Examining Participation Behavior in Defined Contribution Plans Using the Transtheoretical Model of Behavior Change

Michael Gutter, Celia Ray Hayhoe, and Lingling Wang

Using the transtheoretical model of behavior change (TTM), employee contributions to defined contribution (DC) plans were examined. The data came from the 2001 Survey of Consumer Finances (SCF). Households were categorized into one of four TTM stages: precontemplation, contemplation, preparation, and action. The findings indicated that life cycle characteristics, financial characteristics, and personal preferences influenced the likelihood that a household was in the precontemplation, contemplation, or preparation stages relative to being in the action stage.

Key Words: defined contribution plans, retirement savings, saving, Survey of Consumer Finances, transtheoretical model of behavior change

Introduction

Savings have been shown to be essential for most households in order to ensure retirement income adequacy (Choudhury, 2002; Elder & Rudolph, 2000; Hounsell, Humphlett, & Lewis, 2002; Yuh, Montalto, & Hanna, 1998). Despite increasing availability of tax-advantaged savings vehicles, researchers have reported that many Americans do not have adequate savings (America Saves, 2000; Bosworth, Burtless, & Sabelhaus, 1991; Fernandez & Brandon, 2006; Korczyk, 1998; U.S. Department of Labor, 2002). Having little or no savings not only jeopardizes personal financial security but also negatively impacts local communities, states, and society at large. Those individuals without savings may find they are unable to make ends meet in retirement. For those without savings, free or subsidized services may be needed for shelter, transportation, and meals. Those without savings are more likely to be ill-prepared to fund health care costs. These needs have required local, county, state, and federal governments to assume the costs of these services.

Households have various savings options for retirement such as employer-provided retirement accounts [e.g.,

401(k), 403(b), 457, defined benefit (DB), defined contribution (DC), and profit sharing plans] and privately owned accounts [e.g., Individual Retirement Accounts (IRAs), brokerage accounts, and certificates of deposit]. The focus of this study was on DC plans, currently the most common type of employer-provided retirement plan. Over the past decades, the trend has been for employers to offer DC plans instead of DB plans, also known as formula-based pensions (Foster, 1996; Ippolito, 1997; Purcell, 2001).

Research has indicated that many individuals who are eligible for employer-provided retirement plans do not participate. Using the 1995 Survey of Consumer Finances (SCF), Samwick and Skinner (1998) found that 28% of workers were covered by DC plans; however, 79% of covered workers actually contributed to these plans. Basset, Fleming, and Rodrigues (1998) reported that 35% of people who were offered 401(k) plans did not participate. Income was related to DC participation; 81% of workers with incomes $75,000 and above participated, whereas only 36% of workers with incomes less than $15,000 did. In these studies, participation alone was used to identify savers. Using this simple definition provides a limited

Michael Gutter, Ph.D., Assistant Professor and Family Financial Management Specialist, University of Wisconsin Madison, Department of Consumer Science, 1300 Linden Dr. Room 370F, Madison, WI 53706, msgutter@wisc.edu, (608) 262-5498

Celia Ray Hayhoe, Ph.D., CFP®, Assistant Professor and Family Resource Management Specialist, Virginia Polytechnic Institute and State University, Department of Apparel, Housing, and Resource Management, 101 Wallace Hall (0410), Blacksburg, VA 24073, chayhoe@vt.edu, (540) 231-3497

Lingling Wang, M.S., Ph.D. Graduate Student, University of Wisconsin Madison, Department of Consumer Science, 1300 Linden Dr. Room 370F, Madison, WI 53706, linglingwang@wisc.edu

view and understanding of DC plan participation behavior, because goal setting and information seeking, both of which often preceded actual action, are not included in such a definition.

This exploratory study examined the determinants of employee participation in DC plans by investigating the probability of eligible participants falling into the different stages of the transtheoretical model of behavior change (TTM) which was used by Prochaska, DiClemente, and Norcross (1992a, 1992b; Prochaska, Norcross, & Di-Clemente, 1994). This study built on previous research related to DC plan participation (Basset et al., 1998; DeVaney & Chien, 2001; DeVaney & Zhang, 2001; Elder & Rudolph, 2000; Samwick & Skinner, 1998; Springstead & Wilson, 2000) by applying the TTM. The TTM proposed five stages of behavior change: precontemplation, contemplation, preparation, action, and maintenance. In order to classify households into these stages of behavior change, the current study identified households by the intent to save and actual savings.

Although the TTM has not previously been used to examine DC plan participation, the model has been used to examine saving behavior (Shockey & Seiling, 2004; Xiao et al., 2001). Shockey and Seiling (2004) applied the TTM to examine enrollment in the Individual Development Account (IDA) program, and Xiao et al. (2001) applied the model to participation in Money 2000™, a financial education program. By using the TTM to examine DC plan participation, this study adds to the DC plan literature and previous studies that have applied the TTM to other forms of saving.

Theoretical Background
The Economics and Psychology of Saving
This study drew from economic theory and psychology in trying to understand saving behavior. Wärneryd (1999) proposed the expansion of current economic inquiry into saving behavior to account for personal psychology in the basic economic model. Wärneryd did not completely discount the traditional life cycle model (Ando & Modigliani, 1963), which proposed that life cycle stage, income, wealth, time preference, and life expectancy should influence the allocation of income to consumption and savings. In addition to the basic life cycle model, Korczyk (1998) suggested that it was important to consider factors affecting expectations, preferences, and/or motivations. Wärneryd suggested that psychology played a role in the impact of one's expectations on behavior.

Wärneryd (1999) further suggested that relevant issues from a psychological perspective included habit formation, social influences, desire for improvement, thrift and thrifty habits, self-control, uncertainty, time horizon, and cognitive ability. One additional, inherent assumption was that there were no barriers to participation in retirement savings. However, it could not be assumed that every household had easy access to saving vehicles, such as DC plans. Even with alternatives such as IRAs, many households may have lacked the awareness of the existence of rules regarding these saving vehicles or may have been shut out by structural means such as participation rules. Thus, barring any access issues, life cycle characteristics, education, race, financial resources, expectations and preferences, and personal psychology should have influenced DC plan participation behavior; these factors are discussed next.

Life Cycle Characteristics
Studies have indicated that life cycle characteristics are related to DC plan participation. Contradictory findings have been reported in regard to the relationship of age on DC plan participation. Age has been shown to have a positive correlation with participating in DC plans (Andrews, 1992; DeVaney & Zhang, 2001; Xiao, 1997). However, Elder and Rudolph (2000) found that younger households were more likely to participate in pension plans. Marital status, another element of the life cycle stages, also proved to be related; married households tended to save more in DC plans (DeVaney & Chien, 2001). Finally, Elder and Rudolph found that households who participated in pension plans were more likely to have fewer children living at home.

Education
Researchers have demonstrated that retirement saving behavior and education are clearly related. Education was positively related to overall participation in DC plans (DeVaney & Chien, 2001; Elder & Rudolph, 2000). In addition, using the data from the 1986, 1992, and 1998 SCF, DeVaney and Chien (2001) found that household heads with higher levels of education were more likely to contribute larger amounts to a DC plan.

Race and Ethnicity
Race and ethnicity have been found to impact retirement saving behavior (DeVaney & Zhang, 2001; Malroutu & Xiao, 1995; Springstead & Wilson, 2000; Turner, Bailey, & Scott, 1994; Yuh & DeVaney, 1996). For example, DeVaney and Zhang (2001) found that White households

had a higher amount saved in DC plans than households headed by other races. Yuh and DeVaney (1996) reported that Black and Hispanic households contributed less than White households.

Financial Resources

In support of the life cycle hypothesis, Dynan, Skinner, and Zeldes (2000) confirmed that lifetime income was positively related to savings and the marginal propensity to save. Using data from the May 1988 Current Population Survey Benefits Supplement, Andrews (1992) found that households with higher incomes tended to contribute at higher rates to 401(k) plans. However, in the presence of wealth, the stability of income may have been relevant and may possibly have been represented by job tenure. According to studies by Foster (1996) and the U.S. Department of Labor (1992), job tenure was positively related to DC plan participation. Additionally, job tenure increased the likelihood of participation in 401(k) plans (Bassett et al., 1998; Munnell, Sunden, & Taylor 2001/2002). Wealth has been found to influence DC plan participation. Munnell et al. (2001/2002) showed that net worth was positively related to the probability of participating in 401(k) plans. Carroll (1997) found that although wealth influenced savings, 43% of households reported that their most important reason for saving was preparing for an emergency. Only 17% reported that preparing for retirement was their reason for saving; this might have been indicative of a liquidity preference. Financial incentives have also played a role. Using the April 1993 Current Population Survey, Bassett et al. (1998) and Papke (1995) found that receiving an employer's matching contribution had a significant positive effect on 401(k) plan participation.

Expectations and Preferences

Risk tolerance and planning horizon are two important preferences that are consistent with life cycle assumptions and have been shown to impact savings. Munnell et al. (2001/2002) found that having a longer planning horizon was associated with lower probability of participation in 401(k) plans and contribution rates to 401(k) plans. Several studies have shown that willingness to take financial risk was related to DC plan participation. Those willing to take greater risk were more likely to participate (DeVaney & Chien, 2001; Xiao, 1997; Yuh & DeVaney, 1996). Xiao (1997) found that households who were willing to take above average risk were more likely to contribute higher amounts to 401(k) plans.

Expectations regarding future financial resources were shown to influence saving behavior. Engelhardt and Mayer (1995) reported that the savings rate for households who received transferred wealth was lower than non-recipients. Wang and Gutter (2005) found that baby boomers who perceived their pension income (expected or received) as adequate were more likely to contribute a higher percentage of their income to DC plans.

Behavioral Psychological Variables

Laibson, Repetto, and Tobacman (1998) suggested that economists need to consider the effects of psychology on saving. They commented that the control mechanisms built into most DC plans make them appealing because of the forced control. Lack of self-control has been linked to the inability to delay gratification. Thaler and Benartzi (2004) showed that many households who admitted to having low savings rates would increase their retirement savings but lacked the self-control to do so. Self-control has been related to intertemporal resource allocation (Shefrin & Thaler, 1978) and specifically to saving (Mullainathan & Thaler, 2000). One reason was that lack of self-control was likely to lead to overspending or accumulation of costly consumer debt. Using data from three waves (1994, 1995, and 1996) of the Center panel, Milde (2006) suggested that households who have higher levels of self-control problems have higher levels of credit card debt. Rha, Montalto, and Hanna (2001) used three variables, saving goals, foreseeing future expense, and saving rules, as proxies for self-control mechanisms to show that goal setting was a key factor on influencing household savings. They found that saving for retirement, purchasing, and foreseeable major expenses increased the chance of a household spending less than it earned. They also showed that precautionary saving motives increased the odds of saving for retirement by 14%, but having a goal of saving for education had a negative effect on retirement savings.

In summary, our model considered insights from economics as well as psychology. It included variables based on the life cycle model, psychological characteristics, expectations, and perceptions. The nature of saving behavior led to viewing saving behavior as more complex than a simple dichotomy of saving or not saving.

Transtheoretical Model of Behavior Change and Measuring Savings

Saving has been defined as trading consumption today for consumption in the future through resource allocation

(Ando & Modigliani, 1963; Bryant, 1990; Hanna, Fan, & Chang, 1995). This has been thought of as placing current income into an account with the intention of using it in the future. One example of this anticipated future is retirement. For workers who are eligible, their DC plan participation behavior can be considered in the context of the traditional reasons for saving: consumption smoothing in a period of anticipated lower income.

However, it is important to consider that saving behavior would also include intent and preparation to save in addition to actual account contributions or deposits. This study expanded the definition of saving by considering the model proposed by Prochaska et al. (1992a, 1992b; Prochaska et al., 1994) composed of five stages: precontemplation, contemplation, preparation, action, and maintenance. The TTM was intended to present stages of change to show how one may progress from one behavior to another and has been utilized for studies of addiction and, more recently, financial behavior. Using the TTM to examine saving was a meaningful adaptation because it expanded the concept of saving beyond the dichotomy of savers and non-savers. These different stages allowed not only actual savings to be measured but also to capture measures of intent.

Xiao et al. (2001) examined how different aspects of the Money 2000™ program were tied to the specific TTM stages of change. Similarly, Shockey and Seiling (2004) examined changes in saving behavior of IDA participants enrolled in a financial education program. Using the 2001 SCF, the current paper employed the TTM to determine the characteristics of people in four of the five different stages of change to try to ascertain who belonged in which stage. The maintenance stage was not used as the data set lacked a measure of how long a person had been participating in a DC plan. Xiao and colleagues (Xiao, Newman, Prochaska, Leon, & Bassett, 2004; Xiao, Newman, Prochaska, Leon, Bassett, & Johnson, 2004) used the TTM to examine consumers' readiness to get out of debt in an effort to design better programs to assist consumers at different stages. The current study applied the TTM proposed by Prochaska et al. (1992a, 1992b; Prochaska et al., 1994) to saving behavior.

A description of the stages in relation to DC plan participation behavior follows:

- Precontemplation: The household was neither thinking of the need for retirement income nor taking any actions to prepare for such needs.

- Contemplation: The household had set retirement goals or had actively sought information about saving but had not directed funds into a DC retirement savings plan.
- Preparation: The household had a retirement goal and had actively sought information about saving but had not taken action.
- Action: The household had directed funds into a DC retirement plan.
- Maintenance: The household had met the criteria for action, and there was evidence that participation was ongoing over a period of time. Although maintenance was defined, as mentioned previously, only the first four stages were used in this study. Determination of maintenance was problematic without longitudinal data or an appropriate survey question.
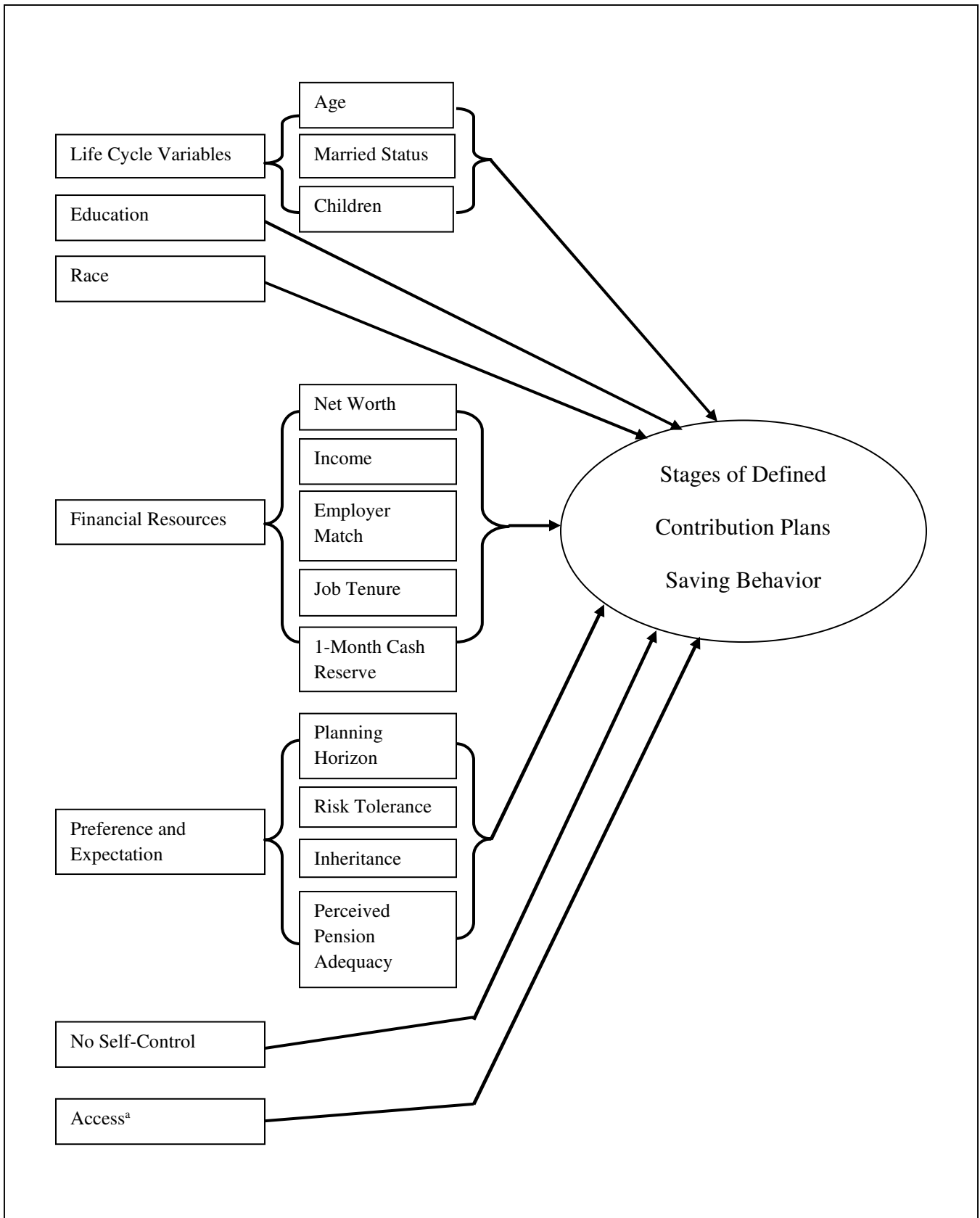
Conceptual Model and Research Questions

As proposed, the model did not specify that people follow a linear progression of behavior change; indeed this often might not be the case. Thus, the focus in this study was not on how people move from stage to stage as in previous studies but on examining intent to contribute to a retirement account to which they already had access. The model proposed relationships between life cycle indicators, education, race/ethnicity, financial resources, personal psychology/expectation, behavioral psychological variables, and the stages of DC plan participation behavior (see Figure 1). The model suggested that DC plan participation behavior considered not only factors related to DC plan participation but also factors related to stages of saving denoted as intent.

Research Questions

The review of literature and theory surrounding DC plan participation behavior prompted several questions that focused the analysis and subsequent discussion:

RQ1: Were life cycle stage characteristics (age, non-couple status, and presence of children) related to the stage of DC plan participation?

RQ2: Were educational attainment and race/ethnicity related to the stage of DC plan participation?

RQ3: Were financial resources (net worth, income, liquidity, job tenure, and employer match for retirement contributions) related to the stage of DC plan participation?

RQ4: Were personal preference variables (planning horizon and level of willingness to take risk of households) related to the stage of DC plan participation?

Figure 1. Conceptual Model of Contribution to DC Plans

Life Cycle Variables
- Age
- Married Status
- Children

Education

Race

Financial Resources
- Net Worth
- Income
- Employer Match
- Job Tenure
- 1-Month Cash Reserve

Preference and Expectation
- Planning Horizon
- Risk Tolerance
- Inheritance
- Perceived Pension Adequacy

No Self-Control

Access[a]

Stages of Defined Contribution Plans Saving Behavior

[a]The variable is controlled through sample design.

RQ5: Were financial expectations (perceived adequacy of pension and expectation of inheritance) related to the stage of DC plan participation?

RQ6: Was the behavioral psychological variable (lack of self-control) related to the stage of DC plan participation?

Methods
Data and Sample
The sample was drawn from the 2001 SCF which was sponsored by the Federal Reserve Board and conducted by the National Opinion Research Center. The SCF was an appropriate choice for this study because it not only contained information on DC plan participation but also had detailed information on demographics, finances, preferences, expectations, and other financial management behaviors. The sample targeted the heads of households between the ages of 25 and 65 who were eligible to be included in DC plans. Those who were ineligible for DC plans were omitted when the issue of access was addressed.

Additionally, households where both the head of household and the spouse were retired, disabled, and/or students were excluded. The exclusion was based on the assumption that only households where either the household's head or spouse were working would have had the ability to contribute to a DC plan.

The SCF had two key issues affecting its use. First, the SCF over-sampled high income households in order to capture wealth in the U.S. However, in order to generalize results, one could use the provided weight variable that compensated for this sampling bias. The descriptive statistics used in this study were weighted. Due to possible endogeneity bias (Montalto, 1998) of the weight term with the empirical model (income is included), the regressions in this study were not weighted. This meant that the results of the Logit were influenced by the sampling bias. If weighted, the results would have introduced an endogeneity bias. Thus, we chose to accept the sampling bias over the more unknown impact of the endogeneity bias.

The second issue of the SCF was that it used a multiple imputation technique to estimate missing values. However, analysis conducted using the SCF should have accounted for the value of a term in each of the five implicates because of between-imputation error. The repeated imputation technique outlined by Montalto and Sung (1996) for

the SCF was used in our estimation of descriptive statistics. The multinomial logistic regression was estimated separately for each implicate. The results reported were the average of the coefficients from each of the five implicates.

Dependent Variables
The dependent variable was a four-level indicator for the stage of DC plan participation behavior for the household. These stages were precontemplation, contemplation, preparation, and action. Indicators were created for each of these stages. The indicator for each stage was derived from the three possible behaviors: goal setting, knowledge seeking, and actual contributions to a DC plan. See the Appendix for a full list of how variables were coded.

Independent Variables
Life cycle variables. The life cycle stage was measured using age, presence of children, and marital status. Because no clear breakpoints in age were suggested by the literature, age was measured continuously. An indicator was included for whether minor children were present. Marital status was measured as couple/living with a partner (reference variable) and non-couple.

Education and race. Education was measured as less than high school, high school, some college, and college. Having 4 or more years of college was the reference category. Race was coded as White or non-White; White was the reference variable.

Financial resources. Job tenure was included to help capture the stability of income. Indicator terms were included for job tenure (5 years or less, 6-10 years, 11-20 years, and over 20 years). Net worth was measured as the difference between assets and liabilities. Net worth included several types of financial assets such as the balance in retirement plans. However, it did not reflect the contribution amount unless this was already accounted for in the account balance. Income and net worth were highly correlated ($r = .6421$).[1] The liquidity measurement was an indicator as to whether or not a household held the equivalent of 1 month's earnings in liquid assets. Finally an indicator was included to measure whether an employer provided a contribution match for the DC plan.

Expectation and preference. The personal preference variables employed were planning horizon and risk tolerance. Planning horizon was measured in years. Risk tolerance was a self-assessment of willingness to take no risk,

average risk, and above average risk, with average risk tolerance being the reference category. Indicator variables were used to represent whether a household had received or expected to receive an inheritance. Perceived pension inadequacy was determined by a SCF question that asked if the respondents felt that they had adequate resources for retirement when considering Social Security, pensions, and DC plans; those who felt they had less than adequate resources were given a 1, and otherwise, they were given a 0.

Behavioral psychological variable. The behavioral psychological variable employed in the study was self-control. If the respondents reported that their spending exceeded or equaled their income over the last year and if the spending did not include purchasing durable goods such as a home, an automobile, or any investment, then the variable of lacking self-control was coded as 1 and coded as 0 otherwise.

Sample Profile

A summary of the sample characteristics can be found in Table 1. The sample consisted of 1,738 households. The average age of the household heads was 43 years. The majority of the sample was White (78%), was married or cohabiting (73%), and had children (58%). A greater proportion had a college education (42%) compared to any other level of educational attainment.

The average household net worth was $75,659.63.[2] Almost half (49%) of the households reported that they had a 1-month cash reserve. The majority (70%) reported that their employer contributed money to their DC plans.

The average planning horizon was approximately 6 years. About one fourth (24%) of the households reported that they would not take any investment risk, whereas 43% were willing to take average risk; 32% were willing to take above average risk. Only 18% of the households had received inheritances, whereas 17% expected to receive inheritances in the future. Over half (59%) reported that they felt the retirement income they received or expected to receive from Social Security and job pensions was enough to maintain their living standards.

The saving goal for most households was retirement. The majority (60%) of the households stated that retirement was their most important reason for saving. In addition, about three fourths (79%) were actively seeking information on saving and investing (see the Appendix for the

Table 1. Household Characteristics of the Sample (*N* = 1,738)

Variables	*M* or %
Life cycle variables	
Respondent's age	43.38
Marital status	
Non-couple	27%
Presence of children	58%
Education	
Less than high school	6%
High school	27%
Some college	24%
College	42%
Culture (race/ethnicity)	
White	78%
Non-White	22%
Financial resources	
Net worth ($)	75,659.63
Income ($)	65,381.85
Job tenure	
Less than 5 years	40%
5 years-10 years	20%
11 years-19 years	22%
Over 20 years	18%
Employer provides match	70%
1-month cash reserve	49%
Preference and expectation	
Planning horizon (years)	6.27
Risk tolerance	
No risk	24%
Average risk	43%
Above average risk	32%
Inheritances	
Received inheritance(s)	18%
Future inheritance	17%
Perceived pension adequacy	59%
Saving behavior	
No self-control	26%
Retirement saving as a goal	60%
Actively seeking information	79%
Contributes	70%
Saving stages	
Precontemplation	4%
Contemplation	13%
Preparation	13%
Action	70%

definition of actively seeking). Consistent with their goals and information use, most (70%) contributed to their DC plans and were considered to be in the action (or potentially maintenance) stage. About one fourth (26%) were shown to have a lack of self-control.

Data Analysis

In order to determine the likelihood of being in one TTM stage versus another based on the independent variables, this study employed logistic regression. The analysis specifically used a multinomial logistic regression where the likelihood of being in the first three stages relative to the stage of action was determined.[3] The multinomial logistic regression was warranted because, despite being referred to as stages, there was no assumption of a linear progression. Due to the high correlation between income and net worth, income was not included in the regression model. The coefficients were based on the average of the coefficient for each of the five implicates of the data (see Table 2). Significance for each level was determined by having p-values that were less than .1, .05, and .01 in four of the five implicates.

Based upon the previous section, the empirical model can be specified as

$$Logit(Y) = \beta_1 + \beta_2 Age + \beta_3 NonCouple + \qquad (1)$$
$$\beta_4 NonWhite + \beta_5 Dep + \beta_6 Lesshigh + \beta_7 Highs +$$
$$\beta_8 Somecol + \beta_9 Networth + \beta_{10} Lessfive +$$
$$\beta_{11} Lessten + \beta_{12} Lesstwenty + \beta_{13} Match +$$
$$\beta_{14} Cash + \beta_{15} Rinheri + \beta_{16} Finheri + \beta_{17} Time +$$
$$\beta_{18} Norisk + \beta_{19} Aboverisk + \beta_{20} Pension +$$
$$\beta_{21} Noselfcontrol + \mu$$

Findings

Research Question 1: Were Life Cycle Stage Characteristics (Age, Non-Couple Status, and Presence of Children) Related to the Stage of DC Plan Participation?

There was evidence to support that life cycle related variables influenced DC plan behavior. Age was positively related to the likelihood of being in both the contemplation and preparation stages compared to being in the action stage. Because DC plans have become more prevalent in recent decades, perhaps older cohorts have been less active in such plans but had been thinking about retirement planning in general. The relationship of household composition to DC plan participation behavior was consistent with the life cycle expectations. Compared to couples, non-couples were more likely to be in the precontemplation stage than in the action stage of saving, even when controlling for financial resources. There was no evidence to support that the presence of children was related to DC plan participation behavior.

Research Question 2: Were Educational Attainment and Race/Ethnicity Related to the Stage of DC Plan Participation?

There was no significant evidence that race or educational attainment influenced saving behavior. Future considerations to measure culture as opposed to race alone may include language, religion, and country of origin.

Research Question 3: Were Financial Resources (Net Worth, Income, Sufficient Liquidity, Job Tenure, and Employer Match for Retirement Contributions) Related to the Stage of DC Plan Participation?

Financial resources were related to DC plan participation behavior. Having greater net worth was positively related to being in the action stage of savings. Those with perceived retirement resource inadequacy were more likely to be in the precontemplation stage than in the action stage. Those with at least 1 month's income in liquid assets were less likely to be in the precontemplation stage and more likely to be in the contemplation and preparation stage than to have been in the action stage. Compared to households with job tenure over 20 years, households with job tenure less than 10 years were less likely to be in the contemplation and preparation stage than in the action stage. Finally, those whose employer provided a match contribution to DC plans were more likely to be in the action stage.

Research Question 4: Were Personal Preference Variables (Planning Horizon and Level of Willingness to Take Risk of Households) Related to the Stage of DC Plan Participation?

The measures of household preference for planning time-frame and willingness to take investment risk were significantly related to saving behavior. Those who stated they had a longer time frame for their planning considerations were more likely to be taking action than to be in the precontemplation stage.

When compared with households who were willing to take average investment risk, those not willing to take any risk were more likely to be in precontemplation, contemplation, or preparation than to be contributing to their DC plans. In contrast, those who were willing to take above average risk were less likely to be in the precontemplation stage of saving behavior than in the action stage.

Table 2. Logistic Regression Coefficients for Saving Behavior Categories

Variables	Precontemplation	Contemplation	Preparation
Intercept	-3.7313*	-1.8101 ***	-2.2206***
Life cycle variables			
Respondent's age	0.0185	0.0208*	0.0259**
Marital status			
Couple (reference variable)			
Non-couple	0.3856*	0.0671	-0.1840
Presence of children	0.2454	0.1449	-0.0399
Culture (race/ethnicity)			
Non-White	-0.0474	-0.0040	0.1734
White (reference variable)			
Education			
Less than high school	-0.3977	-0.2728	0.1278
High school	0.1506	-0.1399	0.0098
Some college	-0.0938	-0.0945	-0.0526
College (reference variable)			
Financial resources			
Net worth	-0.0236	-0.0954***	-0.0516
Job tenure			
Less than 5 years	0.1975	-0.4746***	-0.2159*
5 years-10 years	-0.0451	-0.3313**	-0.2792*
11 years-19 years	0.0222	-0.1109	-0.0529
Over 20 years (reference variable)			
Employer provides match	-1.5083***	-1.2007***	-1.1958***
1-month cash reserve	-0.4118*	0.1001	0.2024**
Preference and expectation			
Planning horizon (years)	-0.0789**	-0.0154	0.0136
Risk tolerance			
No risk	0.5368**	0.3388**	0.2031*
Average risk (reference variable)			
Above average risk	-0.4814*	-0.1775	-0.1189
Inheritances			
Received inheritance(s)	-0.2215	-0.1011	-0.0803
Future inheritance	-0.1986	-0.1986	0.0627
Perceived pension adequacy	0.2844*	0.0964	-0.0009
Psychological variable			
No self-control	-0.0762	0.1426	0.0192

Note. The coefficients presented were based on the average of the coefficient for each of the five implicates of the data. Significance for each level was determined by having p-values that were less than .1, .05, and .01 in four of the five implicates. The reference level for the multinomial logistic regression was Action.

*p < .1. **p < .05. ***p < .01.

Research Question 5: Were Financial Expectations (Perceived Adequacy of Pension and Expectation of Inheritance) Related to the Stage of DC Plan Participation?

Expectations were significantly related to DC plan participation. Households who felt that their Social Security, pensions, and employer-provided retirement plans were inadequate to fund retirement were likely to be in the precontemplation stage of saving behavior. Having received or expecting to receive an inheritance was not significantly related to stages of DC plan participation behavior.

Research Question 6: Was the Behavioral Psychological Variable (Lack of Self-Control) Related to the Stage of DC Plan Participation?

The variable representing a lack of self-control was not significantly related to the stages of saving behavior.

Summary

This study applied the TTM to examine determinants of DC plan participation behavior using the data from 2001 SCF. The results suggest that the variables of age, marital status, financial sources (net worth, job tenure, a 1-month cash reserve, and employer match), and preference (planning horizon and risk tolerance) are significantly related to DC plan participation behavior as categorized within the TTM framework. Based on the results, several patterns can be drawn. Single persons are more likely to be in the precontemplation stage than couples. This finding was consistent with previous studies that have shown that married households were more likely to save than unmarried households (DeVaney & Chien, 2001; DeVaney & Chiremba, 2005).

Those with greater net worth are more likely to be in the action stage. The results from job tenure and age suggest a possible cohort effect. The finding about job tenure seems counterintuitive. Perhaps, those with less time on the job are more eager to take advantage of employee benefits than those who have been on the job longer. Additionally, those with greater tenure might have had different benefits or different preferences for participation. Financial incentives, the only term significantly related to each stage, improve the likelihood that one will be in an action stage versus any of the pre-action stages.

The effect of risk tolerance on DC plan behavior was consistent with previous studies (DeVaney & Chien, 2001; Xiao, 1997; Yuh & DeVaney, 1996). This result was reasonable because households willing to take some investment risk have been shown to be more likely to use instruments like mutual funds over savings or other lower-risk options, and the majority of DC plans use mutual funds or similar instruments. Thus, those willing to take risks were likely to begin doing so in their employer-provided DC plan. The finding about planning horizon was consistent with the expectation that one who was more forward thinking would have been more likely to defer current income to be used for consumption in the future.

This study contributes to the understanding of DC plan participation behavior in several ways. First, it applies the TTM (Prochaska et al., 1992a, 1992b; Prochaska et al., 1994) to DC plan participation behavior. The TTM allows for the recognition of stages of DC plan participation behavior defined not only by the action of making a contribution but also by intent. Distinguishing who may be in precontemplation, contemplation, or preparation stages of saving behavior improves our understanding about the nature of those who are savers and those who are not, especially because non-savers have been often treated as a homogeneous group.

This study faced several constraints. First, the use of secondary data prevented the use of other desired psychological characteristics. Because this study used the SCF, an existing data set, not all of the variables or optimal measures of said variables were available. Proxies for the psychological variables were used when the actual scales were not available in the data set. Secondly, this study could only examine factors associated with the likelihood of being in these stages. Longitudinal data would be needed to conduct other analyses to determine changes in stages; techniques such as *event history* would require such data. Despite these limitations, several implications are presented based on conclusions that the researchers could draw.

Implications
Implications for Educators and Practitioners

Being able to objectively classify households' DC plan behavior into the stages of TTM allows educators, such as Cooperative Extension personnel and financial counselors, to best identify the steps that are most appropriate for a household. Before thinking about programming or counseling recommendations, it is important to determine whether the household members need to save, are saving, or have accumulated savings. If those who need to save are not saving, then it may be important to understand the households' stages in order to recommend the programs

or interventions that would be best suited to their circumstances. For instance, if one has not set goals or lacks awareness of his/her need for retirement savings, teaching these concepts might be the first step. Helping one understand the mechanics of his/her DC plan may demystify the DC plan enrollment and participation processes to enable action.

Implications for Policy Makers

Financial incentives clearly are related to DC plan participation behavior. Having an employer match was associated with a greater likelihood of participation. Policies that encourage employers to provide such matches should be continued. Outreach efforts by Cooperative Extension, employers, and financial services providers to those not participating in DC plans would be an additional suggestion. Specifically, outreach should focus on the availability of a match and provide simpler enrollment forms. Employees that earn a greater match when the firm is more profitable are likely to be more motivated to improve company profitability. Enrollment processes and incentives in any voluntary plan should include outreach and intervention strategies for those that lack the self-control to enroll. These strategies could include encouragement for those who have excuses for not enrolling. For example, mandated enrollment in DC plans would be one intervention. Should any reform of Social Security involve the use of voluntary private accounts, the issue of self-control and possibly other psychological barriers should be considered in the design of the enrollment process.

Implications for Research

Further research using additional measures of personal psychology would provide substantial insight into how to improve the retirement savings for those households that lack self-control but want to participate. There are suggested measures for self-control that could be used in newer datasets (cf. Tangney, Baumeister, & Boone, 2004). In addition to self-control, other psychological characteristics may also be important. For instance, it may also be meaningful to know how materialistic one is or how impulsively one makes decisions in understanding his/her stage of DC plan behavior. In addition, other studies should consider the role of cohort effects in DC plan behavior including intent. Such a study could explore whether there are differences in behavior attributable to cohort effects. These would indicate that it is possible that different groups respond differently to different policies or outreach initiatives. Such a study could combine multiple years of the SCF to have cohorts at various ages.

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Endnotes

[1] There was concern about the correlation between net worth and income ($r = .6421$). However, the model was run alternating each term. When the model was estimated without net worth, income was still not significant. In omitting income and running with only net worth, net worth was still significant. Thus, income was omitted due to its high correlation with net worth.

[2] The median of total income was $64,900, and the median of net worth was $129,836. The average net worth without doing log transformation was $415,708.59. The average total income without doing log transformation was $97,698.07.

[3] Multinomial logistic regression was used here because a categorical dependent variable (STAGES) has four categories. It could be done with SAS using PROC CATMOD. By default, PROC CATMOD uses the highest numbered category as the comparison group.

Appendix
Variable Coding

Variables	Codes
Life cycle indicators	
Respondent's age	= Respondent's age, coded continuously
Married status	
Couple	= 1 if respondent is married or living with a partner; 0 otherwise
Non-couple	= 1 if respondent is not married nor cohabitating; 0 otherwise
Presence of children	= 1 if respondent has child living with him; 0 otherwise
Race	
White	= 1 if respondent is White; 0 otherwise
Non-White	= 1 if respondent indicates any race or ethnicity other than White; 0 otherwise
Education	
Less than high school	= 1 if respondent's number of years of formal education is less than 12; 0 otherwise
High school	= 1 if respondent's number of years of formal education equals 12; 0 otherwise
Some college	= 1 if respondent's number of years of formal education is larger than 12 and less than 15; 0 otherwise
College and above	= 1 if respondent's number of years of formal education is larger than 14; 0 otherwise
Financial resources	
Net worth	= Total assets minus total liabilities for the household, coded continuously; log transformation is used in regression
Income	= Total annual household income for the household, coded continuously; log transformation is used in regression
Job tenure	
Less than 5 years	= 1 if respondent reported that he/she worked for the employer less than 5 years; 0 otherwise
5 years-10 years	= 1 if respondent reported that he/she worked for the employer greater than 5 years and less than 10 years; 0 otherwise
11 years-19 years	= 1 if respondent reported that he/she worked for the employer greater than 10 years and less than 20 years; 0 otherwise
Over 20 years	= 1 if respondent reported that he/she worked for the employer greater than 20 years; 0 otherwise
Employer provides match	= 1 if the respondent's employer made contribution to DC plan; 0 otherwise
1-month cash reserve	= 1 if respondent held reserve 1-month cash; 0 otherwise
Expectation and preference	
Risk tolerance	
No risk	= 1 if respondent was not willing to take any financial risk; 0 otherwise
Average risk	= 1 if respondent was willing to take average financial risk expecting to earn average returns; 0 otherwise
Above average risk	= 1 if respondent was willing to take above average or substantial financial risk expecting to earn above average returns; 0 otherwise
Planning horizon (years)	= The number of years that respondent thought the most important time in planning their family's saving and spending, coded continuously
Inheritances	
Received inheritance(s)	= 1 if respondent had already received an inheritance; 0 otherwise
Future inheritance	= 1 if respondent expected to receive an inheritance in the future; 0 otherwise
Perceived pension adequacy	= 1 if respondent reported satisfaction with the retirement income they received or expected to receive from Social Security and job pensions; 0 otherwise

Appendix (continued)
Variable Coding

Variables	Codes
Saving behavior	
No self-control	= 1 if respondent reported that their spending exceeded their income in last year and that spending did not include purchasing a home or automobile or spending for any investments; 0 otherwise
Retirement saving as a goal	= 1 if respondent reported that their most important reasons for saving are retirement; 0 otherwise
Actively seeking information (activeinfo)	= 1 if respondent got advice from other sources such as Internet, lawyer, accountant, or banker when making saving and investment decision; = 0 if respondent got advice from material in the advertisement or mail or respondent reported that they did not save/invest or shop around
Contributes	= 1 if the money respondent contributed was larger than 0 in an account for retirement; 0 otherwise
Savings stages	
Precontemplation	= 1 if goals = 0, activeinfo = 0, and contributes = 0; 0 otherwise
Contemplation	= 1 if contributes = 0, goals = 1, and activeinfo=0; = 1 if contributes = 0, goals = 0, and activeinfo = 1; 0 otherwise
Preparation	= 1 if goals = 1, activeinfo = 1, and contributes = 0; 0 otherwise
Action	= 1 if contributes = 1; 0 otherwise