.07$, $t(1684) = 3.28$, $p < .01$. This variable was not a measurement of how much alcohol one consumes or an indication of someone who abuses alcohol. The variable identified how many days within a 30-day period a respondent drank alcohol. As such, a respondent with higher number of days in which they consumed alcohol, had higher levels of net worth than a respondent that consumed alcohol a fewer number of days in the 30-day period. There is some literature which identified an association between drinking alcohol and economic success. Mullahy and Sindelar (1993) and French and Zarkin (1995) found that wages peaked for those who drank 1.5 to 2.5 drinks per day (Prieto, 2006).

Zarkin, French, Mroz, and Bray (1998) also reported that men who drank alcohol had higher wages than abstainers. This research seems to support this association.

If a respondent did not have regular physical exams (NOHADPHYSICAL12), this was negatively associated with net worth and significant, $\beta = -0.05$, $t(1684) = -2.17$, $p < .05$. Those who never had physical exams with their doctor or those who had larger time lapses between physical exams had lower net worth than those who had physicals or those who had physicals more frequently. This finding is consistent with prior literature. Those who have fewer physical exams tend to be more present oriented and live for today rather than conscious about future health concerns.

The level of income (INCOME12) was positively associated with net worth, $\beta = 0.34$, $t(1684) = 13.97$, $p < .0001$. As income rises the level of net worth also rises. Put another way, higher levels of income tended to lead to a higher level of net worth. Income as expected was one of the significant predictors of net worth.

Whether someone was employed in 2012 (EMPLOYED12) was significant and positively associated with net worth, $\beta = 0.09$, $t(1684) = 4.16$, $p < .0001$. As compared to someone who was unemployed in 2012, someone who was employed had greater net worth.

Inheritances can play a big role in increasing one's net worth. If someone had received an inheritance (TOTALINHERIT) at some point in their life was found to be significant and positively associated with net worth, $\beta = 0.07$, $t(1684) = 3.32$, $p < .001$. As the level of inheritance rises, so does the level of net worth.

In 1978, if a respondent had experienced family poverty (FAMPOVSTAT78) was significant and negatively associated with the dependent variable, $\beta = -0.10$, $t(1684) = -4.78$, $p < .0001$. There is some literature suggesting that those who experience poverty during their

childhood may be predisposed to a life of poverty. This research supports this conclusion since those respondents who had experienced family poverty in 1978 (when they were between the ages of 14 and 21) recorded lower net worth than those who hadn't experienced poverty.

If a participant had declared bankruptcy in the past (BANKRUPTCY), was significant and negatively associated with net worth, $\beta = -0.11$, $t(1684) = -5.35$, $p < .0001$. As expected those who had declared bankruptcy in the past had lower net worth than those who hadn't. This was consistent with what has been reported in other studies regarding prior bankruptcies.

Age (AGE) was significant and positively associated with net worth, $\beta = 0.04$, $t(1684) = 2.02$, $p < .05$. The older the respondents were, the higher the net worth they had accumulated. This is consistent with what has been reported. The assumption is that the older people get the more accumulated savings, investments, and property they would have amassed. Younger people have yet to accumulate much in savings since they may be building up their careers, starting families, and possibly paying off student loan debt.

Marital status (MARSTATMARRIED) was another variable which was significant and positively related to net worth. Respondents who were married had a higher net worth than those who were not married, $\beta = 0.12$, $t(1684) = 5.53$, $p < .0001$. This finding is also not unexpected since two people combining their assets and two members of a family potentially employed would create greater levels of wealth than single member households.

Homeownership (HOMEOWNER12) was positively associated with net worth and significant, $\beta = 0.05$, $t(1684) = 2.28$, $p < .05$. Those who own their home had greater net worth than those who didn't. This is supported by the literature since net worth in many cases is largely made up of home equity. Race (RACE) was negatively associated with net worth when comparing whites to non-whites. This was significant, $\beta = -0.07$, $t(1684) = -3.51$, $p < .001$. This

finding also supports other research which has found that non-whites had lower net worth than whites.

Model 1 (scale items individually):

$$y_1 = b_0 + (b_1 * X_i) + \mathcal{E}_i$$

Equation 7

$$\text{IHSNetWorth12} = b_0 + (b_1 * \text{Smokes}) + (b_2 * \text{NoDaysDrank}) + (b_3 * \text{TimesUsedMari98}) + (b_4 * \text{NoReadNutLab12}) + (b_5 * \text{NoHadPhysical12}) + (b_6 * \text{Risk10}) + (b_7 * \text{NoContra}) + (b_8 * \text{NoFluShot}) + (b_9 * \text{Income12}) + (b_{10} * \text{Employed12}) + (b_{11} * \text{TotalInherit}) + (b_{12} * \text{FamPovStat78}) + (b_{13} * \text{Bankruptcy}) + (b_{14} * \text{Age}) + (b_{15} * \text{EducLev12}) + (b_{16} * \text{HiGradMot}) + (b_{17} * \text{HiGradFat}) + (b_{18} * \text{MarStatMarried}) + (b_{19} * \text{NumSpouse}) + (b_{20} * \text{NumChildren}) + (b_{21} * \text{HomeOwner12}) + (b_{22} * \text{Race}) + (b_{23} * \text{Gender}) + (b_{24} * \text{RegionNCent}) + (b_{25} * \text{RegionSouth}) + (b_{26} * \text{RegionWest})$$

Model 2

Model 2 with the incentive choice questions as the proxies for time preference was statistically significant $F(20, 1684) = 43.76$, $p < .0001$, see Table 4.3. The two incentive choice variables were not statistically significant. The level of income (INCOME12) was positively associated with net worth, $\beta = 36.81$, $t(1684) = 15.40$, $p < .0001$. Employment status (EMPLOYED12) was significant and positively associated with net worth, $\beta = 0.11$, $t(1684) = 4.89$, $p < .0001$. Total inheritance received by a participant (TOTALINHERIT) was significant and positively associated with net worth, $\beta = 0.07$, $t(1684) = 3.52$, $p < .001$. If a respondent had experienced family poverty (FAMPOVSTAT78), was significant and negatively associated with the dependent variable, $\beta = -0.10$, $t(1684) = -4.78$, $p < .0001$. If a participant had experienced a bankruptcy in their past (BANKRUPTCY) was significant and negatively associated with net worth, $\beta = -0.11$, $t(1684) = -5.49$, $p < .0001$. Age (AGE) was significant and positively associated with net worth, $\beta = 0.05$, $t(1684) = 2.33$, $p < .05$. The participant's marital status

(MARSTATMARRIED) was significant and positively related to net worth. Respondents who were married had a higher net worth than those who were not married, β = 0.13, $t(1684) = 5.79$, $p < .0001$. Owning one's home (HOMEOWNER12) was positively associated with net worth and significant, β = 0.04, $t(1684) = 2.13$, $p < .05$. Race (RACE) was negatively associated with net worth when comparing whites to non-whites. This finding was significant, β = -0.07, $t(1684) = -3.27$, $p < .001$.

Model 2 (incentive choice):

$$y_1 = b_0 + (b_1 * X_i) + \mathcal{E}_i$$

Equation 8

$$\begin{aligned}\text{IHSNetWorth12} = {} & b_0 + (b_1 * \text{IncentChoiceMth}) + (b_2 * \text{IncentChoiceYr}) + (b_3 * \text{Income12}) + (b_4 * \text{Employed12}) + (b_5 * \text{TotalInherit}) + (b_6 * \text{FamPovStat78}) + (b_7 * \text{Bankruptcy}) + (b_8 * \text{Age}) + (b_9 * \text{EducLev12}) + (b_{10} * \text{HiGradMot}) + (b_{11} * \text{HiGradFat}) + (b_{12} * \text{MarStatMarried}) + (b_{13} * \text{NumSpouse}) + (b_{14} * \text{NumChildren}) + (b_{15} * \text{HomeOwner12}) + (b_{16} * \text{Race}) + (b_{17} * \text{Gender}) + (b_{18} * \text{RegionNCent}) + (b_{19} * \text{RegionSouth}) + (b_{20} * \text{RegionWest})\end{aligned}$$

Model 3

Model 3 was comprised of the regression analysis with the time preference scale questions summated into a time preference score. This model was positively associated with net worth and statistically significant $F(19, 1684) = 47.65$, $p < .0001$, see Table 4.4.

Table 4.4

Summary of Regression Analysis for Variables Predicting Net Worth (N = 1,685)

	Model 3			Model 4		
Variable	*B*	*SE B*	*β*	*B*	*SE B*	*β*
TPScale1	-1465.18	316.59	-.10***	-	-	-
TPScale2	-	-	-	47.03	44.67	.02
Income12	0.10	.007	.36***	0.10	.007	.37***
Employed12	4534.93	995.99	.10***	4811.20	1000.14	.10***
TotalInherit	0.01	.003	.07***	0.01	.003	.07***
FamPovStat78	-5479.40	1132.78	-.10***	-5439.1	1139.71	-0.10***
Bankruptcy	-5785.85	1065.36	-.11***	-5962.1	1072.17	-0.11***
Age	403.73	193.05	0.04*	456.15	194.21	0.05*
EducLev12	205.69	214.92	0.02	356.79	213.75	.04
HiGradMot	127.77	188.29	0.02	40.80	189.14	.006
HiGradFat	-5.04	147.75	-0.00	14.18	148.68	.003
MarStatMarried	5229.26	948.61	0.12***	5606.56	953.17	.13***
NumSpouse	-265.73	418.02	-0.01	-382.70	420.10	-0.02
NumChildren	-922.44	450.15	-0.04*	-795.09	452.92	-0.04
HomeOwner12	4990.19	2235.89	0.05*	4800.41	2249.38	0.04*
Race	-2691.71	808.06	-0.07***	-2562.6	815.04	-.07**
Gender	-978.45	871.73	-0.02	146.07	873.63	.003
RegionNCent	-2143.99	1349.77	-0.04	-2198.0	1357.98	-0.05
RegionSouth	-2332.65	1253.16	-0.05	-2556.2	1259.85	-.06*
RegionWest	-1057.47	1443.13	-0.02	-1026.7	1452.01	-.02
Adjusted R^2		.34***			.34***	

Note: Model 3 = Time Preference Scale binary responses. Model 4 = Time Preference Scale using raw variable. Dependent variable IHSNetWorth12.

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

The time preference summated score variable (TPSCALE1) was statistically significant, β = -0.10, $t(1684) = -4.63$, $p < .0001$. The level of income (INCOME12) was positively associated with net worth, β = .36, $t(1684) = 15.08$, $p < .0001$. Employment status (EMPLOYED12) was significant and positively associated with net worth, β = 0.10, $t(1684) = 4.55$, $p < .0001$. Total inheritance received by a participant (TOTALINHERIT) was significant and positively associated with net worth, β = 0.07, $t(1684) = 3.53$, $p < .001$. If a respondent had experienced family poverty (FAMPOVSTAT78) was significant and negatively associated with the dependent variable, β = -0.10, $t(1684) = -4.84$, $p < .0001$. The bankruptcy variable (BANKRUPTCY) was significant and negatively associated with net worth, β = -0.11, $t(1684) = -5.43$, $p < .0001$. Age (AGE) was significant and positively associated with net worth, β = 0.04, $t(1684) = 2.09$, $p < .05$. The participant's marital status (MARSTATMARRIED) was significant and positively related to net worth. Respondents who were married reported a higher net worth than those who were not married, β = 0.12, $t(1684) = 5.51$, $p < .0001$. The number of children that respondents reported was negatively associated with net worth, β = -0.04, $t(1684) = -2.05$, $p < .05$. Owning one's home (HOMEOWNER12) was positively associated with net worth and significant, β = 0.05, $t(1684) = 2.23$, $p < .05$. Race (RACE) was negatively associated with net worth when comparing whites to non-whites. This finding was also significant, β = -0.07, $t(1684) = -3.33$, $p < .001$.

Model 3 (time preference scale binary responses):

$$y_1 = b_0 + (b_1 * X_i) + \mathcal{E}_i$$

Equation 9

$$\text{IHSNetWorth12} = b_0 + (b_1 * \text{TPScale1}) + (b_2 * \text{Income12}) + (b_3 * \text{Employed12}) + (b_4 * \text{TotalInherit}) + (b_5 * \text{FamPovStat78}) + (b_6 * \text{Bankruptcy}) + (b_7 * \text{Age}) + (b_8 * \text{EducLev12}) + (b_9 * \text{HiGradMot}) + (b_{10} * \text{HiGradFat}) + (b_{11} * \text{MarStatMarried}) + (b_{12} * \text{NumSpouse}) + (b_{13} * \text{NumChildren}) + (b_{14} * \text{HomeOwner12}) + (b_{15} * \text{Race}) + (b_{16} * \text{Gender}) + (b_{17} * \text{RegionNCent}) + (b_{18} * \text{RegionSouth}) + (b_{19} * \text{RegionWest})$$

Model 4

The Model 4 regression analysis utilized the time preference scale variables in their raw form, summated into a time preference score variable (TPSCALE2). The model was statistically significant $F(19, 1684) = 46.02$, $p < .0001$ (see Table 4.4), however, the time preference summated score variable was not. The level of income (INCOME12) was positively associated with net worth, $\beta = .37$, $t(1684) = 15.28$, $p < .0001$. Employment status (EMPLOYED12) was significant and positively associated with net worth, $\beta = 0.10$, $t(1684) = 4.81$, $p < .0001$. Total inheritance received by a participant (TOTALINHERIT) was significant and positively associated with net worth, $\beta = 0.07$, $t(1684) = 3.49$, $p < .001$. If a respondent had experienced family poverty (FAMPOVSTAT78) was significant and negatively associated with the dependent variable, $\beta = -0.10$, $t(1684) = -4.77$, $p < .0001$. The bankruptcy variable (BANKRUPTCY) was significant and negatively associated with net worth, $\beta = -0.11$, $t(1684) = -5.56$, $p < .0001$. Age (AGE) was significant and positively associated with net worth, $\beta = 0.05$, $t(1684) = 2.35$, $p < .05$. The participant's marital status (MARSTATMARRIED) was significant and positively related to net worth. Respondents who were married had higher levels of net worth than those who were not married, $\beta = 0.13$, $t(1684) = 5.88$, $p < .0001$. Homeownership (HOMEOWNER12) was positively associated with net worth and significant, $\beta = 0.04$, $t(1684) =$

2.13, $p < .05$. Race (RACE) was negatively associated with net worth when comparing whites to non-whites. This was significant, $\beta = -0.07$, $t(1684) = -3.14$, $p < .001$. Those who were from the southern region of the United States (REGIONSOUTH) was negatively associated with net worth and statistically significant, $\beta = -0.06$, $t(1684) = -2.03$, $p < .05$. This indicates that as compared with someone who resided in the northeast region of the U. S., those who lived in the southern region of the country had lower net worth than one who lived in the northeast.

Model 4 (time preference scale raw variables):

$$y_1 = b_0 + (b_1 * X_i) + \mathcal{E}_i$$

Equation 10

$$\text{IHSNetWorth12} = b_0 + (b_1 * \text{TPScale2}) + (b_2 * \text{Income12}) + (b_3 * \text{Employed12}) + (b_4 * \text{TotalInherit}) + (b_5 * \text{FamPovStat78}) + (b_6 * \text{Bankruptcy}) + (b_7 * \text{Age}) + (b_8 * \text{EducLev12}) + (b_9 * \text{HiGradMot}) + (b_{10} * \text{HiGradFat}) + (b_{11} * \text{MarStatMarried}) + (b_{12} * \text{NumSpouse}) + b_{13} * \text{NumChildren}) + (b_{14} * \text{HomeOwner12}) + (b_{15} * \text{Race}) + (b_{16} * \text{Gender}) + (b_{17} * \text{RegionNCent}) + (b_{18} * \text{RegionSouth}) + (b_{19} * \text{RegionWest})$$

Preferred Model

The preferred model in the study was Model 1. In this model, the eight items that were used to build the time preference scale were added individually and not combined. Model 1 and Model 3 were found not to be significantly different from a model without time preference predictors. An *F*-Test was conducted and revealed no significant difference in explained variance. However, Appendix Tables1 and 2 compares effect sizes of the significant variables. By comparing effect sizes, the importance of the time preference can be determined. For example, a comparison of the standardized coefficients among the significant variables indicates that a one unit change in smoking negatively affects net worth to the same degree that a bankruptcy in the past. While there is no significant difference in the variance explained by

Model 1 or Model 3 compared to a model without either time preference predictor, there is importance in the findings from the individual intertemporal predictors of Model 1 and 3. Referring to Appendix Table 1, it shows that "Smokes" effect size exceeds estimated effects for employment, received inheritance, race, and region of residence. The effect of "Smokes" is also roughly the same for bankruptcy and marital status. Not taking physical exams has about the same effect size as for family poverty status, or homeownership. From Appendix Table 2, one can also infer that the negative influence of the scaled time preference behavior score is similarly effective as compared with employment, inheritance, family poverty status, age, number of children, homeownership, and race.

Chabris et al. (2008), argued that it was important to study indices of behaviors rather than individual behaviors. Chabris et al. further stipulated that when judged this way discount rates turn out to be a key variable in explaining individual differences in choices involving intertemporal tradeoffs. The results here for Model 3 support Chabris et al. however, Model 1 also demonstrated significant and important effects for individual behaviors like smoking and not getting physicals.

Chapter 5 - Conclusions

The current study found that in a national representative sample from the NLSY79, time preference as measured by individual intertemporal behaviors such as smoking, drinking, and not having physical exams were significantly associated with net worth. As theoretically expected smoking and not taking physical exams were negatively associated with net worth. However, drinking was positively associated with net worth. It should be noted that the reference to drinking is not an indicator of someone who abuses alcohol but rather someone who consumes rather than abstains from alcohol. In addition, when time preference was measured by a scale constructed with individual intertemporal behaviors with binary responses, it was significantly and negatively associated with net worth. When time preference was measured by the monetary incentive choice with a one month or one-year wait for a cash prize, they were not significantly associated with net worth.

Limitations

The concept of time preference has been of active study however, there has been no clear consensus on how to measure this latent construct. This study attempts to add a unique contribution to the literature for the measure of this important psychological construct. Part of the contribution of this study is that it attempted to examine time preference from two distinct measurement techniques using a nationally representative sample. In the process, this study has several limitations that should be noted. First, working with secondary data has its own inherent limitations. The variables chosen for study were limited to the questions that were asked by the survey instrument. This research replicated the time preference measurement scale which in concept was initiated by Chabris et al. (2008) and later modified by Finke and Huston in two later studies (2004/2013). Although an attempt was made to replicate the scale from the Finke

and Huston 2004 study, based on data limitations the scale could not be replicated in its exact form so that comparisons while informative may not be complete.

Another limitation is that the incentive choice questions that were available in the NLSY79 data were only asked in 2006. Much of the other variables include data that was collected in 2012. That gap between the two data points limits the usefulness of the incentive choice question. In addition, while there were six incentive choice type questions in the data, only two contained the number of responses that were useful for analysis.

It should be acknowledged that although the dataset is a national representative sample, the population within the sample used for analysis is not. Due to the elimination of participants for non-interview questions on specific variables, the sample is no longer representative of the U.S. population and results may not be generalizable. For example, the rate of homeownership is much larger than the national average. The number of participants that smoke cigarettes, or who use or have used marijuana is also higher than the national averages in those areas.

Cross sectional analysis such as this limit the ability to define a causal relationship among the data. Based on the research, a clear association between time preference and net worth was found however, it cannot be determined if a causal relationship between time preference and net worth exists. In addition, the observed associations imply that the hypothesis that time preference is associated with net worth was supported. However, it is possible that a bi-directional relationship exists. Further analysis using changes in net worth rather than accumulated net worth to understand bi-directionality is recommended.

A distinction between time horizon and time preference should also be made. For example, a time horizon for an investor, is the amount of time before that investor would actually need the invested funds. A younger investor typically would have a longer time horizon than an

older investor. These can be independent of their time preference. A young graduate student with limited assets might have a long time horizon, but have low time preference. Their low time preference might be revealed by the fact that they are not discounting the future value of an education. Additionally, an older person may have a short time horizon for investment purposes but may have a high time preference in that they often make intertemporal choices relative to immediate satisfaction without regard for future consequences.

Another limitation is that the net worth data was collected in 2012, which includes much of the rebound from the economic downturn of 2008 (which later became known as the Great Recession) but perhaps not all.

Finally, since preference measures are based on laboratory quantitative frames that may not reflect the framing of market decisions. There is a concern that the findings may not generalize to market decisions (Benjamin, Brown, & Shapiro, 2013).

Discussion

In their 2004 study, Finke and Huston hypothesized that people who are more likely to engage in risky behaviors were more likely to be present minded in their financial decisions. Their work was based on a sample of 259 undergraduate students and thus was not as generalizable of the U.S. population as the analysis reported here. Finke and Huston found that time preference may affect both investment behavior and behaviors in other decision-making domains. Those who revealed a tendency to favor well-being in the present at the expense of future well-being, were more likely to choose investment outcomes that were also more present oriented. In their study, they used two financial decisions as the dependent variable. Cashing in a savings bond or holding it until maturity, and a present value amount of money that a respondent would accept in lieu of $1000 one year from now.

A threshold was set at 18% (up to $850) which approximated the credit card rate that allowed students to bring future monies into the present. It was hypothesized that respondents with desired monetary discount rates greater than 18% would have higher rates of future utility discounting, compared to those who would select a present value of $850 or greater indicating a monetary discount rate of 18% or lower. When comparing respondents with lower discount rates, they found statistical significance with the time preference behaviors of alcohol use, marijuana use, diet choice, vaccinations, doctor visits and, gambling frequency. When comparing the respondents who chose to cash in the savings bond now, to those willing to wait, the time preference items with statistical significance were somewhat different--cigarette use, alcohol use, marijuana use, vaccinations, unprotected sex, and gambling frequency.

In the current study, in the model when the eight behavioral items were added to the regression individually, statistical significance was found for smoking, drinking, and not having physical exams, all which support the findings by Finke and Huston (2004). However, unlike the Finke and Huston analysis, marijuana use, flu shots, not using contraception, and willingness to take financial risks were not found to be significant in predicting net worth.

In the Finke and Huston study of 2004, for both the dependent variables that represented financial impatience, the scores on the time preference scale were positive and highly significant. Students with higher time preference scores had greater odds of being in the group that wanted to cash in their savings bond immediately, and so supported their hypothesis that high future discounting or a more present oriented bias was associated with financial impatience or myopic financial decisions (Finke & Huston, 2004).

In the regression analysis, Finke and Huston (2004) found significance between the incentive choice and childhood environment, academic major, and gender. In the current study,

the model which used incentive choice questions as a proxy for time preference, found significance with family poverty status in 1978. This may be consistent with the significance found by Fink and Huston regarding childhood rearing environment (urban, suburban, or rural). However, education level and gender in the current study were not significantly associated with net worth.

The Finke and Huston (2004) research reported that respondents from a small town had lower odds of being in the group with higher discount rates. Males were also found to likely be in the group with higher discount rates. Math or engineering students had lower odds of being in the group with higher discounting rates. Freshman were also found to have greater odds of being in the group that was financially impatient.

In the current study, being from the south as opposed to from the northeast was moderately significant as a predictor of net worth in the model using incentive choice questions. Gender was not found to be significantly associated with net worth in any of the models in the current study. Education level was also not found to be significantly related to net worth.

Finke and Huston (2004) discovered that there was a strong association between more myopic behaviors and a preference for money now at the expense of money in the future. Strong correlations existed between the unwillingness to wait for financial rewards and behaviors involving sensation seeking such as drug use, unprotected sex, and preventive health behaviors unrelated to sensation seeking such as the frequency of doctor visits, healthy foods, and getting vaccinations. The authors confirmed their hypothesis that savings and investment behavior were strongly correlated to the willingness to defer gratification. These results suggested that behaviors unrelated to sensation seeking may be possible predictors of investment behavior.

Evidently, risky behaviors that reveal a high intertemporal discount rates are consistent with investing behavior that emphasize a short-run time horizon.

Finke and Huston (2013) studied the association between time preference and the importance of saving for retirement. The researchers sampled a population of undergraduate, graduate, and professional students at a large midwestern university. The sample was quite large at 6,812, but it was not a national representative sample as was the current study. Time preference was measured by comparing dollar values over time and separately using a combination of intertemporal behaviors. The time preference measure of comparing dollar values over time proved to be a weaker predictor than a scale developed through intertemporal behaviors. This finding was consistent with the current study. The incentive choice questions used as a proxy for time preference here, were not found to be statistically significant predictors of net worth. The time preference for money using an incentive choice annual approach variable, yielded the same parameter estimate as the incentive choice questions in the current study. However, the current study had a way to proxy time preference using two incentive choice measures. One focused on a one month wait and the other on a one-year wait to receive a prize. Both measures were not significant.

Finke and Huston (2013) conducted a factor analysis to analyze and measure the potential covariance among the eight questions that could be attributed to time preference or sensation seeking. The factor analysis produced two distinct factors, one composed of five risk related behaviors of smoking, drinking, drug use, seatbelt use, and unsafe sex (indicating a higher rate of time preference) and the other composed of three preventive health related behaviors of eating a healthy diet, exercising and reading nutrition labels. That study found that intertemporal preventive health behaviors were a stronger predictor of the importance of saving for retirement

than all other explanatory variables. This was contrary to the findings here. A similar factor was extracted from the data in this study known as UnHealthBeh. This factor included smoking, not reading nutrition labels, not taking regular physical exams, and not taking a flu shot. However, the UnHealthBeh factor was not found to be a strong predictor of net worth in the model.

Finke/Huston (2013) found very weak correlations between myopic risk related behaviors (smoking, drinking, drug use, seatbelt use, and unsafe sex) and variables that related to preventative health behaviors (eating a healthy diet, exercising and reading nutrition labels). The researchers concluded that both types of behaviors stemmed from characteristics that were not related to time preference. Based on that evidence, they suggested that this reduced the precision of using these behaviors as a proxy for time preference. Finke and Huston used the analysis of Robbins and Bryan (2004) to interpret this pattern. In the latter study, risk related behaviors such as smoking, drug use, drinking and risky sex, had a significant association with sensation seeking as an independent construct. Robbins and Bryan inferred that since some individuals were more sensation seeking than others, it would stand to reason that they would get more utility in the present from engaging in risky behavior like marijuana use. For others, avoiding marijuana and alcohol is not a big sacrifice because sensation seeking is less important. Failure to control for sensation seeking could be the reason why Finke and Huston's preventive health-related behaviors like healthy eating, exercise, and reading nutrition labels were not good predictors.

The analysis presented here may contradict the finding that individual behaviors lack precision as a measure of time preference. In fact, in this analysis when the scale behavior items were added to a regression model individually, the model was a better predictor of net worth than when the behaviors were combined as a scale.

Finke and Huston found that the scale method of measuring time preference was a valid instrument in that the theoretically predicted correlations among domains were informative in that way. The dependent variable for importance of saving to retire correlated significantly with seven of the intertemporal behaviors and almost all in the predicted direction. The importance of saving for retirement was most highly correlated with food label use, eating a healthy diet, exercise, seatbelt use, and drug use. Those who considered saving for retirement very important used seat belts, exercised, and used nutrition labels more frequently. A significantly higher proportion thought it was important to eat a healthy diet and a significantly lower proportion smoked or used drugs. Those who did not value saving for retirement at all had the highest numerical rate of time preference based on the incentive choice questions. Those who considered saving extremely important did not have a significantly higher mean rate of time preference.

In Finke and Huston (2013), the incentive choice measure of time preference was not found to be statistically significant as a predictor of the importance of saving for retirement. However, when that rate of time preference measured as incentive choice, was logged, it was statistically significant in the predicted direction. In their models where time preference was proxied by incentive choice questions, the strongest predictors were age, business major, graduate/professional status, having taken a financial planning course, and being white. In this study, the raw incentive choice questions as a proxy were found to be not statistically significant as a predictor of net worth consistent with the findings of Finke and Huston (2013). However even when the incentive choice variables were log transformed, they were not statistically significant contrary to the finding of Finke and Huston.

When Finke and Huston (2013) measured time preference as an additive scale of risk related behaviors, it was significant and the strongest predictor of importance of saving for

retirement in the model. In contrast, this study found that the time preference scale was only significant when it was comprised of the binary choice response variables. When the time preference scale was comprised of the raw intertemporal behavior variables with more continuous response choices, it was not a statistically significant predictor of net worth.

Finke and Huston's 2013 study, provided the first strong empirical evidence that time preference for money measured using a log-transformed numerical dollar comparison is a significant predictor of the importance a participant placed on saving for retirement. This was not the case in the current analysis for net worth which is an objective measure that stems from actual behaviors. Finke/Huston (2013) also found that behaviors guided by intertemporal utility substitution may serve as a more accurate measure of individual time preference for utility than the previously used numerical measures of time preference. The current study supports this assertion.

In Finke/Huston (2013), the scale of eight behaviors that involve intertemporal tradeoffs of present versus future utility, explained a larger proportion of the variance in the importance of saving for retirement than the traditional numerical representation of time preference. The current study supports this finding. The two factors that emerged from the factor analysis conducted by Finke and Huston, predicted an even larger proportion of the variance in the importance of saving for retirement. However, the three factors that emerged from the current factor analysis were not found to be significant in predicting net worth, which is why the main results focus on separate behaviors here.

The analysis of net worth conducted for this project was guided by Finke and Huston's research strategies, used a larger and more nationally representative sample, and reached different specific conclusions. As examples, Finke and Huston in 2004 and 2013 found that the

scaled approach to time preference measurement was a better predictor than using individual intertemporal behaviors to proxy time preference. This was not the case in the current analysis. The scaled approach measurement technique was not a better predictive model than the individual behaviors added individually to the model.

In addition, Finke and Huston (2013) found empirical support for using the log transformation for measuring the time preference for money was a significant predictor of the importance for saving for retirement. In the current study, the log transformation did not improve the predictability of the incentive choice model as a time preference measurement.

Finally, Finke and Huston (2013) used an incentive choice variable that only measured the willingness to wait for one year for a prize. They found the amount of money it would take to entice respondents to wait was negatively associated with the importance to saving for retirement. The current analysis used a measure which examined a one month wait and a one year wait for a prize. When respondents were asked how much they would have to receive to wait one month for a prize, the responses were positively related to net worth. However, when respondents were asked how much they would have to receive to wait one year for a prize, the larger the amount they would have to receive was positively related to net worth. Neither was significant in the multivariate analysis, but at the bivariate level the IncentChoiceMth and IncentChoiceYr were significantly and negatively correlated with net worth (see Table 5.1).

Table 5.1

Correlations Among Variables Related to Time Preference: Correlations and Descriptive Statistics (N = 1,685)

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. TPScale1	-	.49***	.47***	.19***	.32***	.47***	.44***	.19***	.41***	.48***	.74***	.26***	.26***	.03	.07**	-.21***
2. TPScale2	.49***	-	.14***	.89***	.39***	.21***	.26*	.34***	.04	.13***	.31***	.93***	.34***	-.06**	-.01	.09***
3. Smokes	.47***	.14***	-	.003	.05***	.17***	.12***	-.07**	.07**	.12***	.53***	.02	-.05*	.03	.07**	-.25***
4. NoDaysDrank	.19***	.89***	.003	-	.16***	.02	.07**	.08***	-.05	.02	.05*	.97***	.07**	-.07**	-.03	.16***
5. TimesUsedMari98	.32***	.39***	.05**	.16***	-	-.01	.06*	.06**	-.002	.02	.04	.41***	.06*	-.04	.03	-.01
6. NoReadNutLab12	.47***	.21***	.17***	.02	-.01	-	.17***	-.03	.05	.13***	.73***	.02	-.02	.06*	.06*	-.13***
7. NoHadPhysical12	.44***	.26*	.12***	.07**	.06*	.17***	-	.009	.03	.21***	.66***	.08**	.01	-.02	-.01	-.10***
8. Risk10	.19***	.34***	-.07**	.08***	.06**	-.03	.009	-	.02	.004	-.04	.09***	.98***	-.05	-.05*	.10***
9. NoContra	.41***	.04	.07**	-.05	-.002	.05	.03	.02	-	.01	.07**	-.04	.20***	.03	.04	-.12***
10. NoFluShot	.48***	.13***	.12***	.02	.02	.13***	.21***	.004	.01	-	.41***	.02	.007	.04	.04	-.09***
11. UnHealthBeh	.74***	.31***	.53***	.05*	.04	.73***	.66***	-.04	.07**	.41***	-	.06*	-.02	.04	.06*	-.23***
12. SubsAbuse	.26***	.93***	.02	.97***	.41***	.02	.08**	.09***	-.04	.02	.06*	-	.08***	-.07**	-.02	.14***
13. RiskyBeh	.26***	.34***	-.05*	.07**	.06*	-.02	.01	.98***	.20***	.007	-.02	.08***	-	-.04	-.04	.08**
14. IncentChoiceMth	.03	-.06**	.03	-.07**	-.04	.06*	-.02	-.05	.03	.04	.04	-.07**	-.04	-	.44***	-.11***
15. IncentChoiceYr	.07**	-.01	-.07**	-.03	.03	.06*	-.01	-.05*	.04	.04	.06*	-.02	-.04	.44***	-	-.11***
16. IHSNetWorth12	-.21***	.09***	-.25***	.16***	-.01	-.13***	-.10***	.10***	-.12***	-.09***	-.23***	.14***	.08**	-.11***	-.11***	-

*Pearson's Alpha: *p < .05. **p < .01. ***p < .001.*

Table 5.1 Continued

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
M	2.62	19.29	1.78	5.54	3.07	2.69	1.64	3.54	.45	.57	6.68	8.61	3.99	591.92	1719.7	22,537
SD	1.42	9.89	.92	8.12	2.29	1.49	1.27	2.68	.50	.50	2.61	8.78	2.74	1099.23	2628.49	21,188
Range	0 – 8	3 – 59	1 – 3	0 – 30	0 – 6	0 – 5	1 – 6	0 – 10	0 – 1	0 – 1	2 – 15	0 – 36	0 – 11	1 - 10000	1 - 10000	-39k – 66k

TPScale1 = *time preference scale binary responses*. TPScale2 = *time preference scale continuous responses*. UnHealthBeh = *unhealthy behaviors factor.* SubsAbuse = *substance abuse behaviors factor.* RiskyBeh = *risky behaviors factor*. IHSNetWorth12 = *inverse hyperbolic sine transformed dependent variable*.

Implications for Future Research

The research question posed in this study was whether there was an association between time preference (as measured in two distinct ways), and net worth, an indicator of financial well-being. This was accomplished with a national representative sample. An additional question was to determine if time preference, as measured using an additive scale of intertemporal behaviors, was a better predictor of net worth than the prolific incentive choice questions typically used as a proxy for time preference.

This study confirmed what many researchers have found, and that is that time preference continues to be a difficult construct to measure. More importantly however, finding an association between time preference and an objective measure like net worth has created an agenda for future research. Net worth as a dependent variable is valuable because it is an objective measure based on actual behavior. Much of the research in the field is based on attitudinal variables which are not based on how people behave. Because of the complexity of this construct and the conditions, environment, and choices that affect an individual's time preference, more studies are necessary.

The negative association between time preference and net worth found here, suggests that those with a high rate of intertemporal discounting accumulate less net worth than those with a lower rate of intertemporal discounting. Based on the contributions of this study, it is now evident that time preference may be a factor as to why Americans are not accumulating the necessary wealth to sustain themselves over their life course. Further research needs to build upon these findings and continue to develop stronger measurement techniques for time preference as a construct. The possible bi-directionality of this relationship is an area where additional research is warranted.

Part of the future work should include testing individual intertemporal behaviors involving choices of present versus future utility so that the best measures will emerge. Research questions should include which intertemporal choice behaviors capture the construct of time preference best.

The time preference scale concept should continue to be tested especially in primary data collection formats. Questionnaires need to be developed to test different intertemporal behaviors for use in an additive scale. Ultimately, an additive scale with predictive power should be developed so that it can be tested in sub populations. The goal should be to have a valid, reliable scale to measure time preference so that future researchers will be able to use it with confidence as a measurement technique.

The association of time preference and net worth has been established and since time preference influences net worth, it should be an active area of study. Net worth is objective and its accumulation stems from prudent financial behaviors such as saving, investing, and limited spending. Researchers should now focus on the time preferences that lead to the accumulation of wealth. Additionally, focus should be applied to testing these relationships within different economic subgroups. Additional research could be focused on whether or not the relationship between time preference and net worth is contingent on resource levels. Because of the longitudinal nature of the NLSY79 data, predictor variables from earlier periods can be analyzed with outcome variables that occur in later periods. Additional variables such as locus of control or conscientiousness can be examined for further analysis. The NLSY79 affords researchers the opportunity to use the data in this way.

Incentive choice questions have been used as proxies for time preference in the literature quite often. The findings herein, as well as the findings by Finke and Huston (2013), call into

question the incentive choice questions as a proxy. It is possible that the questions themselves are difficult for respondents to answer and suggests the possibility that respondents don't fully understand the question or are incapable of making the comparison between receiving a cash reward in two different time periods in the future. Additional incentive choice questions should be developed which might be easier for respondents to comprehend.

According to Rogers (1994) time preference is shaped by learning and culture, not by natural selection. There is some research that suggest that time preference is malleable (Carstensen et al., 1999). Research has shown that developing and teaching skills to delay gratification, planning out things in advance, socializing children to be patient and reducing the cost of future-oriented capital at home can be potentially effective policy tools in reducing economic disparities (Gouskova, 2010).

This current study indicates that the assumed association between time preference and net worth bears out in a cross-sectional analysis of a national representative sample. A portion of new research in this area should focus on the question of time preference and its ability to be altered and under what conditions this would be possible. Additional avenues that can be examined are those regarding individuals who don't accumulate sufficient wealth and how much of that deficiency was due to the time preference of their choices. According to Finke and Huston (2013), if time preference is passed down either genetically or through learned behavior the persistence of wealth across generations may be partially a function of shared time preference.

Why households differ in wealth accumulation is essential to evaluate policies aimed at that distribution (Knowles & Postelwaite, 2004). Knowles and Postelwaite (2004) pointed out that part of the difference in wealth accumulation reflects a household's willingness or ability to

reserve part of that income for the future. Time preference may explain a portion of that disparity. More research is necessary to understand this relationship. For example, actual longitudinal data should be conducted that examines different time preferences and the accumulation of net worth over time. This is essential and this study was the first step in that process.

Implications for Financial Counseling and Planning

Time Preference and Wealth Disparity

In the field of financial counseling and planning, time preference and net worth studies can be of enormous value since most of the time planners and counselors are attempting to help clients reach financial goals which ultimately involve real behaviors and real wealth.

Similar households hold very different amounts of wealth and some of the literature suggests that preference heterogeneity may be an important source of wealth inequality (Hendricks, 2007). Venti and Wise (2000) acknowledged that very little of the wealth disparity among households with similar income can be accounted for by portfolio choice or by chance. Venti and Wise (2000) determined that the bulk of dispersion in wealth inequality at the outset of retirement among households with similar lifetime earnings must be attributable to the differences in the amount households choose to save. Krusell and Smith (1998) reported that a small amount of discount rate heterogeneity leads to large increases in wealth inequality. This finding suggests that discount rate heterogeneity may be an important determinant of savings behavior (Hendricks, 2007).

Understanding more about the relationship between time preference and net worth can be a step forward in the process of understanding the disparity of wealth that exists in this country.

Behavioral Nudges

What this research has helped illuminate is that time preference may be preventing people from making the necessary decisions to accumulate wealth. A time inconsistent individual who wishes to save, must find a mechanism to constrain themselves from consuming instead of saving (Klawitter et al., 2012). Researchers have found that time inconsistency is behind the prevalence of programs that commit consumers to future savings paths. Behavioral economics literature has identified tools to nudge people into time consistent choices such as commitment devices which induce people to become more future oriented.

Hoel, Schwab, and Hoddinott (2015) found that the expression of time preference is affected by the psychological decision-making environment which supports the proposition that behavioral nudges are an effective way of influencing economic decisions. Examples of this are layaway programs, Christmas clubs, employer based retirement programs, and tax withholding more than what is expected (Laibson, 1997; O'Donoghue & Rabin, 1999).

This is the method used by Thaler and Benartzi (2004) to nudge people into participating in employer sponsored 401(k) plans. Rather than waiting for employees to fill out their 401(k) paperwork, employers would automatically sign them up for the plan. If they were not interested in joining they could simply opt out. Once employees are enrolled in such a plan, inertia takes over and employees are likely to stay in the plan. In one plan studied by Madrian and Shea (2001), participation rates increased from 49% to 86%. This type of arrangement is perfectly suited for someone with a high discount rate who would not think about the future benefit of saving and might never join the 401(k) without the "nudge."

Plans have also adopted auto escalation features where employees agree to automatic increases in their retirement plan contributions. An example is to move costs in time like the

Save More Tomorrow (SMarT™) program where moving the start of retirement contributions from salary increases to the future, will help people to save more (Lawless et al., 2013). These two features have boosted participation in 401(k)s and more than tripled savings rates in some firms. A recent survey by the Plan Sponsor Council of America showed that 58% of retirement plans were automatically signing up workers, up from 8.1% in 2000 as reported by *InvestmentNews* ("Bigger Nest Egg?" 2017). These features were popularized by the best-selling work of Thaler and Sunstein (2008).

This study affirms the idea that based on an individual's time preference, one may be engaging in behaviors that don't allow them to see the value or consequence of their decisions. Techniques that nudge individuals into pre-commitment and default decisions are justified.

Procrastination

According to Thaler and Benartzi (2004), there is a familiar tendency to postpone unpleasant tasks. Modern models of the problem of self-control and procrastination use the concept of hyperbolic discounting. Hyperbolic agents procrastinate because they wrongly assume that what they will be doing later will not be as important as what they are doing now.

Procrastination tends to produce a strong tendency toward status quo bias (Samuelson & Zeckhauser, 1998). That is to do nothing or just maintain a previous decision. Samuelson and Zeckhauser (1998) reported that individuals disproportionately stick with the status quo and status quo bias is prevalent in the retirement savings domain. More than half the participants in the TIAA-CREF retirement plan in 1987 made no changes in their asset allocation since the day they enrolled. In 2004, Ameriks and Zeldes similarly found that over a 10-year period, nearly half of the TIAA-CREF participants made no changes to their plan.

Part of the lesson that can be learned from this is that once enrolled, workers stayed in their plans even though they make no changes. Procrastination and inertia suggest that once employees enrolled in the plan, they remain in until they opt out.

There is a possible remedy. One of the easiest and most underutilized features of a 401(k) is the automatic rebalancing. According to Aon Hewitt only about 9% of 401(k) participants have auto rebalancing. If a desired portfolio is created with 50% invested in stocks and 50% invested in bonds, periodically rebalancing the portfolio will avoid the problem of that 50/50 allocation becoming an 80/20 allocation. This study supports the notion that these features are necessary and the use of the automatic rebalancing feature should be promoted to increase its use. In addition, 401(k)s should consider making the automatic rebalancing feature the default position for enrollees. Participants would have to opt out if they did not want this feature on the plan.

Expanded Client Questionnaires

Knowing the time preference of a client can be used to frame the discussion regarding a goal oriented behavior that needs to be implemented. For example, in a discussion on increasing saving and investing, a person with a high discount rate might not react well to thinking about the future benefit of accumulated wealth. The discussion can be steered to more present oriented benefits of saving more today. To do that, planners should be thinking about how to identify a client's time preference. This would be valuable in developing a strategy to help that client achieve their financial goals. Client questionnaires can be expanded to include time preference questions so that planners would have more information as to how to approach and discuss aspects of a client's financial situation.

Adopting the Solution Focused Financial Therapy Model

This research has identified that there is an association between time preference and net worth and those with a higher rate of discounting have lower levels of net worth. When faced with a client that has a high discount rate, financial planners have a hard time getting that person to spend less, save more, or even get on track to build wealth. In addition to all the other challenges in getting families to build wealth, having a high discount rate probably means that the typical pragmatic methods used by planners to achieve goals will be ineffective. Financial planners may be better served adopting some of the tenets of Solution Focused Therapy (SFT) into their planning practices.

Considering the findings of this research, techniques from the Solution Focused Brief Therapy (SFBT) model developed by de Shazer (1940-2005) may be particularly suitable for adoption in financial planning, with the operative word being brief. Solution focused therapy is considered a brief therapeutic approach where practitioners believe clients can, and are willing to make changes using their own personal strengths.

According to the Institute for Solution-Focused Therapy website, SFT has been identified as a practical goal driven model with an emphasis on clear, concise, and realistic goal negotiations. Solution focused therapy is a theoretically informed approach typically used by mental health practitioners to help clients use their personal, interpersonal, skills, strengths, and assets to focus on future-oriented goals and tasks (de Shazer et al., 2007). Theoretically informed modalities in financial planning can help practitioners frame an issue, predict what happens next, and provide interventions on how to treat an issue (Britt, Archuleta, & Klontz, 2015). Moving beyond opinion toward evidenced based practice is important to establish credibility and

especially important in training new practitioners (Britt et al., 2015). This is something which is lacking in the field of financial planning.

Solution focused therapy is especially appealing and applicable in the financial planning profession because it is a form of specialized conversation that would be relatively simple for planners to incorporate. Conversations are directed toward developing and achieving the client's vision of solutions. Questions asked by solution focused practitioners are usually centered on the present or on the future. These can easily be tailored to the time preference of the client. These types of questions reflect the belief that problems are best solved by focusing on what is already working and how a client would like their life to be, rather than focusing on the past and how their problems got started.

Studies show that tension levels are high when clients meet with financial planners. In many cases clients feel stupid, or intimidated based on their financial decisions of the past. In the financial counseling field, practitioners have usually focused on the client's financial problems and whatever negative behaviors led to those problems (Archuleta & Grable, 2011). Rarely are financial practitioners trained to promote a client's positive characteristics to build self-identified solutions to financial issues. Solution focused therapy encourages the use of compliments to validate what clients are doing well and to acknowledge how difficult their problems are. Using questions like "How did you do that?" invites the client to self-compliment themselves simply by answering the question.

Solution focused therapists have learned that most people have solved many problems in the past and probably have some idea of how to solve their current problem. When a client acknowledges that they have solved some problems in the past, they would be encouraged to do more of what has previously worked for them. Often SFT practitioners use the miracle question,

a tool which is powerful in getting clients to identify small, realistic, and doable steps that they could initiate the next day. The small steps then become building blocks as clients begin to implement behavioral changes that they themselves have articulated. According to Archuleta, Grable, and Burr (2015), solution focused therapeutic techniques may provide a mechanism for financial behavioral change.

Solution focused therapy outcomes have consistently shown evidence that the technique produces positive behavior changes in shorter periods of time by creating a higher level of client autonomy than other approaches (Bannink, 2007; Corcoran & Pillai, 2009). Corcoran and Pillai (2009) found evidence that SFT had a 50% effectiveness rate compared to alternatives.

Financial planners can easily learn and develop the techniques to engage in a SFT type dialogue with their clients. This dialogue can be tailored based on the time preference of the client which can be measured by the questions added to the risk tolerance or new client questionnaires that planners already use. Financial planning is all about achieving financial goals and SFT is goal oriented therapy. There seems to be a natural marriage of the two disciplines.

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Appendix A - Appendix Tables for Standardized Beta Effect Size

Table 1

Comparison of Effect on Net Worth Using Standardized Coefficients among Significant Variables of Model 1 Predicting Net Worth (N = 1,685)

	Model 1		
Variable	*M*	*SD*	*IHSNetWorth12**
Smokes	1.78	0.92	-2,161
NoDaysDrank	5.54	8.12	1,420
NoHadPhysical	1.64	1.27	-953
Income12	70,242	74,334	7,140
Employed12	0.71	0.45	1,886
TotalInherit	28,405	127,770	1,398
FamPovStat78	0.20	0.40	-953
Bankruptcy	0.20	0.40	-2,267
Age	51.3	2.2	869
MarStatMarried	0.61	0.49	2,543
HomeOwner12	0.96	0.19	975
Race	1.34	0.56	-1,589
RegionSouth	0.40	0.49	-1,187

Note: IHSNetWorth12 M = 22,537, SD = 21,188.
All items are significant at $p < .001$ except NoHadPhysical12, Age, and HomeOwner12 which were significant at $p < .05$.

*Effect on IHSNetWorth was determined by multiplying the Standard Deviation of IHSNetWorth by the Standardized Beta Coefficient of each variable.

Table 2

Comparison of Effect on Net Worth Using Standardized Coefficients among Significant Variables of Model 3 Predicting Net Worth (N = 1,685)

	Model 3		
Variable	*M*	*SD*	*IHSNetWorth12**
TPScale1	2.62	1.42	-2,119
Income12	70,242	74,334	7,606
Employed12	0.71	0.45	2,055
TotalInherit	28,405	127,770	1,504
FamPovStat78	0.20	0.40	-2,204
Bankruptcy	0.20	0.40	-2,309
Age	51.3	2.2	890
MarStatMarried	0.61	0.49	2,543
NumChildren	0.75	0.99	-911
HomeOwner12	0.96	0.19	953
Race	1.34	0.56	-1,504

Note: IHSNetWorth12 M = 22,537, SD = 21,188.
All items are significant at $p < .001$ except Age, NumChildren, and Homeowner12 which are significant at $p < .05$.

*Effect on IHSNetWorth was determined by multiplying the Standard Deviation of IHSNetWorth by the Standardized Beta Coefficient of each variable.