

COLLEGE STUDENTS AND CREDIT CARD USE:
THE EFFECT OF PERSONAL FINANCIAL KNOWLEDGE
ON DEBT BEHAVIOR

A Dissertation
presented to
the Faculty of the Graduate School
at the University of Missouri-Columbia

In Partial Fulfillment
of the Requirements for the Degree

Doctor of Philosophy

By CLIFF A. ROBB

Dr. Deanna L. Sharpe, Dissertation Supervisor

DECEMBER 2007

The undersigned, appointed by the dean of the Graduate School, have examined the dissertation entitled

College Students and Credit Card Use: The Effect of Personal Financial Knowledge on Debt Behavior

presented by Cliff A. Robb,

a candidate for the degree of doctor of philosophy

and hereby certify that, in their opinion, it is worthy of acceptance.

Professor Deanna Sharpe

Professor Robert Weagley

Professor Pamela Norum

Professor Joan Hermsen

Professor Mark Fine

I would like to take a moment to thank all those individuals who have been instrumental in my success. First, I would like to thank my parents, John and Kaye, for their years of support and encouragement. You have always stood by me and provided good advice, and for that I am grateful. Second, I would like to thank my wife, Ebba. First, thank you for moving to Missouri with me, and second, thank you for being supportive of my career goals and never losing faith in my ability to succeed. And, as I often say in times of great jubilation, even when I have had nothing to do with the outcome as is clearly the case in this situation, we did it, baby!

ACKNOWLEDGEMENTS

I would like to take this time to thank all those individuals who have assisted in my academic development. I have been fortunate to work with a wonderful group of professors who have amazed me with their dedication to their individual fields and to those whom they have instructed over the years. First, I would like to thank Deanna Sharpe for her patience and support in the completion of this particular work. You have a wonderful way of always demanding more of your students without coming across as too demanding, if that makes any sense. Second, I would like to thank Robert Weagley for always coming up with the difficult questions, because life would be pretty dull without the difficult questions. Third, I would like to thank Pamela Norum for all her assistance with the survey development, and for stepping in to serve on my committee when the need arose. Fourth, I would like to thank Mark Fine for adding his insight and expertise to this project. Finally, I would like to thank Joan Hermsen for serving on the committee and for always bringing a positive attitude to the discussion.

In terms of getting where I am today, I would like to thank Mohamed Abdel-Ghany for all his support and advice over the years. It is an honor to be working with you now, and I have enjoyed getting to know you as a colleague as well as a mentor. I would also like to thank Michael Finke and Sandra Huston for all the years of support and for helping me to become a better researcher. In general, I know that my accomplishments would not have been possible without help from all the individuals mentioned above, plus the even larger list of professors and fellow classmates whom I was fortunate enough to work with along the way. I have been very blessed, and I thank you all.

TABLE OF CONTENTS

ACKNOWLEDGEMENTS	ii
LIST OF FIGURES	v
LIST OF TABLES	vi
Chapter 1	1
Introduction.....	1
Significance.....	6
Limitations	7
Implications.....	8
Chapter 2.....	9
Literature Review.....	9
Credit Cards as a Market Instrument	9
Development of the Credit Card Market; United States.....	11
College Students as a Vulnerable Population	13
The Role of Financial Knowledge	18
Credit Cards on Campus	21
The Role of Consumer Attitudes	22
The Question of Causality	27
Summary	28
Chapter 3.....	30
Theoretical Framework.....	30
Hypotheses, Primary Analysis	38
Hypotheses, Secondary Analysis	54

Chapter 4.....	60
Methodology and Descriptive Statistics	60
The Data.....	60
Definition of Variables	61
Dependent Variable, First Analysis	63
Dependent Variable, Second Analysis.....	63
Independent Variables	65
Descriptive Statistics.....	74
Research Design.....	81
The Double-Hurdle Model.....	81
Ordinary Least Squares (OLS) Regression.....	83
Chapter 5.....	84
Results and Discussion	84
Results for College Student Credit Card Use	84
Discussion of the Double Hurdle Analysis.....	91
Results for the Financial Knowledge Measure	105
Discussion of the Ordinary Least Squares Regression Analysis	108
Chapter 6.....	117
Conclusion	117
BIBLIOGRAPHY.....	124
APPENDIX A.....	131
APPENDIX B	134
VITA.....	151

LIST OF FIGURES

Figure	Page
Figure 1.1: Consumer Credit Outstanding, 1970-2005.....	4
Figure 3.1: The Relationship between Interest Rates and Amount Borrowed	35
Figure 4.1: The Development of a Composite Measure of Time Preference	73

LIST OF TABLES

Table	Page
Table 3.1: Hypothesized Directions of the Effects of Selected Variables on the Balance Decision	53
Table 3.2: Hypothesized Directions of the Effects of Selected Variables on the Personal Financial Knowledge	59
Table 4.1: Distribution of Credit Card Balances for the Entire Sample of Credit Card Holders (N = 2563)	63
Table 4.2: Personal Financial Knowledge Questions	64
Table 4.3: Variable Definitions.....	65
Table 4.4: Factor 1- Power/Prestige (Eigenvalue: 5.96).....	71
Table 4.5: Factor 2- Distrust (Eigenvalue: 2.58)	72
Table 4.6: Factor 3- Anxiety (1.60)	72
Table 4.7: Credit Card Use Scale.....	74
Table 4.8: Descriptive Statistics for the Entire Sample (N = 3884)	75
Table 4.9: Credit Card Possession and Balance Decision by Class Rank	76
Table 4.10: Descriptive Statistics for Credit Card Holders (N = 2563) versus Non-Card holders (N = 1321)	79
Table 5.1: Results from the Double –Hurdle Analysis, Credit Card balance as the dependent variable	89
Table 5.2: Marginal Effects for each of the Independent Variables on the Probability of Revolving a Balance (Probit).....	90
Table 5.3: Summary of Hypothesized Effects versus Observed Outcomes for the Double Hurdle Analysis	104
Table 5.4: OLS Regression Results, Financial Knowledge as the Dependent Variable (N = 3884).....	107

Table 5.5: Summary of Hypothesized Effects versus Observed Outcomes for the OLS Regression Analysis.....	116
--	-----

Chapter 1

Introduction:

Over the past few decades, the market for consumer credit has undergone significant change. Deregulation of the banking industry and the need of lenders for more profitable market instruments have resulted in increased availability of consumer credit in the form of credit cards. In 1983, only 65 percent of households in the United States held at least one credit card (Castranova & Hegstrom, 2004). More recent estimates suggest that, currently, about 80 percent of households have at least one card (Min & Kim, 2003). When income levels are taken into account, the percent of households holding a credit card is even higher; 92 percent of households with income in excess of \$30,000 report holding at least one card (Gould, 2004). Although these estimates indicate that credit card ownership has increased substantially over the past thirty years, they do not tell the whole story. Households that have credit cards, on average, have more than one - about 6.3 cards per those household in 2005 (Day & Mayer, 2005). Use of credit cards as short term loans has increased as well. Real balances on credit cards more than tripled between 1983 and 1998 (Castranova & Hegstrom, 2004).

This change in access to and use of credit cards may be most easily attributed to the expansion of the target market of the credit card issuers. Credit cards were initially developed as a convenience for merchants' most valued customers, and generally served as a quick means of establishing one's creditworthiness. As the credit card market developed in the latter quarter of the 20th Century, issuers began to recognize new opportunities for profit, and developed new marketing strategies.

Credit card debt is typically revolving debt. This form of credit offers great potential for profits. Essentially, credit card holders have an open-ended loan up to some specified limit. Open-ended loans allow card holders to borrow money when it is convenient for them, and in varying amounts, without having to go through multiple approval processes. Often, the rates attached to these open-ended loans are variable, allowing interest rates to become quite high under certain conditions. Consumers that fail to pay their balance in full at the end of each pay cycle offer the greatest potential for profit, as the average credit card interest rate on cards that do not offer some form or reward or rebate is around 14.41 percent (Credit Card Monitor, 2007). Revolving credit (about 95% of which is credit card debt) has steadily increased since 1970 (See Figure 1.1). Once available only to those consumers defined as economically independent and financially secure, credit cards are now easily obtained by individuals regardless of their income or other measures of financial well being. Of particular interest to researchers and policymakers has been the expansion of the credit card industry into the previously untapped college student market.

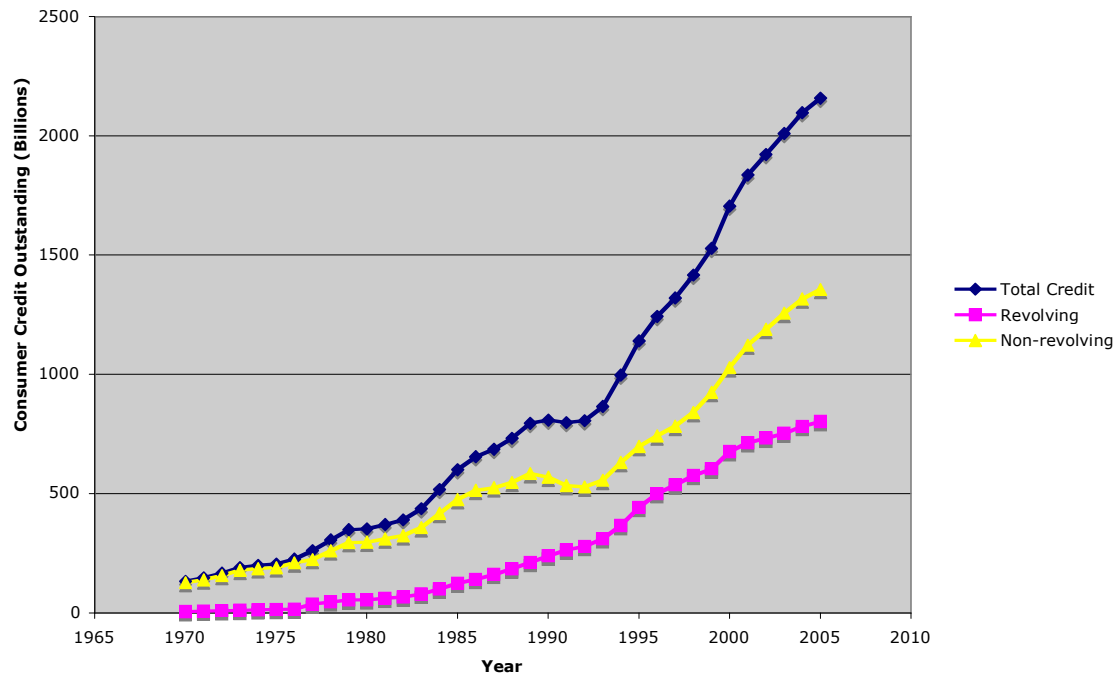
Credit card companies find college students attractive because, although their current income is low, they have potential to earn much higher incomes in the near future. Also, the college student lifestyle offers many opportunities to use credit cards – both as a convenience and as a short term loan – for things such as emergency car repair, a weekend trip, and internet purchases. Expansion of the credit card market to college students has led to credit cards becoming a way of life for today’s college student. Recent studies by Nellie Mae (2002, 2005) indicate that that percentage of undergraduate students holding a credit card declined somewhat between 2001 and 2004, falling from

83 to 76 percent. Still, this percentage is quite high, suggesting that at least 3 in 4 undergraduates have a credit card. For college seniors and graduate students, the proportion of card holders is significantly higher at between 91 and 96 percent (Nellie Mae, 2002; 2005).

College students represent a unique market. As noted, they typically have limited levels of income. Further, rising costs associated with attending both public and private institutions, coupled with the widespread availability of credit cards as a source of borrowing, have increased the proportion of college students who engage in short-term, high-interest debt. According to estimates from Nellie Mae (2005), the average outstanding credit card balance among undergraduates was \$2,169 in 2004. The debt situation for college students is further complicated by the fact that credit cards are often used in conjunction with long-term debt instruments such as student loans.

Critics cite the widespread availability of credit cards as a key enabling agent in the current economic climate of “spend now, pay later” (Feinberg, 1986), or what some have referred to as a culture of materialism (Pinto, Parente, & Palmer, 2001). Whether or not this criticism is completely accurate, it remains clear that the financial landscape regarding credit cards in the United States has undergone serious change. The growing availability and economic significance of credit cards raises new questions for researchers and policymakers alike.

Figure 1.1: Consumer Credit Outstanding, 1970-2005



Source: Federal Reserve

Much of the debate and research regarding expansion of credit cards centers on whether or not such changes is positive. In general, research on credit use by college students suggests that the increasing availability of credit cards is not necessarily a bad thing. A majority of college students seem to have realistic attitudes towards the use of credit cards, and use credit cards responsibly (Newton, 1998; Hayhoe, 2002; Lyons, 2004). Further, cards marketed specifically towards college students generally have low limits, thus credit card balances carried by college students are relatively low, usually averaging a less than three thousand dollars (U.S. General Accounting Office [GAO], 2001). Still, there is evidence that a portion of the college student population may face a relatively high risk of credit card debt accumulation, and it is this group that is most often

of primary interest to researchers (Munro & Hirt, 1998; Nellie Mae, 2002; Lyons, 2004; Marshall & Weagley, 2006).

The purpose of this research is to develop a clearer picture of how college students actually use credit cards. Today's college student tends to be more comfortable with credit cards as compared with previous generations. Members of Generation Y (often referred to as Millennials), individuals born between 1977 and 1994, have been raised in a credit friendly society. For the most part, credit cards have been widely available to them and they appear to attach fewer stigmas to debt accumulation than previous generations have (Ritzer, 1995; Pinto, Parente, & Palmer, 2000). Millennials have a relatively high level of disposable income, but that is coupled with a low degree of financial literacy (Palmer, Pinto, & Parente, 2001). Millennials not only display greater overall spending power than previous generations, they also appear to be more likely to spend as well. Although Millennials tend to start work at a relatively young age, they typically do not list saving for college or contributing to the family as major reasons for entering the work force.

Much of the available literature on consumer credit card behavior has focused on consumer attitudes or some level of specific financial knowledge. Specific financial knowledge is often measured by asking whether respondents are aware of the features and fees (i.e. balance, APR, annual fee) associated with their own credit card. More recently, researchers have begun to explore the potential role of more general personal financial knowledge in the student decision-making process, but there is no consensus as to how this variable might best be measured. The decision to charge a purchase to a card, or to take on a new credit card may be influenced by several factors such as past

experience in dealing with credit cards, attitudes toward credit in general, awareness of the costs and benefits associated with using credit cards (knowledge), and expectations regarding one's future earnings path after college. In this study, general financial knowledge is the key variable of interest, as past studies have failed to develop a clear picture of the relationship between this variable and actual financial behavior.

Theoretically, greater understanding of how the credit card market operates, and how financial markets operate in general should result in individuals making better decisions regarding how and when they borrow. Further, knowledgeable individuals should be more likely to recognize the potential benefits of search in the highly variable credit card market, as the value of search increases with as price dispersion widens (Stigler, 1961). As an added benefit, those individuals with greater knowledge should be more efficient searchers, thus lowering the costs of search.

Significance:

It is important to study credit card use and attainment among college students to improve understanding of how credit attitudes and behavioral patterns develop. Many individuals receive their first cards as freshmen (Nellie Mae, 2005), and gain experience in credit card use while in college. Exploring how the present generation views and understands the money that they use is extremely important given the increasingly complex financial market that consumers face. Today's financial market expects more out of consumers in terms of the kinds of decisions they must make regarding saving, investing, and retirement planning. Measuring financial knowledge may provide further

insight into how well prepared today's college students are to make critical financial decisions. Although an increasing amount of research has been conducted dealing with credit card use and attainment, previous research has tended to focus on the role of attitudes, demographic characteristics, or more specific financial knowledge. By addressing the potential relationship between general personal financial knowledge and credit card behaviors, this study should contribute to the growing knowledge base with regards to credit card usage.

Limitations:

This study has several limitations. First, it is cross-sectional, limiting ability to comment on causality, though differences between class ranks can be examined. Second, the scope of this research is limited to students at one public university in one region of the country, limiting ability to generalize findings to the entire college student population in the United States. Students in private institutions and other regions of the country may exhibit different financial behaviors, and may differ in their overall level of financial knowledge. Third, data are self-reported, creating some room for reporting error.

In survey design, often the best questions to have asked become evident only at the data analysis stage. This work was no exception. Although students were asked whether or not they had taken a course in personal finance, the source of this course is unknown, as is its timing relative to the present data collection. Further, no potential measure of student quality, such as an SAT or ACT score was obtained in the survey.

Implications:

Ideally, results of this study will help enhance understanding of how college students obtain and use credit cards. Such issues are increasingly important to public because they may influence the financial well being of Americans in general. Further, there are educational implications. Study results may provide some direction for the designing presentations, workshops, or courses in financial education. If survey results suggest that personal financial knowledge is an important component in consumer decision making regarding credit card use and attainment, focus on general financial knowledge might be useful when promoting personal finance education among high school and college students.

Chapter 2

Literature Review:

This chapter reviews the literature that has focused on various aspects of the credit card market. First, the credit card market is examined. The function of credit cards as a market instrument is analyzed, and the origin of the credit card market in the United States is outlined. Discussion then focuses college students, the population of interest for the present analysis. In particular, research on what college students know about credit cards, and how the changing credit card market has influenced their attitudes and behavior with regards to credit is analyzed. The literature dealing with the role of personal financial knowledge is then assessed, followed by a detailed review of the literature on attitudinal measurement.

Credit Cards as a Market Instrument:

Any analysis that is concerned with credit card behavior must clearly distinguish which aspect of credit card use and specify the primary issue to be studied. Credit cards are unique in that they serve both as a transactions medium (convenience), and as a form of short-term borrowing. As a result, researchers must be clear regarding the demand they are attempting to model. Credit card users may be classified into one of two categories outlined as follows:

“Convenience users are those individuals who usually pay off their balance in full during the interest free grace period, thereby avoiding finance charges; revolvers are those who usually do not pay their balances in full and thereby incur finance charges” (Canner & Lockett, 1992).

Previous research suggests that the majority (68 percent) of bank-type cardholders are convenience users, and do not revolve a balance from month to month (Min & Kim, 2003). However, it is difficult to determine whether this trend has been influenced by the increasing array of credit cards available in the market because existing literature indicates that general differences in spending behavior may be based on how cards were obtained (Norvilitis, Szablicki, & Wilson, 2003; Barron & Staten, 2004; Mattson, Sahlhoff, Blackstone, Peden, & Nahm, 2004). The increasing popularity of credit cards, both as a transaction medium and as a source of unsecured credit has resulted in changes in how Americans view and utilize debt (Durkin, 2000). Historical data show that over the second half of the 20th Century, the revolving component of consumer credit has increased relative to income, while the non-revolving component has decreased (Durkin, 2000). These findings are supported by Kim and DeVaney (2001) who note a general rise in total debt, especially revolving debt, in over the last twenty to thirty years of the 20th Century.

The incentives associated with using credit cards as a convenience tool, should encourage, consumers to always choose to make purchases with credit cards and pay their balance in full by the due date (Chakravorti, 2003). This is primarily because in an economic sense, convenience users actually pay less than the marginal cost of credit to make use of credit cards (Chakravorti, 2003). A relatively small number of cardholders bear a large proportion of the revolving debt that serves to effectively finance those cards being used by convenience users (King, 2004).

Development of the Credit Card Market; United States:

In discussing credit card use behavior, it is important to briefly note the evolution of credit card marketing in the 20th Century, and more specifically, the development of the college student market. Beginning in the late 1970's, deregulation of the retail banking industry opened the doors for banks to be more aggressive in their promotion and distribution of credit cards as a financial instrument and as a means of profit generation (Manning, 2000; Manning & Kirshak, 2005). As a result of this deregulation, credit cards became largely available to middle income consumers, rather than simply being a convenience tool for a select few of a company's best customers. However, growth in the marketing of credit cards, coupled with the high competition among issuers ultimately resulted in a saturated market.

The high degree of market saturation, coupled with the fact that credit cards were proving to be quite profitable, motivated the banking industry to turn its attention to other untapped markets towards the end of the 1980's (Braunsberger, Lucas & Roach, 2004; Manning & Kirshak, 2005). During the 1980's, regulations still required unemployed students under the age of 21 to have a parental co-signer. But, the 1990's saw credit card marketers drop this requirement due to the high profitability of credit cards in general, and the expected profitability of this new group of consumers (Manning, 2000; Manning & Kirshak, 2005).

While the issue of market saturation clearly contributed to the movement by credit card issuers into the college student market, there are a number of other significant factors that must also be recognized. First, the college student market is quite large (estimated at roughly \$90 billion in the late 1990's) (Braunsberger et al., 2004). Second,

research indicates that the majority of college students (75%) tend to hold on to their first credit card brand for an average of fifteen years (Braunsberger et al., 2004; Commercial Law Bulletin, 1997). This suggests that brand loyalty is quite strong among this consumer group. Further, the college student market is uniquely renewable, in that there is an annual influx of new, easily identifiable consumers (freshmen). The arrival of these new prospects is made all the more interesting to marketers considering that the majority of these students do not have a credit card, or any specific brand loyalty (Braunsberger et al., 2004). These facts are even more significant when one considers that the more recent generation of college students have been raised in a credit friendly society, and thus may display unprecedented comfort in the use of credit cards and the accrual of debt (Pinto, Parente, & Palmer, 2001).

Rapidly escalating costs associated with a college education (College Board, 2005), coupled with greater access to debt instruments such as credit cards (Warwick & Mansfield, 2000) has led some researchers to suggest that college students may be taking on excessive amounts of debt, resulting in a growing number of students failing to persist to graduation. Recent evidence from the College Board suggests that while the amount of aid available per student has increased in recent years, tuition costs have increased at a greater rate, forcing students to seek other methods of paying their college bills (College Board, 2005).

Given these various factors, expansion of the credit card industry into the college market has been a key area of interest for researchers and policymakers alike. Anecdotal accounts of student financial crises, ranging from bankruptcy to debt-related suicide, are often used as arguments in opposition to card solicitation on campus. In response, a

number of universities have banned direct marketing of credit cards on campus (Pinto, Parente, & Palmer, 2001). While the effectiveness of such policies has been brought into question (Pinto, Parente, & Palmer, 2001), such actions are indicative of the approach that has been taken by administrators and policymakers in recent years. For the most part, the primary concern has been the characteristics of the market itself. Specifically, policymakers and researchers have questioned whether or not college students represent a vulnerable population and do certain solicitation techniques have an adverse influence on the accumulation of consumer debt among college students.

College Students as a Vulnerable Population:

There is strong evidence that suggests that college students do not possess a high degree of financial knowledge (Markovich & DeVaney, 1997; Chen & Volpe, 1998; Warwick & Mansfield, 2000; Avard, Manton, English, & Walker, 2005; Jones, 2005). Previous analyses of financial knowledge may be most easily divided into two categories: those that focus on general financial knowledge (Markovich & DeVaney, 1997; Chen & Volpe, 1998; Avard et al., 2005; Jones, 2005) and those that focus on specific financial knowledge (Warwick & Mansfield, 2000; Joo, Grable & Bagwell, 2003; Braunsberger et al., 2004). Studies that use specific financial knowledge as a proxy for financial literacy typically ask individuals about characteristics of their own credit cards (APR, charges, etc.). Existing research indicates that regardless of how financial knowledge is operationalized, those surveyed often tend to lack general financial knowledge.

Research by Markovich and DeVaney (1997) indicates that college seniors may be ill equipped to handle decisions related to credit card debt or other loans. Overall,

college seniors earned a mean score of 0.77 (SD = 0 .89) on a four-point scale of credit/loan knowledge (Markovich & DeVaney, 1997). Other research suggests a more general lack of financial knowledge exists. Using a thirty-six-question survey that dealt with various aspects of personal financial knowledge, Chen and Volpe (1998) reported an average percentage of correct responses of about 53%. Chen and Volpe note significant class rank and degree-type effects, finding that business majors tended to score better than non-business majors and that financial knowledge was higher for upper classmen as compared with lower classmen. These findings were supported by later questionnaire-based research by Avard et al. (2005). In a survey of college freshmen, the researchers found that respondents were able to answer only about thirty-five percent of the questions correctly (Avard, et al., 2005). Jones (2005) noted similar results. On a six-question scale of credit knowledge, incoming freshmen were correct 56% of the time on average.

Warwick and Mansfield (2000) took a different approach to analyzing knowledge, choosing to focus on individuals' knowledge of the various interest rates and limits on their own credit cards. Of primary interest to Warwick and Mansfield's analysis and others like it is overall awareness and understanding of the Annual Percentage Rate (APR) associated with a given individual's card, as well as awareness of balance limits or other associated fees.

APR: Consumer Awareness versus Understanding:

The APR was first introduced in 1968 under the Truth in Lending Act (TILA) as a summary measure of a given loan's price with the intention that such a measure might allow consumers to compare different loan offers more easily (Lee & Hogarth, 1999). Since its introduction, evidence suggests that awareness of the APR among consumers

has grown significantly (Lee & Hogarth, 1999; Durkin, 2000; Hogarth & Hilgert, 2002). The question that continues to trouble researchers and policymakers alike, however, is whether or not consumers have increased their understanding of the APR as awareness has grown. Previous findings suggest that consumers are not only aware of APRs, but that they know they are important (Hogarth & Hilgert, 2002). Using data from the Survey of Consumers (n = 1000), when consumers were provided with the following statement, “If you expect to carry a balance on your credit card, the APR is the most important thing to look at when comparing credit card offers”, 84 percent of respondents correctly noted this as being true (Hogarth & Hilgert, 2002).

Overall, the literature suggests consumers have a general lack of understanding with respect to APRs, leading researchers to conclude that higher awareness does not necessarily correspond with higher understanding (Lee & Hogarth, 1999). These findings are further supported by research among the college population, where a number of studies have attempted to assess the overall awareness and understanding of this increasingly important market (Chen & Volpe, 1998; Warrick & Mansfield, 2000; Mattson et al., 2004).

Evidence from a sample of 924 college students suggests that college students are not very knowledgeable of APRs (Chen & Volpe, 1998). When presented with the following question only about 33 percent of the sample noted the correct response of E:

“Which of the following statements is TRUE about the annual percentage rate (APR)?

- A. APR is the actual rate of interest paid over the life of the loan.
- B. APR is expressed as a percentage on an annual basis.
- C. APR is a good measure of comparing loan costs.
- D. APR takes into account all loan fees.
- E. All of the above”

(Chen & Volpe, 1998)

Work of Warwick and Mansfield (2000) indicates that college students may not even be aware of the importance of the APR associated with their credit cards, as 71 percent of a sample of 381 students was unaware of the APR associated with their own card. Joo et al. (2003) report slightly better findings, as 61 percent of college students sampled (n = 272) reported knowing their own credit card's APR.

While it is possible that lower awareness among this specific population could be attributed in large part to a general lack of financial independence (i.e. the students may not know the rates associated with their card because they do not see or pay their bill), students should be aware of the APR in order to become responsible users of credit. There is some research that suggests that APR awareness among the college student population may be strongly related to perceived relevance, as those students who indicate knowing the rates associated with their own cards tend to be those that carry higher balances, suggesting that convenience users are less concerned with APR (Mattson et al., 2004).

From the available evidence, it is clear that understanding of the APR is a key issue for concern, particularly among college age consumers who are in the process of developing or refining their financial habits and attitudes.

Balance Limits and Other Associated Fees:

APR is not the only area in which college students appear to lack information regarding their own credit cards. Warwick and Mansfield (2000) note that a little over half of the respondents from their study reported knowing their credit limit (57%) and their current balance (52.5%). Similarly, Joo et al. (2003) found that roughly half of respondents were aware of the other relevant fees associated with their own cards.

Generally Responsible Spending Behavior:

Ironically, despite the clear shortcomings in college student financial knowledge, prior research suggests that college students generally use credit responsibly (Newton, 1998; Kidwell & Turrisi, 2000; Norvilitis & Santa Maria, 2002; Lyons, 2004). This result might be attributed to the fact that the majority (59%) of students are convenience users and do not carry a revolving balance (Institute for Higher Education Policy, 1998). Further, research suggests that only about twenty percent (20%) of those who do carry a revolving balance report carrying a balance of \$1000 or more, and only about five percent (5%) report carrying balances over \$3,000 (Institute for Higher Education Policy, 1998; Lyons, 2004). These findings differ slightly from data reported by the Nellie Mae Corporation (2002; 2005). According to Nellie Mae's statistics, twenty-one percent (21%) of undergraduates sampled carried balances between \$3,000 and \$7,000 in 2001, though this statistic did decrease to 14 percent in 2004. In 2004, roughly 45 percent of the sample reported carrying a balance of \$1,000 or more (Nellie Mae, 2005).

Existing research indicates that college students are at least as knowledgeable as other adults when it comes to financial measures of knowledge (Braunsberger, et al., 2004). In answering an objective knowledge survey, college students responded correctly 59.6% of the time, whereas the adult respondents were correct 62.8% of the time (Braunsberger et al., 2004). So, despite not necessarily having a strong understanding of personal finance, college students appear to generally make use of financial tools such as credit cards effectively, and appear to be as knowledgeable as the general adult population. These findings raise the question as to what role if any financial knowledge might play in the decision to acquire and use credit cards.

The Role of Financial Knowledge:

It has been noted that college students do not appear to be very knowledgeable of financial issues in general, yet they still appear to be effective users of credit cards for the most part. Further, college students appear to be comparable to the general population when it comes to personal financial knowledge. These findings raise the question as to whether or not personal financial knowledge has any impact of one's financial decision-making.

Theoretically, knowledge is important for its role in the decision-making process. Liebermann and Flint-Goor (1996) suggest that prior knowledge of an issue is one of the most important variables influencing information processing. These findings are supported by Chen and Volpe's (1998) research, which suggests that one's level of financial knowledge tends to influence opinions and decisions. Further, in a general analysis of household decision-making behavior, evidence suggests that financial knowledge and financial behavior may be positively related (Hilgert, Hogarth, & Beverly, 2003). Using a composite score of financial knowledge, strong correlations are found between one's knowledge score and an index of credit management behaviors (Hilgert, Hogarth, & Beverly, 2003). There is evidence that suggests that knowledge in general, often proxied using one's education level, may be a significant factor in the development of credit attitudes (Zhu & Meeks, 1994; Chien & DeVaney, 2001).

Gartner and Todd (2005) suggest that completion of an online credit education program is correlated with more responsible credit card behaviors (Note: for their analysis, responsible behaviors were those that typically contribute to higher credit scores such as making payments on time, not exceeding limits, etc.). Although their analysis is

not constructed in a way that allows conclusions to be drawn regarding causality, it does provide evidence of a significant relationship between financial knowledge and observed behavior. These findings support the more general results that have been found in analyses of financial education programs. Overall, findings suggest that individuals who are learn financial management skills at earlier ages have better financial outcomes than those who are not involved in financial education programs (Baek, 2001; Doll, 2000; Varcoe, Garrett, Martin, Rene, & Costello, 2001).

Although much of the earlier research regarding consumer financial knowledge presents evidence of some unique and significant relationships, little research has been done which questions the link between actual financial knowledge and observed behaviors among the college student population. The previously mentioned study by Gartner and Todd (2005) represents a clear movement toward this type of research, though their study does not focus exclusively on college students. Jones (2005) presents an exploratory analysis of consumer credit knowledge and actual observed behaviors such as debt level among college students. Using a 100-point scale of financial knowledge (based on responses to six survey questions dealing with general credit knowledge), OLS regression was used to determine whether any significant relation between credit knowledge, demographic information, access to credit, and use of credit might exist (Jones, 2005). No significant relation between knowledge and use of credit cards was found, but the exploratory nature and small sample size ($n = 216$) dictate that this question be pursued further.

Understanding more about the role of knowledge could potentially lead to a better understanding of those college students who are typically categorized as at-risk. Students

who reported having taken a course in personal finance have been found to be significantly less likely to be financially at-risk as compared with those who have not taken such a course (Lyons, 2003). While evidence shows that the majority of college students appear to handle credit cards responsibly, there are still a percentage of individuals in the student population that do not.

The percentage of the college student population that may be considered at-risk depends on how being financially at-risk is defined. Lyons (2004) used research findings from the U.S. General Accounting Office and The Education Resources Institute and the Institute for Higher Education Policy to develop a profile of an individual that is financially at-risk: 1) they carry a revolving balance of \$1,000 or greater, 2) they have been delinquent on their credit card payments for two or more months, 3) they have borrowed up to the maximum credit limit on at least one of their credit cards, and 4) they only pay off their credit card balances some of the time or never (Lyons, 2004).

Significant differences have been noted between those who use credit wisely and those who do not. Munro and Hirt (1998) found that minorities, students on financial aid, and upper-level students who received their cards after beginning college were more likely to carry a revolving balance. These findings are supported by Lyons' (2004) analysis of financially at-risk college students, which further notes the potential influence of gender and how cards are obtained. Specifically, Lyons finds that females are more likely to have difficulty making credit card payments, as are students who attained their cards via mail, on-campus, or at a retail store.

Credit Cards on Campus:

A question that has drawn some attention in the prior literature is the question as to what influence, if any, different methods of credit card attainment have on the spending habits of college students. Specifically, are there differences in the amount of debt carried by those who obtain credit cards from on-campus solicitations as compared with other sources of credit cards such as banks, retail stores, or direct-mail solicitations? The available evidence suggests that there are differences in how credit cards are used based solely on method of attainment (Norvilitis, Szablicki, & Wilson, 2003; Barron & Staten, 2004; Mattson, Sahlhoff, Blackstone, Peden, & Nahm, 2004), but it is unclear as to what role individual differences might play in the attainment process, and exactly how much different behaviors are based on method of attainment.

Barron and Staten analyzed a large data set of newly opened accounts, and compared characteristics of those accounts opened by young adults through college marketing programs, those opened by young adults through other marketing programs, and those opened by older adults through other programs (2004). Their findings indicate that student accounts tend to have lower balances, smaller credit limits, and lower rates of utilization than accounts opened by other groups. One potentially confounding issue in this particular analysis is that there is no clear differentiation between college students and non-students, nor is there any clear evaluation of differences of attainment methods other than on-campus versus other.

The previous literature is not entirely consistent on this topic, however. Some studies note that students who obtained cards through on-campus solicitation techniques held a higher average monthly balance (\$1,039) as compared with those who received

cards through other sources (\$854) (Student Credit Card Debt, 1998). Mattson et al. (2004) note a similar pattern among a college student sample.

Despite some disagreement in the available literature, there does appear to be strong supporting evidence to suggest that consumers use their credit cards differently based on how cards are obtained. Early research by Abend (1991) suggests that individuals who received their cards through retail stores spent more on average (\$1459.28 per year) than bank card users (\$467.59 per year). Using a sample of 3,838 students, Mattson et al. (2004) noted that receiving a credit card through one's parents is associated with carrying a lower monthly balance (\$93) as compared with individuals who received their cards through direct-mail solicitations (\$520). Lyons (2004) also notes that those individuals classified as financially at-risk were more likely to obtain their card through the mail, from a retail store, or through some on-campus solicitation.

Many campus administrators have responded to the negative portrayal of credit cards in the popular media by limiting credit card access on campus (i.e. banning the solicitation of credit cards). There is evidence to suggest that this has had no real influence on the number of credit cards obtained by college students (Pinto, Parente, & Palmer, 2001). There are numerous other means by which credit cards are actively marketed to college students, many of which require little effort or active consideration from the consumer.

The Role of Consumer Attitudes:

One issue that has been addressed by a number of studies is the potential influence of consumer attitudes towards credit on credit card attainment and use (Davies

& Lea, 1995; Xiao, Noring, & Anderson, 1995; Hayhoe, Leech, & Turner, 1999; Durkin, 2000; Chien & DeVaney, 2001; Hayhoe, 2002; Baum & O'Malley, 2003; Joo et al., 2003). The method by which attitudes are measured varies significantly from study to study, but looking at the literature as a whole, some broad trends can be noted.

There is the question as to whether attitudes are an effective predictor of behavior. Research from the area of social psychology suggests that behavior and attitudes do not always agree, indicating that a more complicated series of interactions may be involved (Ajzen, 1996). Further, attitudes can be difficult to assess, and outcomes may be strongly related to the timing of the data collection, as some research suggests that attitudes change over time (Godwin, 1997).

In general, the literature provides evidence that individuals with more positive attitudes toward credit are more likely to carry an outstanding balance (Canner & Cynrak, 1986; Godwin, 1997; Chien & DeVaney, 2001; Kim & DeVaney, 2001). Earlier research by Canner and Cynrak (1986) suggests that individuals with more favorable attitudes toward borrowing in general are more likely to use credit cards as a source of revolving credit rather than as a cash substitute. Further research has demonstrated that the amount of debt held by a household is influenced by ability as well as willingness to borrow (Godwin, 1997). Research using the Survey of Consumer Finances (SCF), suggests a positive correlation between scores on a specific attitude index and outstanding credit card balance (Chien & DeVaney, 2001; Kim & DeVaney, 2001).

The literature does not universally support this line of thought, however, as other studies using the SCF suggest that those who use credit cards as a means of borrowing tend to hold less favorable views of credit as compared with those who use credit as a

cash substitute (Durkin, 2000). Analyzing responses over a thirty-year period, Durkin finds that there is greater polarization in attitudes toward credit among consumers in the year 2000 as compared with consumers in 1970. Inconsistencies in the literature may primarily be the result of methodological differences as Durkin gauges individuals' attitudes toward credit with a single question from the SCF: "People have different opinions about credit cards. Overall, would you say that using credit cards is a good thing or a bad thing?" (SCF, 2000). Using this single item measure, less positive views toward credit cards are noted among those who have three or more credit cards, have more than \$1500 in revolving debt, have transferred a balance between cards, hardly ever pay their balance in full, and hardly ever pay the minimum payment in full (Durkin, 2000).

One of the more interesting findings from Durkin's (2000) analysis deals with the potential origins of consumer attitudes. Specifically, the survey data suggests that negative attitudes may have more to do with individuals' perceptions of experiences of consumers in general, and not with their own personal experiences (Durkin, 2000).

Attitudes are particularly interesting to the analysis of credit card behavior among consumers because there is a widely held belief that attitudes about debt have changed dramatically during the last half of the twentieth century, with the modern consumer generally accepting credit as a key component of their everyday financial life (Lea, Webley, & Walker, 1993; Davies & Lea, 1995). This study uses the Money Attitude Scale (MAS) as developed by Yamauchi and Templer (1982) to evaluate the role of attitudes in consumer credit behavior.

The Money Attitude Scale:

Initial research by Yamauchi and Templer (1982) distinguished between four dimensions of money attitudes: 1) power-prestige, 2) retention-time, 3) distrust, and 4) anxiety. More recent findings have supported these categories, as similar factors are noted in tests of a modified version of the MAS (Tokunaga, 1993; Roberts & Jones, 2001). Tokunaga (1993) uses three of the four subscales outlined above in some research, although reasons for omitting the distrust subcategory were not made clear. Research using the modified version of the MAS suggests that heavy credit card users may be more likely to view money as a source of power/prestige, experience greater anxiety in dealing with money, and be generally less concerned with retaining money (Tokunaga, 1993). Roberts and Jones (2001) used a similar attitude scale and focused their research on college students. It is their opinion that the retention-time component might be inappropriate for this particular population, thus removed it in their work.

Attitudes among College Students:

Similar to the present analysis, a number of studies focus on the college student population (Davis & Lea, 1995; Xiao et al., 1995; Hayhoe, Leach, & Turner, 1999; Roberts & Jones, 2001; Hayhoe, 2002; Baum & O'Malley, 2003; Joo, Grable, & Bagwell, 2003). In recent years, concerns have been raised regarding the comfort level that today's college student displays in dealing with credit (Pinto, Parente, & Palmer, 2001). Specifically, as members of Generation Y, today's college students have been raised in a consumer culture that is reliant upon and tolerant of credit card debt. College students are particularly interesting because they tend to have relatively high levels of debt coupled with low incomes. The available research suggests that students view debt

favorably, which may be strongly related to their current position in the life cycle, and the general expectation that their current low income levels are temporary.

In a sample of university students in the United Kingdom, higher levels of debt and greater debt tolerance were noted among those students who had been in school longer (Davis & Lea, 1995). Tolerance of debt was measured by a 14-item scale designed to assess general attitudes toward credit. Xiao, Noring, and Anderson (1995) develop and test a comprehensive measure of credit card attitudes, further dividing them into three key categories; behavioral, affective, and cognitive. Findings suggest that more favorable attitudes tend to exist among the affective (82%) and cognitive (67%) categories, with attitudes being associated with a number of key demographic characteristics, including gender, major, number of cards, living arrangements and co-signor status (Xiao et al., 1995).

Attitudinal measures have been used both as a means of gauging credit card use and as a means of determining how many credit cards a particular individual might possess. Evidence suggests that students with four or more credit cards tend to score higher in the affective credit attitude category (Hayhoe et al., 1999). Further, those with four or more cards scored higher on the cognitive attitude scale, indicating that such individuals are more thoughtful about credit cards in general, which may be a result of their greater attention to and use of credit cards (Hayhoe et al., 1999). Similar to earlier research by Davis and Lea, Hayhoe et al. (1999) noted that older students tend to carry more credit cards and to score higher on the affective credit scale. Findings also suggest that higher affective credit scores are strongly associated with students carrying an

outstanding balance on several credit cards (Hayhoe, Leach, Turner, Bruin, & Lawrence, 2000).

In a longitudinal comparison of students at two different periods (1997 compared with 1999), affective credit attitudes were measured to determine how such attitudes change over time (Hayhoe, 2002). While this study yielded few significant findings due to its small sample size, it is noted that students who graduated between the two periods display lower affective credit scores (Hayhoe, 2002).

Contrary to previous findings, Joo, Grable, and Bagwell (2003) find that those students in higher academic years tend to hold more negative attitudes toward credit as compared with those in lower years. Other attitudes noted as impacting attitudes include race, parental use of cards, card possession, money ethic, and locus of control (Joo et al., 2003).

The Question of Causality:

While a number of studies have dealt with the potential relationship between consumer attitudes and actual credit behavior, questions remain as to the exact nature of this relationship. Specifically, do attitudes form as a result of specific credit behaviors or do specific credit behaviors influence attitudes? Although researchers acknowledge this key concern, it remains a question of interest (Davis & Lea, 1995; Chien & DeVaney, 2001). This question is primarily raised because social psychological research presents several different theories that attempt to explain the relation between attitudes and behaviors. According to cognitive dissonance theory, people may actually make modifications to their beliefs in situations where their beliefs and actions are inconsistent,

thus attitudes may be based on behavior (Festinger, 1957). Contrary to this assertion, the theory of reasoned action proposes that people make choices based on already formed beliefs, or attitudes (Fishbein & Ajzen, 1975). While findings presented by Davis and Lea (1995) are more supportive of cognitive dissonance theory, the data are not the result of a true longitudinal design, and causality must be interpreted carefully. Given the available evidence, there does appear to be a significant relationship between attitudes and behavior, but the interpretation of such a relationship should be carefully considered.

Summary:

The previous literature develops a much clearer picture of how college students obtain credit cards and the degree of financial knowledge among this population, but it remains unclear as to what role general financial knowledge might have on financial behavior. Although some previous research suggests that personal financial knowledge is linked to actual behavior among the general population, it is unclear as to the extent to which such results might hold for the college student population. Due to the unique financial position of college students, the borrowing decision may be more significant than other personal financial decisions. Thus, developing a clearer understanding of the potential link between knowledge and behavior could potentially benefit this specific population. Further, it is important to recognize that all financial behaviors may not be created equal; different relationships might exist between financial knowledge and various financial behaviors.

Although there has been a proliferation of financial education programs over the last few decades (See Fox, Bartholomae, & Lee, 2005 for a comprehensive review), these

programs have generally lacked outcomes assessment. There is more financial education available to consumers than in years past, but the actual influence of these programs is unknown. To justify these programs, a clearer understanding of the relationship between financial education and behavioral changes must be developed.

Chapter 3

Theoretical Framework:

The present analysis is, at heart, a study of consumer demand for debt. Individuals are faced with the decision of how to best arrange their expected income over their expected life cycle. Although researchers have posited a number of theories to explain why consumers might consider borrowing against their future potential, or expected, earnings, the question might best be explained in the context of the life-cycle income hypothesis.

The life-cycle income hypothesis is a dynamic theory that allows for the careful analysis of intertemporal choices by individuals. Based on early work by Ando and Modigliani (1963), utility is assumed to be a function of one's own aggregate consumption in both the present and future periods. The primary assumption of the life-cycle income hypothesis is that individuals choose how much to consume in each period based on the goal of consuming their total resources evenly over their remaining life span. To simplify this model, it is further assumed that there is no bequest motive, and that the consumer desires to use all of their resources during their lifetime.

It is assumed that individuals will seek to maximize their intertemporal utility function subject to their available resources (the sum of current and discounted future earnings over their lifetime and net worth). Thus, current consumption may be expressed as a function of resources and the rate of return on capital with parameters depending on age. Expected income is unobservable and may be expressed as follows:

Expected Income:

$$y_t^e = \beta' y_t; \beta' = 1$$

$$C_t = (\alpha'_1 + \beta' \alpha'_2) y_t + \alpha'_3 A_{t-1} = \alpha_1 y_t + \alpha_3 A_{t-1}$$

$$\alpha_1 = \alpha'_1 + \beta' \alpha'_2 \cong \alpha'_1 + \alpha'_2$$

Where: y_t^e is equal to expected income at time period t

y is equal to income at time period t

C_t is the aggregate consumption in period t

Given a single asset (A_1) that the consumer possesses at the beginning of period 1, which earns interest rate (r_2) on any funds held over into period 2. It is important to note that A can take on a negative value (as it would in the case of debt accrual). Further, as no bequest motive is assumed, assets should be equal to zero (0) at the end of period 2 given a simple two-period model.

Theoretically, it is possible to start with the most basic model of intertemporal choice where the consumer must choose consumption levels based on preferences in a two period model:

$$U = v(c_1, c_2) \tag{3.1}$$

Where: U = the utility function for a given individual

c_1 = consumption in period 1

c_2 = consumption in period 2

The above utility function is too general for the present analysis, however, and must be modified to better reflect the decision to borrow given a variable interest rate that varies with the observed level of A . Thus, we begin with a modified version of the simple two-period model of student utility:

$$U_s = \Delta t_1 v(c_1/\Delta t_1) + \Delta t_2 v(c_2/\Delta t_2) \quad (3.2)$$

Where: U_s = the utility function for a given college student

$\Delta t_1 v(c_1/\Delta t_1)$ represents consumption in time 1 given no time preference factor, or no impatience

$\Delta t_2 v(c_2/\Delta t_2)$ represents consumption in time 2 given no time preference factor, or no impatience

Here the flow of utility is equal to consumption per unit of time given the overall goal of a smooth consumption pattern. So in this simple world, it is possible to determine how much an individual will choose to borrow depending on income in time 1 versus time 2.

Assets at the end of period one may be presented as follows:

$$A_1 = A_0(1 + r(A_0)) + y_1 - c_1 \quad (3.3)$$

Where: A_1 = assets at time period 1

A_0 = assets at time period 0

r = interest rate associated with borrowing

Given that: $A_0 = 0$
 $A_1 = y_1 - c_1$

It is important to note that the borrowing decision has a direct impact on the interest associated with one's asset, thus the cost of debt varies with the amount that one owes/revolves.

$$A_2 = A_1(1 + r(A_1)) - c_2 + y_2 \quad (3.4)$$

Where: A_2 = assets at time two

Given the assumption of no bequests: $A_0 = 0$
 $A_2 = 0$

Or, to put it in words, the individual begins and ends with no assets.

Based on equation 3.2, consumers are faced with the following maximization problem:

$$\text{Max } [\Delta t_1 v(c_1/\Delta t_1) + \Delta t_2 v(c_2/\Delta t_2)] \quad (3.5)$$

Subject to the following constraint where $(y_1 - c_1)$ is substituted for A_1 :

$$0 = (y_1 - c_1) (1 + r(y_1 - c_1)) - c_2 + y_2 \quad (3.6)$$

In equation 3.3 above, there is an inverse relationship between r and A in period 1, thus more borrowing results in increasing r (higher APR). In other words, more negative values of A result in larger values of r . This maximization problem can be solved using a Lagrangean:

$$L = [\Delta t_1 v(c_1/\Delta t_1) + \Delta t_2 v(c_2/\Delta t_2)] - \lambda [(y_1 - c_1) (1 + r(y_1 - c_1)) - c_2 + y_2] \quad (3.7)$$

Where: λ is the marginal value of consumption

To find the maximization of equation (3.5) subject to the constraint (3.6), thus maximizing satisfaction, L must be differentiated by c_1 , c_2 , and λ respectively setting each of the partial derivatives to zero. Taking the derivative with respect to λ produces equation (3.6):

$$\partial L/\partial c_1 = \Delta t_1 v'(c_1/\Delta t_1)(1/\Delta t_1) + \lambda [(1 + r(y_1 - c_1)) + (y_1 - c_1)(r'(y_1 - c_1))] = 0 \quad (3.8)$$

In formula 3.8, when c increases (more consumption), the constraint is tightened due to the fact that the interest rate (r) increases as well. So the cost of consumption in time 1 is twofold, as there is less money for use in time 2 and the associated interest rate increases. $(y_1 - c_1)$ represents the amount owed, with r' representing the interest paid on that amount. Thus, as $(y_1 - c_1)$ becomes increasingly negative, r' increases.

$$\partial L / \partial c_2 = \Delta t_2 v'(c_2 / \Delta t_2) (1 / \Delta t_2) - \lambda = 0 \quad (3.9)$$

Where λ is the marginal value of consumption in period 2. To maximize, set both of the above formulas equal to zero, essentially rewriting equation (3.9) as follows:

$$v'(c_2 / \Delta t_2) = \lambda \quad (3.10)$$

So we are left with the three unknowns, c_1 , c_2 , and λ , and three equations (3.6), (3.8), and (3.10) that must be solved for. Substituting (3.10) into (3.8), the result is:

$$[v'(c_1 / \Delta t_1) / v'(c_2 / \Delta t_2)] = (1 + r(y_1 - c_1) + (y_1 - c_1)r'(y_1 - c_1)) \quad (3.11)$$

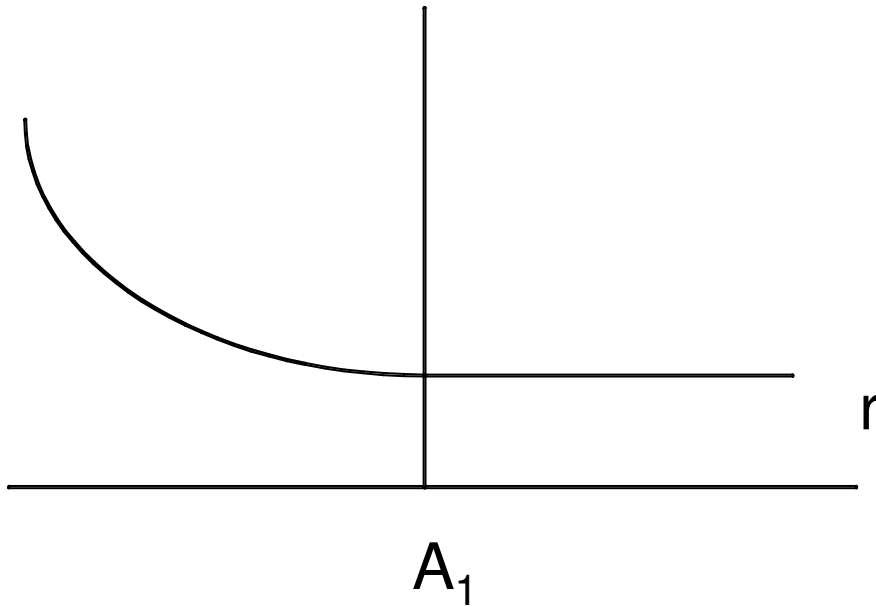
Based on equations (3.6) and (3.11), there are two remaining unknowns, c_1 , c_2 . Equation (3.6) may be rewritten to represent the amount of excess in period 2:

$$c_2 - y_2 = (y_1 - c_2) (1 + r(y_1 - c_1)) \quad (3.12)$$

Equation (3.12) presents the excess in period 2 as being equal to the amount saved in time 1 plus the interest. Given a situation with no saving or borrowing, $c_1 = y_1$.

Graphically, we can represent r as a function of the amount borrowed, A_1 (Figure 3.1).

Figure 3.1: The Relationship between Interest Rates and Amount Borrowed



As shown in Figure 3.1, r exists at some set amount (market rate of interest) even in the absence of borrowing. As A_1 decreases (borrowing increases), the interest rate increases.

The marginal value of consumption in period 1 divided by the marginal value of consumption in period two is equal to $(1 + r)$.

$$[v'(c_1/\Delta t_1) / v'(c_2/\Delta t_2)] = 1 + r(0) \quad (3.13)$$

where; $v'(c_1/\Delta t_1)$ = the marginal value of money this year

$v'(c_2/\Delta t_2)$ = the marginal value of money next year

Theorem 1: Debt and saving are only equal to zero in the present model when

$$[v'(y_1/\Delta t_1)/v'(y_2/\Delta t_2)] = 1 + r(0) \quad (3.14)$$

The first half of equation (3.14) is fundamental to the borrowing decision. The larger this ratio becomes, the more you will borrow. This results in more balanced consumption between the two periods.

If $[v'(y_1/\Delta t_1)/v'(y_2/\Delta t_2)] > 1 + r(0)$ then a consumer borrows rationally

If $[v'(y_1/\Delta t_1)/v'(y_2/\Delta t_2)] < 1 + r(0)$ then a consumer saves

College students are in a unique economic position because they are typically faced with a modest current income stream with significantly higher expected earnings after graduation. Based on the life-cycle income hypothesis, borrowing by college students may be viewed as a rational decision based on the fact that college graduates expect to have a significantly higher earnings path than high school graduates (Baum & Payea, 2004). Thus, given the rational expectation of higher income in the near future, college students may be more likely to use credit to facilitate a smooth pattern of consumption over their life cycle (Kidwell & Turrisi, 2000; Norvilitis & Santa Maria, 2002).

Thus far, an argument as to why an individual might rationally choose to borrow has been presented with no specification as to the means through which this borrowing might occur. The decision to borrow is not a simple yes-no decision. Essentially, the rational decision of whether to borrow is the first part of a multi-step process. Once an

individual decides to borrow, the next logical step is to consider the cost of borrowing. Assuming a rational decision making process, individuals seek to equate the marginal costs with the marginal benefits of any given decision. In paying for a college education, a number of potential payment methods may be available to a given individual. In terms of real costs (interest rate), credit cards are one of the most expensive borrowing alternatives available if a balance is revolved. So while it may be considered rational for college students to utilize debt instruments to finance their education, credit cards may be considered a relatively inefficient means of borrowing based on their high interest rates and the requirement of minimum payments.

The analysis becomes more difficult when one considers the importance of information and how it is understood. Empirical findings suggest that there are significant benefits to search in credit markets (Lee & Hogarth, 1998). What is not understood, however, is the extent to which this is known among the college student population. If the college student population is not particularly knowledgeable when it comes to financial markets, it might be that they do not fully understand the costs associated with borrowing via credit cards. Ausubel (1991) argues for consumer irrationality in the attainment of credit cards, as individuals forgo extensive search based on the belief that the card will only be used as a convenience tool. One might question whether this is truly irrational behavior, or is it more likely the result of a lack of information? College students may not necessarily be irrational in their financial decision making, particularly as it pertains to credit use and attainment, but may lack key information to effectively weigh the costs and benefits associated with a given decision.

Theoretically, greater financial knowledge should result in a greater understanding of all of the costs associated with using credit cards. Without a working knowledge of how financial markets and their various instruments operate, it is difficult to judge the actual costs of a given decision.

Hypotheses, Primary Analysis:

Based on the available literature, a number of hypotheses may be stated based on the independent variables used in the primary analysis. Table 3.1 presents an overview of the variables and hypothesized effects.

Financial Knowledge

For the present analysis, the general focus is on developing a more detailed understanding of what influence general financial knowledge might have upon reported behavior. Specifically, how might knowledge effect the decision to revolve and to what extent one revolves. Based on the theoretical framework, college students who have a greater degree of financial knowledge are more likely to be aware of the number of available alternatives in the market. For example, if an individual is aware of other debt instruments such as student loans that are available at lower costs, they are more likely to make use of these alternatives before using credit cards. Further, it is expected that more knowledgeable individuals are better able to understand the costs and benefits associated with using credit cards as a tool for financing one's education. This assertion is supported by findings from Hilgert, Hogarth, and Beverly (2003). Individuals with greater financial knowledge are noted as being more likely to engage in effective credit card management

behaviors among the general population. These findings are further bolstered by evidence that individuals who develop financial management skills at a younger age tend to do better financially than individuals who are not exposed to financial education (Baek, 2001; Doll, 2000; Varcoe et al., 2001). Hypothesis 1 may be stated as follows:

H₁: Holding other factors constant, financial knowledge is inversely related to whether one carries a revolving balance

Hypothesis 2 is closely related to Hypothesis 1, and may be stated as follows:

H₂: Among those with a revolving balance, greater financial knowledge is associated with a lower reported balance, other factors held constant

Credit Card Origin

A secondary area of interest in this study is the relationship between credit card origin and spending behavior. Specifically, does the likelihood of revolving a balance and overall balance level vary based on how cards were obtained, all else equal? Are individuals holding bank cards more or less likely to revolve than individuals holding store-based cards? Is the actual balance revolved greater among individuals with direct mail cards as compared with other credit card types? Previous findings suggest that such differences might exist (Norvilitis et al., 2003; Barron & Staten, 2004; Mattson et al., 2004), but little is known as to why. The present analysis posits that differences might exist based on the amount of individual involvement required in obtaining a given card.

Hypothesis 3 may be stated as follows:

H₃: There will be significant differences in probability of revolving a balance based solely on credit card origin. Specifically, individuals holding cards from a bank source will be relatively less likely to revolve a balance while those holding

cards from a campus source, direct mail, or a retail outlet will be more likely to revolve a balance.

Similarly, Hypothesis 4 may be stated as follows:

H₄: There will be significant differences in the amount of revolving debt among those who choose to revolve based on credit card origin, all else equal.

Specifically, individuals holding cards from a bank source will carry a lower balance when compared with those holding cards from a campus source, direct mail, or a retail outlet.

Gender

The literature provides strong evidence to support gender differences in terms of credit card possession, usage, and understanding. In terms of possession rates, female students are more likely than male students to hold a credit card, though there is some disagreement as to differences in overall balance behavior (Armstrong & Craven, 1993; Lawrence, Christofferson, Nester, Moser, Tucker, and Lyons, 2003). Armstrong and Craven (1993) note lower debt levels among females, but more recent research suggests that females hold more debt than male students (Micomonaco, 2003). Further, data on financially at-risk students suggests that females are more likely to be delinquent in paying off their credit card balance when compared with males by a factor of 2.7 (Lyons, 2004). Based on the most recent findings, hypothesis 5 may be stated as follows:

H₅: All else equal, Females will be more likely than males to revolve a balance.

Similarly, Hypothesis 6 may be stated as follows:

H₆: Among revolvers, females will be likely to revolve larger balances in general when compared with males, other factors being equal.

Race/Ethnicity

While previous evidence suggests that African-American students and other non-caucasian students are less likely than non-Hispanic white students to hold a credit card, being a racial minority has been strongly associated with being financially at-risk. Lyons (2004) notes that being African-American significantly increases a student's probability of holding \$1000 or more in credit card debt by 16.4 percentage points. Other research has noted that there is greater probability of receiving a delinquency notice among African-American and Hispanic students (Allen & Jover, 1997). Overall, being a member of a racial minority group has been associated with less responsible credit card behaviors (Munro & Hirt, 1998). Based on these findings, Hypotheses 7 and 8 may be stated as follows:

H₇: Likelihood of revolving will be lower for white individuals as compared with other racial categories, other factors being equal.

H₈: Among revolvers, white students will carry lower log balances than students from the racial category of other, all else being equal.

Year in School

Based on the available literature, there is strong evidence of significant class-rank effects among the college student population. While Nellie Mae (2005) presents credit card debt statistics for college students at a single point in time, a clear class-rank trend is apparent. These data clearly indicate an increasing incidence of credit card ownership, as well as growing debt levels as students progress through the college system. Only about 42 percent of freshmen are noted as holding credit cards, with an average debt of \$1,585.00 among this particular sub-group. In contrast, roughly 72 percent of

sophomores are noted as owning cards, whereas 91 percent of seniors have one. Among seniors, the average debt level is nearly double that of freshmen at \$2,864.00. Research indicates a general age effect in terms of the probability of holding a balance and the size of the balance held (Reynolds, Hogarth, & Taylor, 2006).

In this study, results of an initial correlation analysis of the relevant independent variables suggested that age and class rank were strongly related (.77). Given this strong correlation, class rank was chosen for the present analysis. Since the present study is focused primarily on traditional age college students, the sample was restricted to those under the age of thirty, thus limiting the amount of variation in age among the sample. Hypothesis 9 may be stated as follows:

H₉: The probability of revolving a balance will increase as students progress through the college education system from freshmen to graduate students, other factors being equal.

Similarly, Hypothesis 10 may be stated as follows:

H₁₀: Greater balances will be noted among revolvers as students advance in class rank, all else equal.

Parent's Income and Education

Measurement of available resources of college students can be particularly difficult since many students do not engage in market work while attending classes (35% of the present sample), or choose to work in the market only part-time. In fact, the inability to engage in full-time market work is often noted as one of the primary opportunity costs of choosing to obtain a college education.

Previous analyses have used parent's income as an indirect measure of student lifestyles and available resources. Priyambodo (2005) notes that roughly 14 percent of college students come from households with an annual family income less than \$50,000. These students are noted as being more likely to develop serious credit card debt as compared with their peers (Priyambodo, 2005). At the present time, it is unclear as to how parental income influences credit card use, though it is possible that it is an indicator for how well informed students might be with regard to financial markets. With that in mind, Hypothesis 11 is stated as follows:

H₁₁: Likelihood of revolving a balance will decrease as parent's income increases, other factors being held constant.

Similarly, Hypothesis 12 may be stated as follows:

H₁₂: The size of the log balance revolved will be inversely related to parental income, all else being equal.

Closely related to the issue of parental income is that of parental education. Parental education has received less attention in the literature, but it may serve as an indicator for how much emphasis parents place on the development of financial knowledge among their children. Although it was expected that there might be a high degree of correlation between these variables, results from the initial correlation analysis (.24) suggested that this was not a problem. Hypothesis 13 may be stated as follows:

H₁₃: As parental education increases, likelihood of revolving a balance will decrease, all other factors held constant.

Similarly, Hypothesis 14 may be stated as follows:

H₁₄: Among revolvers, greater parental education will be associated with lower log balances, all else being equal.

Attitudinal Measures

Attitudes toward credit have been associated with credit card behavior in a number of studies. As noted in the review of literature, individuals with more positive attitudes toward credit are noted as being more likely to carry an outstanding balance (Canner & Cynrak, 1986; Godwin, 1997; Chien & DeVaney, 2001; Kim & DeVaney, 2001). In terms of credit card possession, Yang, James, and Lester (2005) suggest that affective and behavioral attitude scores are the strongest predictors of the number of credit cards held by an individual. For the present analysis, only one specific attitude, power, was analyzed. Factor analysis using the present sample suggested that there were at least four potential attitudinal factors at work. However, three of the factors were weak, with a majority of the statements loading most strongly on the first factor (power). The development of the money attitude measure for the present analysis and results of the factor analysis are explained in more detail in Chapter 4. According to Yamauchi and Templer (1982), the power measure indicates the extent to which individuals view money as a tool to influence or impress others. Roberts and Jones (2001) note a strong relationship between this attitude and compulsive buying. In considering the power measure, credit cards may serve as a means by which individuals might provide false signals of wealth by engaging in conspicuous consumption. Individuals might use credit to purchase items that would otherwise be unaffordable given their real income and wealth.

H₁₅: Individuals scoring high on the power measure are less likely to view money as a source of influence over others, and are thus less likely to carry a balance, all other factors being held constant.

Hypothesis 16 may be stated as follows:

H₁₆: Among those who do carry a balance, higher power scores will be associated with lower log balances, *ceteris paribus*.

APR

There is evidence that knowledge of the APR associated with one's own credit card is an overall indicator of knowledge of the costs of using that card. Early research on this issue assumed that individuals who used credit responsibly would be the most likely to know their own card's APR, but the evidence suggests the opposite. Mattson et al. (2004) noted that individuals who could report their APR were more likely to carry a revolving balance. This finding may indicate that convenience users are less concerned with the APR associated with their cards because, by paying off the card at the end of each billing cycle, they avoid paying high rates of interest. The response rate for the APR question was quite low for the present sample, limiting the overall usefulness of the variable. In order to maintain a reasonable sample size, individuals were initially coded as reporting their highest APR or not. Unfortunately, this modification did not prove useful and results were difficult to interpret. Consequently, the APR measure was dropped from the present analysis.

Course in Personal Finance

Previous exposure to a course in personal financial planning should theoretically improve an individual's understanding of financial concepts and principles. Lyons (2003)

notes that individuals who have taken a course in personal finance are significantly less likely to be financially at-risk as compared with those students who have not had a course in personal finance. Further, evidence suggests that not having taken a course in personal finance is associated with a greater likelihood of carrying four or more credit cards (Hayhoe et al., 1999). Hypothesis 17 may be stated as follows:

H₁₇: Other factors being constant, greater previous experience with personal financial planning material will be associated with a lower probability of carrying a credit card balance.

Hypothesis 18 may be stated as follows:

H₁₈: Individuals who have had at least one course in personal finance will carry lower log balances, *ceteris paribus*.

Major

Individuals were classified as business majors or not. This distinction was included based on the general findings that suggest business majors are more knowledgeable than the general student population regarding personal finance (Chen & Volpe, 1998; 2002). Certainly, if business majors are better informed about matters of personal finance, they might exhibit different financial behaviors. But, it is difficult to state how business majors might use credit cards as compared with other students since business majors can expect relatively high incomes after graduation. Thus, they may use credit cards as a rational means of borrowing. As the present analysis controls for expected income, Hypothesis 19 may be stated as follows:

H₁₉: All else equal, business majors will be less likely than non-business majors to carry a revolving balance.

Hypothesis 20 is similar, and may be stated as follows:

H₂₀: Among students who do revolve a balance, being a business major will be associated with a lower log balance overall, other factors being held constant.

Financial Aid

Financial aid is provided to students in a number of forms, and offers the distinct advantage of allowing students to delay debt repayment of until after graduation and to repay at favorable rates. Roughly 66 percent of the sample in this study receives some form of financial aid. Previous research suggests that those individuals receiving financial aid are more likely to be financially at-risk, and to engage in less responsible credit card behaviors. Munro and Hirt (1998) note that responsible credit card usage is associated with not receiving financial aid, while Hayhoe et al. (1999) found that individuals making use of federal student loans were more likely to carry four or more credit cards. Further, the receipt of financial aid has been associated with holding \$1000 or more in credit card debt, maxing-out one's credit card, and not paying the balance in full (Lyons, 2004).

Given the available evidence, Hypotheses 21 and 22 may be stated as follows:

H₂₁: Individuals receiving financial aid will be more likely to carry a revolving balance, all other factors being equal.

H₂₂: The reception of financial aid will be associated with a higher log balance among revolvers, all else constant.

To further enhance the financial aid variable, sample respondents were asked whether or not they ever used credit cards to pay for school items because financial aid was not sufficient (See Question 6 in Appendix B). This should provide further insight into the question of how effective current financial aid programs are in providing

financial assistance to students. A positive response to this question suggests a greater probability of students incurring larger expenses than they normally might, and

Hypothesis 23 and 24 may be stated as follows:

H₂₃: Individuals who use credit cards to purchase school items because financial aid is not enough to cover the costs will be more likely to carry a revolving balance, holding all other factors constant.

H₂₄: Among revolvers, a positive response to survey question six will be associated with a greater log balance, *ceteris paribus*.

Other Debt

Previous studies found a positive relationship between credit card debt and the possession of other forms of debt (Mattson et al., 2004). In a measure of at-risk behaviors, Lyons (2004) notes that college students who hold other forms of debt are more likely to hold \$1000 or more in credit card debt. Hypothesis 25 may be stated as follows:

H₂₅: Individuals holding some other debt will be more likely to revolve a balance, all other factors being held constant.

Similarly, Hypothesis 26 may be stated as follows:

H₂₆: Other factors held constant, the presence of other forms of debt besides credit card debt and student loans will be associated with larger log balances among revolvers.

Financial Status

Whether or not individuals are financially independent from their parents (no longer claimed as dependents for tax purposes) may have influence whether or not they

carry a revolving balance. According to Lyons (2004), being financially independent is strongly associated with being financially at-risk. Specifically, financially independent students are more likely to be delinquent, to carry a card that is maxed-out, and to not pay their balance in full (Lyons, 2004). Intuitively, these findings make sense, as financially independent students do not the emergency income that parents may provide and may be forced to seek alternatives in the market. Based on the previous research, Hypotheses 27 and 28 may be stated as follows:

H₂₇: Individuals that are financially independent will be more likely to revolve a balance as compared with college students who are not financially independent, all other factors held constant.

H₂₈: Among revolvers, balances will be larger among students who are financially independent, all else equal.

It should be noted that individuals who file taxes independently may still receive financial assistance from their parents. For this reason, individuals were placed in one of two categories based on who pays the credit card bills: 1) student indicates he or she pays their own credit card bills, or 2) student indicates his or her parents paid his or her credit card bills. Similar to the previous hypotheses, Hypotheses 29 and 30 may be stated as follows:

H₂₉: Students who report paying their own credit card bills will be more likely to carry a revolving balance, all else equal.

H₃₀: Balance revolvers who report paying their own credit card bills will display larger log balance relative to those who receive parental assistance, controlling for all other factors.

Expected Income

Although attending college is expected to increase one's potential earnings over that of a high school graduate, students may have significantly different expectations regarding their future income path based on their major or area of study. Based on life-cycle theory, individuals seek to attain a smooth pattern of consumption over their lifetime. College students are in a unique position of having very low current incomes, on average, coupled with the expectation of dramatically increased incomes in the near future. Individuals expecting a particularly steep earnings path after college may find it rational to borrow, even at high interest rates, so that they may enjoy a higher level of living while attending college. Based on the life-cycle theory of income consumption, Hypothesis 31 may be stated as follows:

H₃₁: Individuals expecting a relatively high income after graduation from college will be more likely to carry a balance, all other factors being held constant.

Similarly, Hypothesis 32 may be stated as follows:

H₃₂: Among revolvers, individuals expecting relatively higher incomes after graduation will carry larger log balances, *ceteris paribus*.

Marital Status

While a large majority (92%) of the students in the present sample is single, some evidence from previous studies suggests that there are differences in credit card behavior based on marital status. Specifically, being married is associated with an increased probability of holding \$1000 or more in credit card debt (Lyons, 2004). These findings are further supported by Jones' (2005) research, as higher levels of debt are noted among married students in general. This makes sense from the standpoint that married students

are more likely to have a family to support, or at the very least, one other person sharing the cards, resulting in higher average balances. What is unclear from the available literature is the likelihood of married students using credit cards to facilitate this greater debt accumulation. Given the evidence, Hypothesis 33 may be stated as follows:

H₃₃: There will be no significant differences in the probability of revolving a balance based on marital status, all else equal.

Conversely, Hypothesis 34 may be stated as follows:

H₃₄: Among revolvers, married students will display larger log balances than students who are not married, other factors being equal.

Employment

Employment status has not received much attention in analyzing the credit card behavior of college students, though some assumptions may be made regarding this variable based on the theoretical framework. Primarily, students who are employed while attending college have the advantage of receiving additional income. Although our analysis does not allow us to draw any conclusions about the directional relationship, it is fair to assume that employed students might be better able to make the regularly scheduled payments required by credit card issuers. Based on the theoretical framework, Hypotheses 35 and 36 may be stated as follows:

H₃₅: Employed students will be less likely to revolve a balance than those who are unemployed, other factors being equal.

H₃₆: Among those who do carry a revolving balance, employment status and balance size will be inversely related, all other factors being equal.

Time Preference

Previous analyses of credit card usage have ignored the potential role of time preference as a variable of interest. For the present analysis, a composite measure was designed to identify individuals as being relatively more present or future oriented. Based on the theory of time preference, individuals who are more present oriented (higher composite scores) are more likely to engage in behaviors that enhance current consumption at the cost of future consumption. Thus, Hypotheses 37 and 38 may be stated as follows:

H₃₇: Individuals who are more present oriented will be more likely to carry a revolving balance, *ceteris paribus*.

H₃₈: Among revolvers, balance level should increase as one's composite time preference score increases (i.e. as individuals become more present oriented).

Table 3.1: Hypothesized Directions of the Effects of Selected Variables on the Balance Decision

VARIABLE	REVOLVE	AMOUNT REVOLVED
Financial Knowledge	(-)	(-)
Card Origin		
Bank	(-)	(-)
Parent	?	?
Campus	(+)	(+)
Direct Mail	(+)	(+)
Retail	(+)	(+)
Female	(+)	(+)
White	(-)	(-)
Class Rank	(+)	(+)
Parent's Income	(-)	(-)
Parent's Education	(-)	(-)
Attitudinal: Power	(-)	(-)
Course	(-)	(-)
Major (Business)	(-)	(-)
Financial Aid	(+)	(+)
Charge School Items	(+)	(+)
Other Debt	(+)	(+)
Independent	(+)	(+)
You Pay	(+)	(+)
Expected Income	(+)	(+)
Married	NS	(+)
Employed	(-)	(-)
Time Preference	(+)	(+)

Hypotheses, Secondary Analysis:

Personal financial knowledge is a key variable of interest for the present analysis, yet it is not entirely clear which factors contribute to its development. However, there have been a few studies conducted with the express purpose of measuring financial literacy among the college student population. Based on the previous literature, the following variables have been found to be related to personal financial knowledge and its development:

Gender

The prevailing evidence suggests that female students are less financially knowledgeable than their male counterparts. In a study of college seniors, females were noted as scoring significantly lower than males on a measure of personal financial knowledge (Markovich & DeVaney, 1997). Utilizing a comprehensive questionnaire dealing with numerous aspects of personal finance, Chen and Volpe (1998) found that female students provided correct answers about 50.77 percent of the time, whereas male students were correct 57.40 percent of the time. These results were confirmed in a later analysis by the same authors, and females were noted as demonstrating less enthusiasm for, lower confidence in, and less interest in the area personal finance (Chen & Volpe, 2002). Based on these data, Hypothesis 39 may be stated as follows:

H₃₉: All else equal, female respondents will have lower financial knowledge scores than males

Race/Ethnicity

Although some categorical differences exist depending on specific types of personal financial knowledge, Chen and Volpe (1998) note that African-American students tend to have the lowest scores, with white students earning the highest overall scores in general. In a later analysis by Hilgert and Hogarth (2002), White respondents were noted as being more knowledgeable in the area of personal finance than other racial groups. Hypothesis 40 may be stated as follows:

H₄₀: White respondents will have higher financial scores as compared with other races, other factors held constant.

Year in School

In their comprehensive analysis of college student financial knowledge, Chen and Volpe (1998) note significant class rank effects. In general, graduate students were found to be more knowledgeable than undergraduates. Among undergraduates, scores on a measure of personal financial knowledge were higher for those that had more years of college experience. Thus, Hypothesis 41 may be stated as follows:

H₄₁: All else being equal, personal financial knowledge will increase with class rank, with freshmen displaying the lowest scores and graduate students displaying the highest scores.

Parent's Income and Education

Previous analyses suggest that income and education have a strong influence on personal knowledge of credit (Kinsey & McAlister, 1981) and on personal financial knowledge in general (Hogarth & Hilgert, 2002). For the present analysis, the variable of income is less useful due to the large percentage of unemployed and part-time employed

students involved. Similarly, all the respondents in the present analysis are relatively similar in terms of their education level. Parent's income and education are included as proxies for the likelihood of students being made aware of personal financial issues.

Based on these assumptions, Hypothesis 42 and 43 may be stated as follows:

H₄₂: Higher parental income will be positively related to student financial knowledge scores, other factors being held constant.

H₄₃: Higher parental education will be positively related to student financial knowledge scores, other factors being held constant.

Major

In analyzing students by major, business majors are distinguished from all other majors based on evidence from Chen and Volpe (1998) which suggests that business majors are more knowledgeable in all areas of personal finance when compared with other majors. Thus, Hypothesis 44 may be stated as follows:

H₄₄: Business majors will have higher financial knowledge scores than other majors, all else being equal.

Number of Cards

Similarly, those consumers who have higher levels of personal financial knowledge are more likely to be aware of the costs associated with taking out a high number of unneeded credit cards, and might thus display greater selectivity when choosing cards. Specifically, such individuals are hypothesized to engage in greater amounts of search, and should be more likely to choose cards based on their characteristics (APR, annual fee) rather than convenience. Thus, Hypothesis 45 may be stated as follows:

H₄₅: Financial knowledge will be inversely related to the number of credit cards that an individual carries, all else being equal.

Credit Card Origin

Differences have been noted in terms of balance behavior based solely on how credit cards were obtained (Mattson et al., 2004). However, little is known as to why such outcomes might occur. Differences in credit card use behavior may be due to differences in how they are marketed. It may be that certain methods of credit card attainment provide consumers with relatively more information. While direct mail cards are required to state specific features such as the APR and other specifics, the contracts may be confusing and difficult to process for many individuals. Obtaining a card from a bank or parent may provide individuals with the opportunity for general questions to be addressed, and such information may result in more responsible credit card use. Thus, Hypothesis 46 may be stated as follows:

H₄₆: Consumers who possess cards from a parent or bank source will generally display higher knowledge scores when compared with the possession of other card types, all else being equal.

Course in Personal Finance

Individuals who have taken a course in personal finance should be familiar with the types of questions that make-up the measure of personal financial knowledge that was utilized in the present analysis. This general familiarity should theoretically improve individuals' scores. Thus, Hypothesis 47 may be stated as follows:

H₄₇: Individuals who have had at least one course in personal finance will have higher scores on the measure of personal financial knowledge, *ceteris paribus*.

Credit Card Use

Individuals were differentiated based on their reported credit card use behavior. Potentially, individuals who engage in more responsible credit card use behaviors may have a better understanding of financial matters in general. Individuals who understand the full consequences of irresponsible credit card use behavior are more likely to engage in responsible financial behaviors such as making regular payments in excess of the monthly minimums. Hypothesis 48 may be stated as follows:

H48: Individuals who report engaging in more responsible credit card behaviors will display higher financial knowledge scores relative to individuals who report less responsible credit card behaviors, all other factors being held constant.

Other variables

For the present analysis, a number of other variables were included as controls in the measurement of the measurement of financial knowledge. Among these variables were financial status (financially independent or not), financial aid, credit attitude (power), marital status, employment status, and the presence of other debt. A summary of the hypothesized effects is presented in Table 3.2.

Table 3.2: Hypothesized Directions of the Effects of Selected Variables on the Personal Financial Knowledge

VARIABLE	EFFECT
Female	(-)
White	(+)
Year in School	(+)
Parent's Income	(+)
Parent's Education	(+)
Business Major	(+)
Course in Personal Finance	(+)
Number of Credit Cards	(-)
Origin of Card	
Bank	(+)
Parent	(+)
Direct Mail	(-)
Campus	(-)
Retail	(-)
Other	(-)
Credit Card Use	(+)

Chapter 4

Methodology and Descriptive Statistics:

This chapter presents the relevant descriptive statistics for the data used in the present analysis. First, a summary of the data is presented, along with a brief discussion of how the data were collected. Second, definitions and measures of the various dependent and independent variables are explained. Finally, the relevant descriptive statistics are presented, along with a detailed discussion of the study's methodology.

The Data:

The data used in the present analysis are from an independently generated survey of college students at a major Midwestern university. All currently enrolled students at the university were invited to participate in the survey via e-mail (see Appendix A for a copy of the introductory and two follow-up e-mails). Data were collected in the one-month period between January 22, 2007 and February 22, 2007. Over this period, three separate e-mail invitations were sent to the entire student body. To induce participation in the survey, students were given the option to enter a drawing for a chance to win one of three \$150 gift certificates to a nearby mall. Between January 22 and February 22, 6520 submitted surveys were received, representing a response rate of roughly 24% (based on an approximate student body of 27,000).

The survey consisted of 83 questions dealing with a variety of personal and financial characteristics (see Appendix B for a full copy of the web-based survey). The

present survey is a continuation of a similar survey that was conducted at the same university in 2004, though some modifications were made based on the goals of the present research. Specifically, a series of six questions designed to assess personal financial knowledge were added to this version of the survey. Aside from collecting data dealing with general personal financial knowledge, the survey was designed to gather data on credit card use and attainment, general demographic characteristics, consumer attitudes toward credit, online spending habits, labor force participation, and time preference. At the present time, there is no available nationally representative data set that contains all of the variables relevant to the present analysis.

All of the relevant data were collected and compiled via the use of Survey Monkey (www.surveymonkey.com), an online survey site, and the mass e-mail system at the University of Missouri-Columbia. Once collected, the online data were analyzed using the Statistical Analysis Software (SAS) computer program. Response rates varied for the key variables of interest, thus reducing the size of the sample used for the present analysis.

Definition of Variables:

The theoretical model (Chapter 3) and previous research guided selection of variables for the empirical analyses. The empirical model may be stated as:

$$D_c: f(R_i, A_i, K_i, T_i, Z_i)$$

Where D_c = Demand for credit

R = The price or cost of credit, defined as the interest rate charged on outstanding balances.

A = Market alternatives to credit cards for borrowing. This variable serves as a proxy for substitutes.

K = The knowledge component.

T = Vector of tastes and attitudes towards credit and money in general

Z = Demographic component

The primary dependent variable for analysis is the level of revolving debt, or the amount of one's monthly credit card balance that is carried over, in log form. The explanatory variables are the respondent's year in school, financial knowledge, gender, race, financial status (independent or not), who makes payments on the cards, expected income, source of cards, financial aid, whether cards are used to pay for school items when financial aid does not meet students' needs, parent's education, parent's income, marital status, money attitude measures, course experience, major, employment status, other debt, and time preference.

A secondary analysis is conducted in which a student's personal financial knowledge score (0-6) serves as the dependent variable. For the second analysis, respondent's year in school, gender, race, financial status (independent or not), source of cards, number of credit cards, financial aid, parent's education, parent's income, marital status, money attitude measures, course experience, major, employment status, other debt, time preference, and credit card use are the relevant independent variables of interest.

Dependent Variable, First Analysis:

The purpose of the present study is to better understand the potential relationship between personal financial knowledge and reported credit card behavior. The dependent variable is the total reported balance on all credit cards after the last monthly payment was made, with values ranging from zero to several thousand. Table 4.1 presents the distribution of credit card balances for the entire sample of card holders. Roughly thirty eight percent of those holding at least one credit card carried a revolving balance. This variable indicates the credit card debt burden faced by the household. Data are also collected regarding credit card usage, measured as the average total monthly charge on all credit cards.

Table 4.1: Distribution of Credit Card Balances for the Entire Sample of Credit Card Holders (N = 2563)

Distribution of Credit Card Balances	Percentage
\$0	62.11%
\$1-99	2.26%
\$100-499	9.79%
\$500-999	6.52%
\$1,000-1,999	6.40%
\$2,000-2,999	3.63%
\$3,000-7,000	6.63%
>\$7,000	2.65%

Dependent Variable, Second Analysis

Some previous analyses have used education level or a measure of specific financial knowledge when addressing a given consumer's level of financial awareness or understanding. In other cases, financial knowledge was analyzed through a more extensive questionnaire process that utilized a series of hypothetical situations from

which the respondent must choose the best answer. The present analysis develops a proxy for personal financial knowledge that consists of six key questions (See Table 4.2.), each dealing with a different element of personal finance. This is an experimental measure.

Available literature suggests that there may be an association between observed financial behavior and actual financial knowledge.

Table 4.2: Personal Financial Knowledge Questions

Question	Potential Responses (Correct Response in Bold)
Which of the following credit card users is likely to pay the GREATEST dollar amount in finance charges per year, if they all charge the same amount per year on their cards?***	<ul style="list-style-type: none"> a. Someone who always pays off their credit card bill in full shortly after it is received (%) b. Someone who only pays the minimum amount each month (%)* c. Someone who pays at least the minimum amount each month, and more when they have more money (%) d. Someone who generally pays their card of in full, but occasionally will pay the minimum when they are short on cash (%) e. Don't know (%)
Which of the following types of investment would best protect the purchasing power of a family's savings in the event of a sudden increase in inflation?***	<ul style="list-style-type: none"> a. A twenty-five year corporate bond b. A house financed with a fixed-rate mortgage c. A 10-year bond issued by a corporation d. A certificate of deposit at a bank e. Don't know
Which of the following statements best describes your right to check your credit history for accuracy?***	<ul style="list-style-type: none"> a. All credit records are the property of the U.S. Government and access is only available to the FBI and Lenders b. You can only check your credit report for free if you are turned down for credit based on a credit report c. Your credit report can be checked once a year for free d. You cannot see your credit report e. Don't know
Which of the following loans is likely to carry the highest interest rate?	<ul style="list-style-type: none"> a. A car loan b. A home equity loan c. A credit card loan d. A student loan e. Don't know

Table 4.2: Personal Financial Knowledge Questions Continued

Question	Potential Responses (Correct Response in Bold)
Which of the following is TRUE about the annual percentage rate (APR)? [†]	<ul style="list-style-type: none"> a. APR is expressed as a percentage on a semi-annual basis b. APR does not take into account all loan fees c. APR is not an accurate measure of the interest paid over the life of the loan d. APR should be used to compare loans e. Don't know
A high-risk and high-return investment strategy would be most suitable for: [†]	<ul style="list-style-type: none"> a. An elderly retired couple living on a fixed income b. A middle-aged couple needing funds for their children's education in two years c. A young married couple without children d. All of the above because they all need high returns e. Don't know

* Correct answers indicted in bold face type.

** Indicates a question used in the 2006 Jump\$tart questionnaire.

[†] Indicates a question modified from Chen and Volpe (1998).

Independent Variables:

Among the chosen independent variables, financial knowledge, power, time preference, and card use were included as scaled, categorical variables, with all other variables included as dichotomous variables. Brief variable definitions as well as coding methods are detailed in Table 4.3, and more extensive explanation of each of the variables is explained in the following section.

Table 4.3: Variable Definitions

Variable	How Coded
Financial Knowledge	Categorical variable on a scale ranging from 0-6
Sociodemographic Variables	
Sex	= 1 if female, 0 otherwise
Race	= 1 if white, 0 otherwise
Freshman	= 1 if freshman, 0 otherwise
Sophomore	= 1 if sophomore, 0 otherwise

Table 4.3: Variable Definitions Continued

Variable	How Coded
Junior	= 1 if junior, 0 otherwise
Senior	= 1 if senior, 0 otherwise
Graduate	= 1 if graduate student, 0 otherwise
Independent	= 1 if financially independent, 0 otherwise
Who Pays	= 1 if student pays credit card bill, 0 otherwise
Low Expected Income	= 1 if < \$30,000, 0 otherwise
Middle Expected Income	= 1 if > \$29,999 and < \$60,000, 0 otherwise
High Expected Income	= 1 if > \$59,999
Financial Aid	= 1 if Financial Aid received, 0 otherwise
Charge School Items	=1 if student charges school items when financial aid is not sufficient, 0 otherwise
Employment	= 1 if employed, 0 otherwise
Marital Status	= 1 if married, 0 otherwise
Other Debt	= 1 if other debts exist, 0 otherwise
Course in Personal Finance	= 1 if they have had a course, 0 otherwise
Business Major	= 1 if business major, 0 otherwise
Less than High School	= 1 if parents education is less than high school, 0 otherwise
High School	= 1 if parents education is high school, 0 otherwise
Some College	= 1 if parents education is some college, 0 otherwise
College	= 1 if parents education is college or more, 0 otherwise
Low Parent's Income	= 1 if parents income < \$50,000, 0 otherwise
Middle Parent's Income	= 1 if parents income > \$49,999 and < \$100,000, 0 otherwise
High Parent's Income	= 1 if parents income > \$99,999, 0 otherwise
Origin of Card	
Bank	= 1 if bank card, 0 otherwise
On-Campus	= 1 if campus source, 0 otherwise
Parent	= 1 if from parent, 0 otherwise
Mail	= 1 if direct mail, 0 otherwise
Retail/Store	= 1 if store card, 0 otherwise
Other	= 1 if other source, 0 otherwise
Attitudinal Variables	
Power	Categorical on a scale of 15-65
Other Variables of Interest	
Time Preference	Categorical
Credit Card Use	Categorical on a scale of 15-55

Personal Financial Knowledge:

Personal financial knowledge was measured as a categorical variable with scores ranging from 0 to 6. Respondents' scores were based on the number of correct responses provided on the six personal financial knowledge questions that were included in the survey (See Table 4.2.).

APR:

Introduced in 1968 under the Truth in Lending Act (TILA), APR is the most useful measure of the actual cost of credit to a given consumer over the life of a loan. For this reason, APR is used to proxy the total cost of credit. Evidence suggests that consumer awareness of APR has gradually increased since its introduction (Lee & Hogarth, 1999; Durkin, 2000; Hogarth & Hilgert, 2002). Despite evidence of more widespread awareness of APR and its importance, response rates continue to be quite low in general. In the present analysis, only 38 percent of respondents reported knowing their highest current APR. Due to the poor response rate on this particular variable, APR was not included in the present analysis. In initial trials of the analysis APR was coded as a dichotomous variable, 0 indicating that APR was not reported at all and 1 indicating that APR was reported. The variable was dropped in the final analysis due to the fact that it did not provide any useful information in terms of the decisions to revolve and how much to revolve.

Year in School:

Respondents were categorized by current year in school, ranging from freshmen to graduate and professional students. Professional students are categorized as those enrolled in law, medical, veterinary, or business programs at the time of the survey. Due

to the generally low response rates from the professional student categories, professional students and graduate students were combined as one category for the present analysis. The present analysis is concerned with how typical age college students utilize debt instruments, thus the sample was restricted to those individuals under the age of 30. Given this restriction, year in school was chosen as a variable for analysis rather than age.

Gender:

Respondents' gender was included as a dichotomous variable, with one indicating female and zero indicating male.

Race:

Race was included as a dichotomous variable in the present study, with respondents being categorized as white, coded as one, or non-white, coded as zero. Since the majority of respondents were white, minority respondents were treated as one group.

Financial Status:

Individuals were also classified as financially independent from their parents or not. For the present survey, students were considered to be financially independent if their parents did not claim them on their tax return. Financially independent students were coded as one; financially dependent students were coded as zero. Further, individual income data were collected from those individuals claiming to be financially independent.

Who Pays:

Individuals were further categorized based on who reportedly pays the credit card bills. Students who report paying their own credit card bills (or who reported having a

spouse pay the bills) were coded as 1, whereas students receiving assistance from their parents were coded as 0.

Expected Income:

Respondents were categorized based on their expected level of future income after college. This information was coded categorically as shown in Table 4.3. It was theorized that such information should be useful in understanding borrowing/debt behavior. Those expecting a greater future income might perceive present debt as being more manageable.

Source of Cards:

Credit cards held by respondents were divided into categories based on method of attainment. For the present study, six key categories from which cards might be obtained were identified; bank, parents, direct mail, retail/store, campus source, or other. It is important to note that the above categories were not mutually exclusive in terms of the analysis, as an individual may carry a variety of different card types.

Financial Aid:

Financial aid was coded as a dichotomous variable, indicating whether or not an individual received any kind of student financial aid. Potential categories of aid included federal work-study, federal student loans, need-based grants, scholarships, tuition waivers, or any other type of assistance not included in the above list.

Charge School Items:

Those students receiving financial aid were further questioned as to whether they ever charged school items (such as tuition or books) on their credit cards because

financial aid was insufficient. Individuals that charged school items were coded as 1 and those that did not report charging school items were coded as 0.

Parent's Education:

Respondents were categorized based on the highest level of education achieved by a parent. Parents' education level was categorized as never completed high school, high school diploma or equivalent, some college, or college graduate or greater. This variable may serve as a potential proxy for students' knowledge, or may be involved in development of a student's time preference.

Parent's Income:

Individuals were divided into categories based on their parents' level of income, which may serve as a proxy for resource availability. For analysis, parent's income was divided into three categories, low, medium, and high. Income categories for parent's income are presented in Table 4.3.

Marital Status:

Marital status was included as a dichotomous variable, with married individuals being coded as one and single individuals being coded as zero.

Money Attitude Measures:

Previous research in the area of consumer attitudes suggests that a strong relationship exists between consumers' specific attitudes towards, and use of credit. The present study makes use of a modified version of the Money Attitude Scale (MAS) that was first introduced by Yamauchi and Templer (1983). Based on previous research by Roberts and Jones (2001), items dealing with the retention-time dimension were not included, as they were not considered relevant for the college student population. Initial

research by Yamauchi and Templer (1983) suggests at least four attitudinal categories in regards to money, and this result is supported by the present findings. While results of the current factor analysis suggest that there are four potential factors at work, three of the factors were weak (containing four items or less). Using the present sample, the majority of the statements loaded most strongly onto the first factor, which most closely resembles the power measure from Yamauchi and Templer (1983).

Given the results of the factor loadings, only the power measure was utilized for the present analysis. For the purpose of interpretation, lower scores on the power/prestige scale were associated with individuals more strongly viewing money as a source of power. Categories were developed through the use of factor analysis, and results of the analysis are displayed in Tables 4.4 – 4.6.

Table 4.4: Factor 1- Power/Prestige (Eigenvalue: 5.96)

Factor Loading	Item
.684	I must admit that I purchase things because I know they will impress others
.673	In all honesty, I own nice things in order to impress others
.664	I behave as if money were the ultimate symbol of success
.636	I seem to find that I show more respect to people with more money than I have
.633	Although I should judge the success of people by their deeds, I am more influenced by the amount of money they have
.625 [†]	I show worrisome behavior when it comes to money
.623*	When I buy something, I complain about the price I paid
.608	I use money to influence other people to do things for me
.602	People I know tell me that I place too much emphasis on the amount of money a person has as a sign of success
.577 [†]	I spend money to make myself feel better
.572*	I argue or complain about the cost of things that I buy
.562 [†]	I am bothered when I have to pass up a sale
.517 [†]	I show signs of nervousness when I don't have enough money
.492*	When I make a major purchase, I have a suspicion that I have been taken advantage of

* indicates factors that originally loaded as Distrust (Yamauchi & Templer, 1982)
 † indicates factors that originally loaded as Anxiety (Yamauchi & Templer, 1982)

Table 4.5: Factor 2- Distrust (Eigenvalue: 2.58)

Factor Loading	Item
.535	I hesitate to spend money, even on necessities
.521	After buying something, I wonder if I could have gotten the same for less elsewhere
.463	It bothers me when I discover I could have gotten something for less elsewhere
.454	I automatically say, “I can’t afford it” whether I can or not

Table 4.6: Factor 3- Anxiety (1.60)

Factor Loading	Item
.614	It’s hard for me to pass up a bargain

Course Experience:

Individuals were categorized based on whether or not they have had a course in personal finance. Individuals who have had at least one course in personal finance were coded as one, while those who have not were coded as zero. Previous research is mixed as to the expected influence of limited experience in the area of personal finance.

Major:

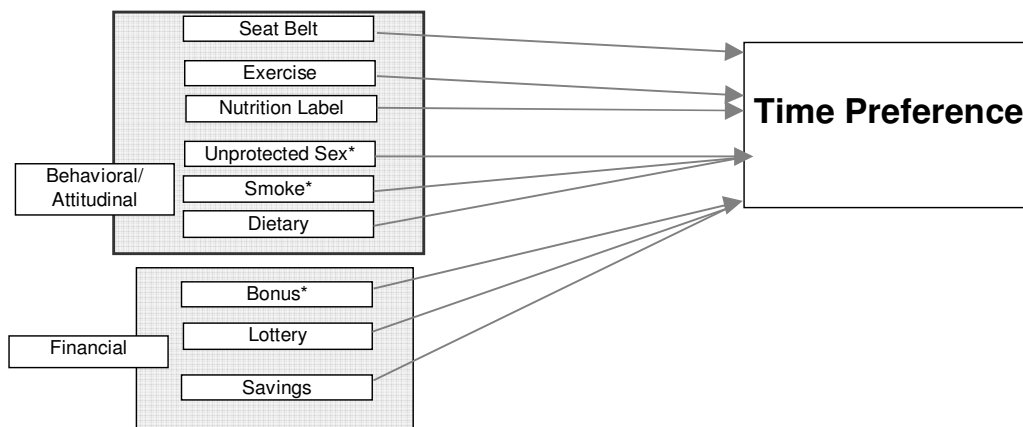
Based on previous research, individuals were categorized as being business majors, coded as one, or not, coded as zero. Prior research suggests that business majors may be more knowledgeable in terms of personal finance due to greater exposure to relevant concepts.

Time Preference:

A composite measure of time preference was included in an attempt to place the proper weight on consumer decisions. Figure 4.1 presents a conceptual model of the variables included in the measure’s development. Variables included were uni-

directionally coded such that higher scores correspond with higher rates of time preference (i.e. more present oriented as scores increase). After coding, the nine variables were standardized using z-scores with each variable having a mean value of 0 and a standard deviation of 1. The standardized variables are averaged to create a composite measure to proxy for the latent variable of time preference.

Figure 4.1: The Development of a Composite Measure of Time Preference



* indicates that the variable was reverse coded

Employment Status:

Employment status was coded as one if employed, zero otherwise.

Other Debt:

Individuals with other debts aside from student loans or credit card debt were coded as one. Those without other debts were coded as zero

Credit Card Use:

A composite measure was included based on individuals' reported payment behavior and credit card usage for a given pay cycle. Questions included in the development of the credit card use measure are presented in Table 4.7. For interpretation, higher scores on the credit card use scale indicate more financially responsible behavior.

Table 4.7: Credit Card Use Scale

Question	Strongly Agree	Strongly Disagree
My credit cards are usually at their maximum credit limit	1	5
I frequently use available credit on one credit card to make a payment on another credit card	1	5
I always pay off my credit cards at the end of each month*	5	1
I worry how I will pay off my credit card debt	1	5
I often make only the minimum payment on my credit cards	1	5
I am less concerned with the price of a product when I use a credit card	1	5
I am more impulsive when I shop with credit cards	1	5
I spend more when I use a credit card	1	5
I am seldom delinquent in making payments on my credit cards*	5	1
I rarely go over my available credit limit*	5	1
I seldom take cash advances on my credit cards*	5	1

* indicates that the variable was reverse coded

Descriptive Statistics:

As previously discussed, a total of 6520 responses were received from the online survey of student finances. This number was greatly reduced when cases with missing variables were omitted from analyses and when the sample was further restricted to

individuals aged thirty or under. Descriptive statistics for the entire usable sample are presented in Table 4.8. Roughly 66 percent of respondents indicated holding at least one credit card, with a reported average of about 1.4 cards per respondent among cardholders. It is important to note that the number of cards held was based on the number of cards that a respondent reportedly used as a credit card on a regular basis. These findings are generally consistent with that of other research, if not slightly lower. The available literature has suggested possession rates between 70-80 percent among the total college population (Nellie Mae, 2002, 2005; Lyons, 2004).

Table 4.8: Descriptive Statistics for the Entire Sample (N = 3884)

Variable	Frequency	Variable	Frequency
Own a Credit Card	65.99%	Financial Aid	66.15%
Carry a Balance	25.00%	Charge School Items*	23.29%
Course in Finance	28.73%	Independent	30.90%
Have Other Debt	18.00%	You Pay on Cards*	87.09%
Knowledge (# Correct)		Source of Card*	
0	4.97%	Parents	17.17%
1	9.71%	Direct Mail	23.89%
2	16.19%	Campus Source	4.81%
3	24.20%	Bank	26.08%
4	27.01%	Store/Retail	14.47%
5	16.66%	Other	7.93%
6	1.26%		
White	86.28%	Employed	64.01%
Female	65.83%	Business Major	17.82%
Year in School		Parent's Education	
Freshman	19.77%	Less than High School	0.70%
Sophomore	18.82%	High School	9.81%
Junior	18.87%	Some College	21.27%
Senior	20.96%	College or More	67.84%
Graduate [†]	21.58%		
Expected Income		Parent's Income	
Low	13.90%	Low	19.75%
Medium	59.32%	Medium	34.99%
High	21.81%	High	34.27%

Table 4.8: Descriptive Statistics for the Entire Sample Continued

Variable	Frequency	Variable	Frequency
Married	7.60%	Urbanization	
		Urban	12.62%
		Suburban	60.92%
		Rural	26.47%
Continuous Variables		Mean	St. Deviation
Average Monthly Spending		\$197.26	375.66
Amount Revolved		\$559.62	1990.88
Number of Cards Used (Max = 8)		0.92	1.01
Age (Max = 30)		21.29	2.73
Knowledge (Max = 6)		3.14	1.42
Credit Card Use (Min = 15; Max = 55)		42.64	7.69

* Indicates that N = 2563 due to the fact that these variables were only applicable to those individuals holding credit cards (1321 individuals did not report holding credit cards)

† Graduate student category consists of professional, medical, and law students.

As shown in Table 4.9, credit card possession can be examined on the basis of class rank, providing a general picture of possession rates among college students.

Table 4.9: Credit Card Possession and Balance Decision by Class Rank

Class Rank	Percentage Holding at least one Credit Card	Percentage Revolving a Balance
Freshmen	40.10%	8.46%
Sophomore	53.76%	17.24%
Junior	67.26%	26.06%
Senior	77.52%	35.87%
Graduate Student	88.11%	39.14%
Professional Student	77.14%	21.43%
Law Student	88.06%	29.85%
Medical Student	98.57%	21.43%

When all student respondents are considered, the average balance carried over was \$559.62. A similar survey was conducted at the University of Missouri starting in late September and ending in early October of 2004, and the data do not suggest the presence of any seasonal effects. In the fall 2004 semester, a sample of 4439 respondents

under the age of 29 reported an average balance of \$675.39 with a standard deviation of \$1,997. For the present sample, average monthly spending on all cards was \$197.26. This is somewhat misleading measure, however, since it included students who do not own credit cards. Still, it provides a picture of the average overall credit card debt for our sample as a whole. Twenty-five percent of the sample reported holding a revolving balance. These values are analyzed in more detail in Table 4.10, which differentiates those students who report holding credit cards from those who do not.

The mean age for respondents is around 21 years of age, including students from all class ranks as well as graduate and professional students. The majority of the sample consisted of white (86%) females (66%), with all other races making up about 14% of the sample. University statistics from 2004 suggest that about 10 percent of the student population were minorities, with international students accounting for another 5 percent. In terms of class rank, 19.77 percent of the sample respondents were freshmen, 18.82 percent were sophomores, 18.87 percent were juniors, 20.96 percent were seniors, and 21.58 percent were graduate students (this category included professional, medical, and law students. These demographics are generally descriptive of the student population as a whole, as roughly 76 percent of the students enrolled at the University of Missouri in 2004 were undergraduates compared with 24 percent enrolled as graduate or professional students.

Slightly more than a quarter (28.73%) of those sampled report having had at least one course in personal finance. Of those sampled, 17 percent were business majors. About 31 percent of the sample respondents reported being financially independent, while a majority (67%) received some form of financial aid.

How credit cards are obtained is a significant area of interest for the present study. Method of attainment was divided into five key categories, as previously discussed, with 17 percent of cards coming from students' parents, 24 percent from direct mail, 5 percent from some on-campus source, 26 percent from a bank, 14 percent from a retail/department store, and 8 percent coming from other potential sources (including gasoline cards).

In general, those surveyed note having relatively well-educated parents. Roughly 68 percent of parents had a baccalaureate degree or higher, whereas only 10.5 percent had a high school diploma or less. Among respondents, roughly 59 percent expected to earn an income between \$30,000 and \$59,999 after graduating from college, with 14 percent expecting to earn less than \$30,000. About 22 percent of respondents report expecting an income in excess of \$60,000.

About 7.6 percent of the sample respondents were married, with the rest being classified as single. A majority (61%) of respondents reported being from a suburban area, with only about 13 percent reporting being from an urban area and 26 percent from a rural area.

The descriptive statistics can be further broken down based on whether or not individual reported holding a credit card. As shown in Table 4.10, key differences existed between those who had credit cards and those who do not have credit cards.

Table 4.10: Descriptive Statistics for Credit Card Holders (N = 2563) versus Non-Card holders (N = 1321)

Variable	Credit Card Holders	Non-Credit Card Holders
Mean Age	21.92 (2.86)	20.06 (1.98)
Average Monthly Spending	\$298.93 (428.35)	--
Amount Revolved	\$848.05 (2400.54)	--
Number of Cards Used	1.40 (0.94)	--
Knowledge Score Mean	3.31 (1.38)	2.82 (1.46)
Credit Card Use	43.81 (7.76)	40.41 (7.04)
Knowledge (# Correct)		
0	3.47%	7.87%
1	8.58%	11.88%
2	14.16%	20.14%
3	24.00%	24.60%
4	29.22%	22.71%
5	19.20%	11.73%
6	1.37%	1.06%
White	86.03%	86.75%
Female	66.37%	64.80%
Year in School		
Freshman	12.02%	34.82%
Sophomore	15.33%	25.59%
Junior	19.24%	18.17%
Senior	24.62%	13.85%
Graduate	28.79%	7.57%
Carry a balance	37.89%	--
Course in Finance	28.79%	28.61%
Financial Aid (received)	69.06%	64.19%
Charge School Items	23.29%	--
Financially Independent	38.78%	15.59%
You Pay on Cards	87.09%	--
Other Debt	21.42%	11.36%
Parent's Education		
Less than High School	0.70%	0.68%
High School	9.87%	9.69%
Some College	22.24%	19.38%
College or More	66.91%	69.64%
Expected Income		
Low	13.19%	15.29%
Medium	59.62%	58.74%
High	23.14%	19.23%
Parent's Income		
Low	20.37%	18.55%
Medium	34.80%	35.35%
High	34.41%	33.99%

Table 4.10: Descriptive Statistics for Credit Card Holders (N = 2563) versus Non-Card holders (N = 1321) Continued

Variable	Credit Card Holders	Non-Credit Card Holders
Business Major	17.60%	18.24%
Employed	68.71%	54.88%
Married	10.57%	1.82%
Urbanization		
Urban	12.72%	12.41%
Suburban	59.54%	63.59%
Rural	27.74%	24.00%

Notably, sample respondents who reported holding at least one credit card were almost two years older than those who did not have at least one credit card, with an average age of 21.92 as compared with 20.06. This effect may be further analyzed by student’s class rank, as a larger percentage of cardholders were noted as being juniors, seniors, or graduate students when compared with non-cardholders. The non-cardholders were much more likely to be freshmen and sophomores.

Individuals who reported holding credit cards also had higher average scores on the financial knowledge measure. In terms of overall score out of six, a larger percentage of credit card holders fell within the 4 to 6 questions correct range (49.79%) as compared with those who do not have credit cards (35.50%). A larger percentage of those holding at least one credit card had some other type of debt as well. Further differences were noted based on financial independence, as 38.78 percent of those holding at least one credit card reported being financially independent as compared with 15.59 percent of those without cards. Similarly, a much higher percentage of cardholders reported being married (10.57%).

Research Design:

The present study employs a double-hurdle analysis technique in dealing with reported credit card spending behaviors (Cragg, 1971; Heckman, 1979; Reynolds, Hogarth, & Taylor, 2006). Due to the two-step nature of the credit card balance decision, the present analysis must be designed such that variations for each of the steps are clearly defined. The double-hurdle technique is necessary to clearly explain the determinants for both the decision to carry a revolving balance and the decision of how much to revolve. For the secondary analysis, Ordinary Least Squares (OLS) Regression is appropriate because the dependent variable, financial knowledge, is a scaled categorical variable.

The Double-Hurdle Model:

Studies of consumer credit card usage must use appropriate empirical models. One of the primary issues that can be problematic for researchers in analyzing credit card use stems from the fact that a large percentage of respondents do not carry a balance. As a result, a large proportion of the dependent variables are zero-value responses. These types of data may be difficult to analyze using conventional regression analysis.

The double-hurdle model is appropriate for the present analysis because there are two unique decisions that students with credit cards must make. First, students must decide whether or not to revolve a balance, which may be modeled as a dichotomous dependent variable. Second, the respondents that do choose to revolve a balance must further decide the extent to which they wish to revolve, which may be modeled as a continuous dependent variable. The double-hurdle method is unique in that it allows for the two decisions to be modeled sequentially and analyzed separately. As a result, signs

and significance levels may vary between the stages of analysis, which is not possible given a conventional regression analysis.

The present analysis used a double-hurdle specification technique similar to that utilized by Cragg (1971) and Heckman (1979). The double hurdle model was developed to improve upon the Tobit I model that is often used to analyze data when a substantial number of the observations report a zero value. The traditional Tobit I model is limited in its assumptions because it considers the influence of the independent variables of interest to be consistent in estimating both decisions, whether or not to revolve and how much to revolve. This restriction is likely to result in some degree of model misspecification in the present analysis. To correct for this potential error, a modified version of the Heckman two-step approach was used.

The Heckman specification was initially designed to analyze household consumption of goods. This specification recognizes that the decisions to consume a good and the actual degree of consumption might be independent from one another (Heckman, 1979). For the present study, the credit card debt decision is analyzed via a maximum likelihood estimation utilizing the QLIM command in SAS®. The standard Heckman selection model may be outlined as:

$$\text{Selection Equation: } Y_{1i} = X_{1i}\alpha + v_i \quad (4.1)$$

$$\text{Main Equation: } Y_{2i} = X_{2i}\gamma + u_i \quad (4.2)$$

Where Y_{1i} is a latent variable valued at 1 if individuals report having a credit card that they use on a regular basis, and 0 if not. Y_{2i} is the extent to which individuals revolve a balance and is observable only if individuals are coded as 1 in equation 4.1. The error terms from both models (v_i and u_i) were assumed to have a bivariate normal distribution.

The QLIM procedure in SAS® generates maximum likelihood estimates for the variables of interest. First, the model estimates the decision to carry a revolving balance as a yes-no decision with a probit model. If individuals do revolve a balance, those cases are further analyzed through the second step utilizing a maximum likelihood model. Thus, the two decisions are fully differentiated from one another.

Ordinary Least Squares (OLS) Regression

Multiple regression was used to analyze the variation in personal financial knowledge among the sample respondents. Multiple regression allows for a large degree of flexibility in terms of the chosen independent variables for analysis, and is robust in situations where the data are normally distributed. Using this technique, the present analysis first determines which of the independent variables of interest are significantly related to personal financial knowledge. Then, multiple regression accounts for the amount of variation in the dependent variable that is explained by the chosen independent variables.

Chapter 5

Results and Discussion:

In this chapter, the results of the double-hurdle analysis of credit card usage and the OLS regression analysis of financial knowledge are presented and discussed. Each hypothesis presented in Chapter 3 is assessed based on the findings.

Results for College Student Credit Card Use:

A double-hurdle model was used to analyze college student credit card usage behavior for the entire sample of credit card holders. As previously discussed, credit card use is best analyzed as a two-step process, the first step being whether to revolve or not and the second step being how much to revolve. Table 5.1 presents the results of the double-hurdle analysis. Results from the probit analysis are not easily interpreted directly. Marginal effects associated with each of the independent variables are presented in Table 5.2.

Personal financial knowledge was statistically significant in the second stage of the analysis, though not in the first stage. In determining whether or not to revolve a balance, it appears that personal financial knowledge did not have a statistically significant influence on the decision to revolve for the present sample. However, looking at those who chose to revolve, personal financial knowledge was positively related to the log balance an individual chose to carry. Thus, among revolvers, greater financial knowledge was associated with a greater overall log balance. Specifically, increases in

one's financial knowledge score by one point were associated with a roughly \$54.00 increase in one's balance.

Whether or not an individual had taken a course in personal finance was not found to be significant in either stage of the analysis. Significant class effects existed in both stages of the analysis. Compared with graduate students, juniors and seniors were noted as being more likely to revolve a balance. Specifically, seniors were 13 percent more likely and juniors were 8.5 percent more likely to revolve. However, no statistically significant differences existed for freshmen and sophomores. In the second stage of the analysis, the actual log balance revolved was found to decrease with lower class rank. No significant differences were found when graduate students were compared with seniors, freshmen, and sophomores. Juniors were found to carry lower log balances than graduate students. Further, business majors were found to be less likely to carry a revolving balance as compared with all other majors. Despite notable differences between business majors and others in the first stage, no significant differences were observed in the second stage with regard to individuals' major.

Parent's education appears to have a significant influence on whether or not individuals chose to revolve a balance, as the likelihood of revolving increased with decreasing parental education to some extent. Compared with individuals whose parents have a college education, individuals whose parents have a high school degree or only some college experience were more likely to carry a revolving balance by six percent and seven percent, respectively. No significant differences were observed between those whose parents had less than a high school education and those with a college degree or more. This is potentially due to the fact that only a small percentage of individuals (0.7%)

sampled had parents with less than a high school degree. Individuals whose parents held a high school diploma reported greater log balances as compared with respondents whose parents held a college degree or higher degree. Parental income was divided into three categories (low, medium, and high). No significant differences in log balance or in the probability of revolving were found among sample respondents based on this variable.

Those students categorized as being financially independent were more likely (5%) to revolve a balance as compared with those who were not financially independent. Among revolvers, financial independence was associated with a larger log balance. Individuals who reported paying their own credit card bills were 13% more likely to revolve, though no significant impact on the overall amount revolved was evident from the present data. Expected income was not significant in either stages of the analysis.

Whether or not an individual received financial aid was significantly related to their probability of revolving a balance, as well as to the extent to which individuals revolved. Specifically, those receiving financial aid were found to be about 5 percent more likely to carry a revolving balance as compared with individuals who did not receive any financial aid, and were observed to carry larger log balances. This variable was further tested by questioning individuals as to whether financial aid was sufficient in covering expenses related to one's education. Those claiming to use credit cards to charge school items because financial aid was insufficient to cover them were more likely to carry a revolving balance than those who did not report charging school items for that reason. Further, individuals charging school items reported carrying larger log balance relative to the rest of the sample. Similarly, the presence of other forms of debt, aside from student loans and credit card debt was positively related to whether or not one

carried a revolving balance, and had a similar influence on the log balance revolved. Those carrying other forms of debt were 11 percent more likely to carry a revolving balance.

Employment status was statistically significant in the first stage of the analysis, but not in the second. Specifically, employed individuals were 9 percent more likely to carry a revolving balance. No significant differences in the probability of revolving a balance were noted based on marital status, though married students carried larger log balances than non-married students, all other factors held constant.

In addition to the variables discussed thus far, a number of demographic variables played a significant role in the present analysis. Compared with male respondents, females were found to be more likely to revolve a balance, though real log balances among female revolvers were not significantly different from those displayed by male revolvers. As compared with all other races, white students were 14 percent less likely to carry a revolving balance. However, among revolvers, no significant differences are noted between white students and others in terms of the amount revolved.

The attitudinal measure used in the present analysis played a role in the decision of whether or not to carry a balance from month to month, and on the extent to which individuals revolve. Individuals scoring high on the power index were less likely to carry a revolving balance. Further, an inverse relationship was noted between individuals' power scores and the log balance revolved.

Students displayed some variation in willingness to carry a balance based on how their credit cards were obtained. Due to the unique nature of the credit card origin variable (the categories created were not mutually exclusive), no single category may

serve as an effective reference group for analysis. However, the present results allowed the relative influence of holding a specific card type or not on willingness to carry a balance to be assessed. Specifically, possession of a card obtained from a local bank source, campus source, direct mail solicitation, or a retail source was associated with a greater probability of revolving a balance. It should be noted that the magnitude of these effects varied significantly: direct mail cards were associated with an 11 percent increase in the likelihood of individuals carrying a revolving balance as compared with an 8 percent increase associated with bank cards, 7 percent with store cards, and 7 percent with campus cards. Conversely, holding a card obtained from a parent was inversely related to the likelihood of revolving a balance. In terms of the real log balance revolved, bank, campus, mail, retail, and other card types were all associated with larger log balance amounts, with the largest effect (.772) being associated with mail-based cards. No significant effects on log balanced revolved were noted based on the possession of credit cards obtained from a parent.

Table 5.1: Results from the Double –Hurdle Analysis, Credit Card balance as the dependent variable

Parameter	Stage 1: Probit Analysis (N = 2563)		Stage 2: Maximum Likelihood Analysis (N = 971)	
	Coefficient	St. Error	Coefficient	St. Error
Intercept	-0.467*	0.236	6.259***	0.473
Knowledge	0.006	0.022	0.097**	0.034
Female	0.171**	0.062	-0.041	0.099
White (vs. Other)	-0.425***	0.081	0.040	0.127
Year in School (Graduate Student Omitted)				
Freshman	0.115	0.116	-0.911***	0.195
Sophomore	0.131	0.102	-0.923***	0.160
Junior	0.263**	0.094	-0.408**	0.145
Senior	0.416***	0.085	-0.236	0.138
Financially Independent	0.295***	0.072	0.287**	0.112
You Pay on Cards	0.400***	0.108	-0.187	0.231
Expected Income (Middle Income Omitted)				
Low Expected Income	0.049	0.084	-0.012	0.123
High Expected Income	-0.072	0.068	0.020	0.105
Origin of Cards				
Bank	0.261***	0.068	0.377***	0.106
Campus	0.208*	0.107	0.551***	0.149
Parent	-0.162*	0.076	0.151	0.129
Direct Mail	0.341***	0.071	0.772***	0.113
Retail/Store	0.217**	0.067	0.247**	0.099
Other	0.089	0.091	0.436**	0.135
Financial Aid	0.168**	0.062	0.234*	0.104
Charge School Items	0.222***	0.065	0.212*	0.098
Parent's Education (College or More Omitted)				
Less than High School	0.551	0.338	-0.198	0.371
High School	0.191*	0.094	0.276*	0.138
Some College	0.221**	0.067	0.176	0.104
Attitudes				
Power	-0.021***	0.003	-0.019**	0.006
Married (vs. Single)	-0.022	0.096	0.444**	0.137
Course in Personal Finance	-0.062	0.062	-0.001	0.096
Business Major (vs. Others)	-0.151*	0.076	-0.170	0.121

Table 5.1: Results from the Double –Hurdle Analysis, Credit Card balance as the dependent variable Continued

Parameter	Coefficient	St. Error	Coefficient	St. Error
Parent’s Income (Middle Income Omitted)				
Low Income	-0.026	0.074	-0.064	0.105
High Income	0.014	0.064	0.114	0.102
Employed	0.281***	0.063	0.143	0.115
Other Debt	0.352***	0.067	0.373***	0.107
Time Preference Composite	-0.059	0.067	-0.086	0.096
Rho	0.143	0.192	--	--
Sigma	--	--	1.268***	0.037

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

Table 5.2: Marginal Effects for each of the Independent Variables on the Probability of Revolving a Balance (Probit)

Parameter	Marginal Effect
Knowledge	0.002
Female	0.055**
White (vs. Other)	-0.137***
Year in School (Graduate Student Omitted)	
Freshman	0.037
Sophomore	0.042
Junior	0.085**
Senior	0.134***
Financially Independent	0.052***
You Pay on Cards	0.129***
Expected Income (Middle Income Omitted)	
Low Expected Income	0.016
High Expected Income	-0.023
Origin of Cards	
Bank	0.084***
Campus	0.067*
Parent	-0.052*
Direct Mail	0.110***
Retail/Store	0.071**
Other	0.029
Financial Aid	0.054**
Charge School Items	0.071***

Table 5.2: Marginal Effects for each of the Independent Variables on the Probability of Revolving a Balance (Probit) Continued

Parameter	Marginal Effect
Parent's Education (College or More Omitted)	
Less than High School	0.177
High School	0.061*
Some College	0.071**
Attitudes	
Power	-0.007***
Married (vs. Single)	-0.007
Course in Personal Finance	-0.021
Business Major (vs. Others)	-0.049*
Parent's Income (Middle Income Omitted)	
Low Income	-0.008
High Income	0.004
Employed	0.090***
Other Debt	0.113***
Time Preference Composite	-0.019

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

Discussion of the Double Hurdle Analysis:

Results of the double-hurdle analysis indicate that the factors influencing each step in the sequential decision process differ. There are a few instances of sign changes and the significance of variables varies from one stage to the next. However, the overall model statistics suggest that the model is appropriate. A number of the variables analyzed did not have the effect expected given the previous literature and the theoretical model. Table 5.3 summarizes the relationships between the hypothesized effects and actual outcomes of the analyses.

Hypothesis one was not confirmed. Higher levels of financial knowledge were not significantly related to the decision to revolve a balance. Previous findings suggest that higher scores on measures of financial literacy should result in a greater likelihood of

individuals following recommended financial practices (Hogarth & Hilgert, 2002). Results among the general population suggest that increased financial knowledge is associated with improved credit use behavior (Hilgert, Hogarth, & Beverly, 2003). It is unclear as to why the present findings are not similar to the previous studies, but it may have to do with the different populations or the measure of personal financial knowledge. The present analysis introduced a new measure of personal financial knowledge and was limited to a select population, college students.

Although hypothesis two posited that more knowledgeable individuals would be likely to carry lower log balances, the opposite effect was noted. Among revolvers, level of balance revolved is, in fact, positively related to financial knowledge. This issue would be easier to resolve with longitudinal data as timing of action might allow a clear distinction to be made between cause and effect. The cross sectional nature of this study does not allow for any distinction to be made in regards to the direction of the relationship. Consequently, it is not clear whether more knowledgeable individuals rationally choose to revolve a greater balance due to some outside reason, or whether those individuals that have greater debt are more likely to seek out financial knowledge as a result. Combined with the results for hypothesis 1, the current measure of financial knowledge does appear to be somewhat useful in analyzing college students' use of debt.

The influence of source of card is difficult to disentangle. Since the categories were not mutually exclusive, it is not appropriate to use any one category as a reference group for analysis. However, notable differences in balance behavior were noted based solely on the type of card an individual holds. Holding credit cards received from the category of other does not appear to have any significant impact on the probability of

revolving a balance in the present analysis. Four of the other card types (bank, mail, store, and campus) were all associated with a greater probability of revolving a balance, with parental cards having an inverse effect on balance behavior. From this study, it is clear that there are differences in the relative magnitudes of the effects associated with each of the card types. As previously noted, mail-based cards (11%) had the largest marginal effect.

It was initially hypothesized (Hypothesis 3) that holding bank-type cards might result in more responsible credit card use behavior (i.e. not revolving a balance). This hypothesis was not supported by the present findings, though there was evidence that students using mail based cards were relatively more likely to revolve than those holding bank-type cards. Interestingly, individuals holding cards received from a parent were less likely to carry a revolving balance, even when controlling for who pays the credit card bill. This finding supports previous research by Mattson et al (2004). Based on these findings, it appears that it may not be a bad idea for parents to provide their children with a credit card. Such situations allow parents to take a more active role in their child's financial development.

For the second stage of the analysis, holding any of the six card types except for those received from parents was associated with higher log balances. However, mail-based cards appear to have the largest positive effect (.772) on log balance overall. Thus, there is little support for hypothesis four given the present findings. Whereas individuals using bank-type cards do appear to be relatively more responsible in their use behavior relative to mail based cards, the evidence concerning other types of cards is less strong. This finding was surprising given that cards received from retail stores or on-campus

solicitations have been associated with greater amounts of debt relative to bank cards in a number of previous analyses (Abend, 1991; Lyons, 2004; Mattson et al., 2004).

Hypotheses three and four were only partially supported in the present analysis, but the evidence supports the idea that credit card behavior may differ based solely on how a given card is obtained. Such findings have serious implications for how credit cards are marketed, and for the educational programs. Although many college campuses have adopted policies requiring that credit card marketers stay off of their campuses, evidence suggests that this action has done little to curb credit card attainment among college students. Credit cards are widely available via mail, on-line, and off campus locations. Education regarding credit card attainment might be more effective if specific effort is made to reach students who are more likely to obtain their cards from a direct mail source, as these types of cards were associated with the least responsible credit card use behavior. Unfortunately, without more details as to the extent of search involved in obtaining a given card, it is difficult to draw conclusions about the relationship between the amount of active involvement in credit card search and consequence credit card behavior on the part of cardholders.

As noted in the literature, females tend to be less knowledgeable about personal finance, and have often been noted as carrying more cards on average as compared with males. Hypothesis five was supported by the present findings, as females were noted as being more likely to revolve a balance. Hypothesis 6 was not supported by the present findings, as no significant differences were noted between males and females in terms of the actual log balance revolved. While females may be more likely to use credit cards as a debt

instrument, they do not appear to be more at-risk than male revolvers in terms of their credit card behavior.

Similar to the findings regarding gender differences, the hypothesized effects for race were only partially supported. Although white students were less likely to revolve than other students as hypothesized (Hypothesis 7), the expectation that white students would in turn carry lower log balances was not supported (Hypothesis 8). Among revolvers, no significant differences are noted between white students and those of other races in terms of the size of the log balance revolved. Thus, although there is evidence to suggest that white students are less likely to engage in certain risky credit card behaviors (i.e. revolving a balance), among revolvers, white students appear to be as at risk as any other racial group. This finding suggests there may be a need to customize educational programs when the focus is on participation as, for that decision, differences in risky behavior was associated with different racial groups.

Interestingly, juniors and seniors were more likely to revolve a balance as compared with graduate students. No differences were noted between graduate students and freshmen or sophomores in revolving a balance. Among revolvers, the pattern appears to function as hypothesized (Hypothesis 10), at least partially. Freshmen, sophomores, and juniors carried lower log balances as compared to graduate students, but no significant differences were noted when comparing graduate students with seniors. These results may indicate that graduate students are more likely to understand the consequences of carrying a revolving balance, and are thus less likely to do so. However, despite this greater understanding, many graduate students may face difficult financial situations due to the longer amount of time required for their education. Given a long

time before full-time labor market entry may force some graduate students to use credit cards to a greater extent, which may explain why they tend to display larger log balances when they do revolve.

Hypotheses 11 and 12 were not supported by the present results, as no significant effects on spending behavior were noted based on parental income in either stage of the analyses. Earlier research has suggested that students from lower income families run a much greater risk of developing credit card debt issues. However, in the present analysis neither low-income nor high-income families were significantly different from the reference group (middle-income households). This lack of consistency with past studies may be due to differences in sample characteristics or previous analyses may have failed to account for key variables that are included in the present analysis.

Hypothesis thirteen was supported in the present analysis, as having parents with lower education levels was associated with a greater likelihood of revolving a balance. Specifically, students whose parents held a high school diploma or had attended only some college were more likely than students whose parents held a college degree or more to revolve a balance. Among the sample of revolvers, having a parent with a high school diploma was associated with carrying a larger log balance as compared to those with a college degree or greater. These findings suggest that parental education does play a significant role in college student financial behavior. Individuals whose parents held less than a high school degree were not found to be significantly different from those whose parents held a college education, though it is possible that this result may be attributed to the fact that a very small percentage (less than 1%) of the sample reported having parents holding less than a high school degree. In retrospect, it would likely have been better to

categorize individuals as those whose parents hold a college degree or not. By combining the categories of some college, high school, and less than high school (for a total of 33 percent of the sample population), it is likely that a more robust result would have been obtained.

Both Hypotheses 15 and 16 were confirmed in the present analysis. As individuals' power scores increased, likelihood of carrying a balance decreased by a factor of -0.021. As expected, individuals who view money as a source of power over others (lower score) are more likely to carry a balance. Further, higher scores on the power measure were associated with lower overall log balances. While the present analysis was coded differently than the other analyses in terms of the direction of the power measure, the results were consistent with previous findings. Tokunaga (1993) found that individuals classified as heavy users of credit cards were more likely to view money as a source of power or prestige.

Similar to the assumptions regarding financial knowledge, it was believed that previous experience in a personal finance course might result in more responsible financial behaviors. Despite the fact that a significant percentage of the respondents (28%) report having had at least one course in personal finance, the variable was not found to be significant in either stage of the analysis. Several limitations associated with the personal finance course variable may have been responsible for this general lack of significance. First, these findings may be due to the general nature of introductory personal finance courses, as a broad range of topics are covered over a short period. Without further experience, it may be difficult for students to successfully apply the new knowledge to their daily lives. Further, it is difficult to determine whether students were

taking such courses by choice with a general interest in learning the materials. Second, timing of the course may be an issue. It is unknown as to when students encountered the course in personal finance. A high school level course is likely to differ from a college level course, and it will likely be difficult for students to remember all of the relevant information if no further courses are taken. Similarly, if an older student had an introductory personal finance course as a freshman, it may be difficult as a junior or senior to remember relevant concepts related to financial markets. In general, the variable is vague and does not allow for any strong conclusions to be drawn regarding its potential relation to credit card use. Future analyses should be more careful to collect more information as to when and where a course was taken, as well as the general purpose of the course. For example, was the course designed to introduce students to a specific area of personal finance, or was it a survey level course that covered a broad range of topics?

In terms of individuals' majors, support was found for Hypothesis 19, but not for Hypothesis 20. Specifically, business majors were noted as being less likely to revolve a balance when compared with students who were not business majors. However, among revolvers, being a business major did not appear to have any significant impact on the log balance revolved.

Individuals receiving financial aid are already engaging in some form of borrowing to pay for a college education. Based on the previous literature, it appears that individuals with financial aid are more likely to take on other forms of debt, such as credit card debt. Hypotheses 21 and 22 was supported by the present findings, as those receiving financial aid were noted as being more likely to carry a balance on their credit card(s) and generally reported larger log balances. Whether this finding is due to a

general openness to debt instruments among certain individuals, or to the fact that such individuals are stretched financially and need alternative sources of funding is not entirely clear from the present analysis. This general willingness to take on greater amounts of debt was noted despite the fact that financial resources are controlled for. While parental income was included as a measure of financial resource, it may not be the best indicator of actual resources available to students. Often, individuals whose parents have a relatively high income level will have limited access to financial aid. Thus, there may actually be greater financial pressure on middle-income students than on lower-income students due to the fact that the middle-income students do not appear to need assistance. Further, there is evidence that those who report using credit cards when financial aid is not sufficient to cover their education-related expenses were more likely to carry a balance (Hypothesis 23), and carried larger log balances (Hypothesis 24) in turn. This suggests that individuals may turn to more inefficient methods of borrowing in cases where financial aid is inadequate. This issue may potentially become more of a concern if educational expenses continue to outpace financial aid as it has in recent years.

Individuals were also differentiated based on whether or not they carried other forms of debt aside from credit card debt or student loan related debt. In general, it was hypothesized that individuals who were willing to take on credit card debt might be more open to debt as a market solution in general. Hypothesis 25 was supported, as individuals with other forms of debt were more likely to carry a balance than those without other debt, all other factors being equal. Further, support for Hypothesis 26 was found as well, as significantly larger log balances were noted among revolvers based on the presence of other debt. The present findings are supportive of the argument that certain individuals

may be more likely to use debt as a means of maintaining some desired level of living. Even when resource levels are controlled for, carrying one form of debt (student and/or consumer loans) was strongly correlated with the presence of credit card debt.

Due to the nature of the present sample, individual income was not entirely viable as a means of differentiating individuals on the basis of their financial resources. One way in which individuals were distinguished from one another based on financial situation was in whether or not they reported being financially dependent on their parents. Since individuals claiming financial independence lack a key source of financial support, it was hypothesized (Hypothesis 27) that they might be more likely to make use of credit card debt, which is relatively easy to obtain. Further, without parents monitoring or paying on their cards, financially independent individuals might be more likely to carry larger balances as well. These assumptions are based primarily on the high costs of college and limited time available to the average student to make an income to cover such expenses. Hypotheses 27 and 28 were supported, as those claiming financial independence were more likely to revolve a balance as compared with dependent students, and among revolvers, financially independent students were noted as carrying larger log balances. Individuals were further differentiated based on whether or not they reported paying their own credit card bills. As hypothesized (Hypothesis 29), students who reported paying their own bills were more likely to revolve a balance. Hypothesis 30 was not supported, however, as no significant differences in the overall log balance revolved were noted based on who pays the credit card bills.

As previously noted, economic theory dictates that borrowing may be rational in cases where one's expected future income is significantly greater than one's current

income. In such situations, drawing on this future income through borrowing can be an effective method of smoothing consumption and improving one's overall level of utility. With this in mind, it was hypothesized (Hypothesis 31) that individuals with higher expected incomes might be more likely to use credit cards as a means of smoothing consumption. While credit cards are not necessarily the most efficient means of pulling resources from the future, they may still be rational given a steep enough income curve after graduation. Surprisingly though, expected income is not noted as having a significant impact in the present analysis. There is no support for either Hypothesis 31 or 32 based on the present results. These findings are contrary to theory, as individuals should not engage in such costly borrowing behavior without reasonable confidence in their ability to pay off that debt in the near future.

The influence of the marital status variable on credit card use was not clear a priori for the first stage of the analysis. As hypothesized (Hypothesis 33), marital status did not have a significant effect on the probability of revolving a balance in the present sample. Among revolvers, married individuals reported larger log balances revolved. These findings support Hypothesis 34. The evidence suggests that while it might be expected that married students would have more expenses than unmarried students in general, they may not necessarily be more likely to use credit cards as a means of debt accrual. Further, other factors such as the potential for dual incomes may play a role. Without knowledge of whether the spouse is a student as well, or is employed in the market, it is difficult to explain exactly what is happening in this situation. Future research dealing with the role of marital status should collect data pertaining to spousal employment status, as well as spousal credit card ownership and usage behavior.

It was initially hypothesized (Hypothesis 35) that employment status might have an inverse impact on the probability of revolving a balance. This assumption was not supported by the present findings. Being employed was associated with a greater likelihood of carrying a balance. Further, it was hypothesized (Hypothesis 36) that employed students might be better able to make payments on any revolving debt, and thus should display lower log balances as compared with unemployed students. Contrary to Hypothesis 36, employment status was not associated with any significant difference in terms of log balance revolved.

Both Hypothesis 37 and 38 were unconfirmed according to the present data. The time preference composite was not found to be significant in either stage of the present analysis. There are several potential reasons for this outcome. First, the time preference composite used was first designed and implemented using another data set that had some variables not available in this data collection (See Finke & Huston (2004), for a full discussion of the composite measure development). The present composite measure was a slightly modified version of the original measure. The modifications were made primarily due to limitations of the present data set. One of the primary limitations was the lack of a usable measure for individuals' education level. Due to the fact that the sample is taken entirely from a population of college students, there was relatively little variation in education level (all have at least some college or more). Some evidence suggests that education is one of the most prominent factors in determining individuals' time preference (Fuchs, 1982; Grossman, 1999), or that education level reveals one's predetermined level of time preference (Bryant & Zick, 2006). If this is so, then the lack of variation in the present sample in terms of education level may have rendered the

measure ineffective in this study. Unfortunately this is not an issue that may be easily overcome, though future research may work on developing different methods for measuring time preference that do not involve education.

In summary, the model appears to do a fairly good job of predicting college student credit card usage. Table 5.3 presents a summary of the hypothesized effects as they compare to the observed outcomes from the analysis. Looking at the first stage of the analysis, there were a number of variables that failed to show significance (knowledge, cards received from the source category of other, freshman and sophomore status, parental income, the parental education level of less than high school, course in personal finance, expected income, and time preference). Also, there were a few cases of variables being significant but with different signs than expected (cards received from a bank source, junior and senior status, and employment status).

As noted previously, many of the hypothesized effects for the second stage of the analysis were not supported. In general, several variables failed to be significant (gender, race, senior status, parental income, the parental education levels of less than high school and some college, course in personal finance, major, expected income, employment status, and time preference). There were a few cases where an effect was significant, but the sign was different than expected (knowledge and cards received from a bank). These findings suggest that further study of credit card use models may be necessary, as numerous variables did not behave as predicted.

Table 5.3: Summary of Hypothesized Effects versus Observed Outcomes for the Double Hurdle Analysis

Parameter	Stage 1: Probit		Stage 2: Maximum Likelihood	
	Hypothesized Effect	Observed Outcome	Hypothesized Effect	Observed Outcome
Knowledge	(-)	NS	(-)	(+)
Origin of Cards				
Bank	(-)	(+)	(-)	(+)
Campus	(+)	(+)	(+)	(+)
Parent	(?)	(-)	(?)	NS
Direct Mail	(+)	(+)	(+)	(+)
Retail/Store	(+)	(+)	(+)	(+)
Other	(?)	NS	(?)	(+)
Female	(+)	(+)	(+)	NS
White (vs. Other)	(-)	(-)	(-)	NS
Year in School (Graduate Student Omitted)				
Freshman	(-)	NS	(-)	(-)
Sophomore	(-)	NS	(-)	(-)
Junior	(-)	(+)	(-)	(-)
Senior	(-)	(+)	(-)	NS
Parent's Income (Middle Income Omitted)				
Low Income	(+)	NS	(+)	NS
High Income	(-)	NS	(-)	NS
Parent's Education (College or More Omitted)				
Less than High School	(+)	NS	(+)	NS
High School	(+)	(+)	(+)	(+)
Some College	(+)	(+)	(+)	NS
Attitudes				
Power	(-)	(-)	(-)	(-)
Course in Pers. Finance	(-)	NS	(-)	NS
Business Major	(-)	(-)	(-)	NS
Financial Aid	(+)	(+)	(+)	(+)
Other Debt	(+)	(+)	(+)	(+)
Financially Independent	(+)	(+)	(+)	(+)

Table 5.3: Summary of Hypothesized Effects versus Observed Outcomes for the Double Hurdle Analysis Continued

Parameter	Hypothesized Effect	Observed Outcome	Hypothesized Effect	Observed Outcome
Expected Income (Middle Income Omitted)				
Low Expected Income	(-)	NS	(-)	NS
High Expected Income	(+)	NS	(+)	NS
Married (vs. Single)	NS	NS	(+)	(+)
Employed	(-)	(+)	(-)	NS
Time Preference Comp.	(+)	NS	(+)	NS

Results for the Financial Knowledge Measure:

In addition to the double hurdle analysis of behavior related to credit card balance, Ordinary Least Squares (OLS) regression was used to evaluate the factors potentially influencing the financial knowledge. Results from the regression are presented in Table 5.4. Overall, the model is significant; the selected variables account for about twenty percent of the variance in a given individual’s financial knowledge score. Variables were chosen based on previous research that suggested differences in financial knowledge existed based on gender, race, class rank, income level, experience in financial courses, and other demographic characteristics.

Both being female and non-white were associated with a slightly lower score on the financial knowledge measure. There are strong class rank effects, as financial knowledge appears to be higher with each successive year of education. As compared with graduate students, all other class ranks are found to be less knowledgeable with the exception of seniors who were not found to be statistically different from graduate students. Thus, freshmen were the least knowledgeable with overall scores that were .689

points less than graduate students. Financial knowledge scores were slightly higher for sophomores (-.539) and juniors (-.378) as compared with graduate students.

How cards were obtained had an influence on one's overall financial knowledge score. Those individuals receiving their cards from a direct mail source or from a campus source had higher financial knowledge scores. There were no significant differences in individuals' financial knowledge scores based on how many cards they reported holding. How individuals are educated appears to influence personal financial knowledge. Individuals who have had at least one course in personal finance were found to achieve higher scores on the financial knowledge measure (.370) as compared with those who have not had a course. Similarly, being a business major was associated with a higher score (.371) on the financial knowledge measure.

Parental education was not found to have a significant influence on financial knowledge. Individuals who reported having parents with a lower income were found to have lower scores on the personal finance index when compared with having middle-income parents. However, no differences were noted between students with high-income parents versus those with middle-income parents.

Individuals who were financially independent had higher scores on the financial knowledge measure (.229). Further, individuals who received financial aid were more knowledgeable than those who did not receive financial aid by .210 points. Measures of financial knowledge were also positively related to the presence of other forms of debt aside from credit card or student loan debt. Employment status had no significant effect on the financial knowledge measure.

No significant differences existed in the financial knowledge measure based on the power measure utilized in the present analysis (credit attitudes). Individuals were scored based on how they reportedly used their credit cards. More responsible credit card behaviors were positively associated with personal financial knowledge, as a point increase on the usage measure corresponded with a .036 increase in one's financial knowledge score.

Table 5.4: OLS Regression Results, Financial Knowledge as the Dependent Variable (N = 3884)

Variable	Parameter Estimate	Standard Error
Number of Cards	0.004	0.032
Gender (1 = Female)	-0.342***	0.044
Race (1 = White)	0.362***	0.062
Year in School (Graduate Student Omitted)		
Freshman	-0.689***	0.079
Sophomore	-0.539***	0.078
Junior	-0.378***	0.076
Senior	-0.081	0.072
Independent (1 = Yes)	0.229***	0.058
Origin of Cards		
Bank	0.083	0.055
Campus	0.292***	0.100
Parent	-0.211***	0.062
Direct Mail	0.243***	0.062
Retail/Store	0.097	0.067
Other	0.155	0.084
Financial Aid (1 = received)	0.210***	0.046
Parent's Education (College or More Omitted)		
Less than High School	0.405	0.251
High School	-0.061	0.072
Some College	-0.063	0.052
Attitudes		
Power	0.001	0.003

Table 5.4: OLS Regression Results, Financial Knowledge as the Dependent Variable Continued

Variable	Parameter Estimate	Standard Error
Married (1 = Yes)	0.188*	0.088
Course (1 = Yes)	0.370***	0.046
Business Major (1 = Yes)	0.371***	0.055
Parent's Income (Middle Income Omitted)		
Low Income	-0.133*	0.058
High Income	0.080	0.048
Employed (1 = Yes)	0.072	0.045
Other Debt (1 = Yes)	0.167**	0.056
Credit Card Use	0.030***	0.003
Intercept	1.47***	0.176
Adj. R-Square	0.195	
F-Statistic	35.92***	

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

Discussion of the Ordinary Least Squares Regression Analysis:

The fit of financial knowledge model appears to be good; the model is significant at the .0001 level. As noted, the model appears to account for about twenty percent of the variance in personal financial knowledge among the sample respondents. Many of the primary hypotheses regarding the financial knowledge variable were supported, though some were not.

Hypothesis 39 was clearly supported. Being female was associated with a lower financial knowledge score by .342 points, other factors being equal. This result is consistent with previous research that suggested females were generally less knowledgeable than males in the area of personal finance. These findings indicate that female students might benefit from specific education programs.

In analyzing racial differences, Hypothesis 40 was supported in the present analysis. As compared with all other racial categories, being white was associated with a financial score that was higher by .362 points, all else held constant. This finding indicates that minority students tend to be less knowledgeable of financial matters in general, thus making them more likely to be at risk of financial hardship. Due to the fact that minority students made up a relatively small portion of the student population, all other racial categories were compared to whites. Thus, the category of other may have actually captured a number of international students who are generally lacking in knowledge of American culture and not necessarily financial knowledge per se.

As expected, a class rank effect was noted among the sample population. As students progress, there appears to be a steady development in terms of individual financial knowledge. Specifically, freshmen had scores that were over half a point lower on the financial knowledge scale when compared with graduate students. This confirms our initial hypothesis (Hypothesis 41), but leaves questions as to what might cause such class effects. Are college students learning about personal finances through their course work, or is it more an effect of college students gaining more responsibility and experience in financial markets as they age and become independent? This is particularly important from the standpoint of educational program design. If improving financial knowledge is more the result of experiences in the actual financial market, do the benefits of financial education programs justify their costs? This is an issue that should be further explored.

Prior research indicates that parental income and education should have a strong influence over students' exposure to personal financial matters. In the case of parental

income, our initial hypothesis (Hypothesis 42) is supported, as students from lower income households are notably less knowledgeable when compared with middle-income households. However, no significant results were noted in the case of parental education. Although it was anticipated (Hypothesis 43) that more educated parents might be more likely to provide their children with financial information, this study did not support that idea.

As hypothesized (Hypothesis 44), business majors were found to be more knowledgeable than the rest of the college student population, other factors being held constant. This may be due to the fact that business majors tend to become familiar with many financial concepts in their coursework, which may result in a higher level of financial knowledge. However, when financial knowledge is controlled for in the first analysis, business majors displayed more responsible credit card behaviors in general relative to the rest of the student population. This suggests that not only are business majors likely to be more knowledgeable of personal financial topics, but they may be more likely to apply this knowledge to their financial decisions.

The number of credit cards held is not noted as having a significant influence on financial knowledge. It was hypothesized (Hypothesis 45) that more informed individuals might carry fewer credit cards on average based on the fact that they have a better understanding of the costs associated with taking on a large number of cards. In the present study, this did not appear to be the case. This is likely an issue that could have been improved by asking individuals about the credit card attainment process. Specifically, are individuals likely to take the time to research each card (which suggests

that financial knowledge should have some impact on how many cards are attained) or do they simply accept offers without much thought.

Based on the theoretical framework, it was believed that more knowledgeable individuals would be more likely to hold credit cards obtained from sources that tend to provide more information to customers, such as a bank. The opposite was found, however, as having a card from a direct mail source or campus source was associated with a higher score on the financial knowledge measure and bank cards were not found to be related to the measure of financial knowledge utilized in this study. This finding was surprising due to the fact that many campus solicitation strategies are indirect, choosing to attract students with offerings of free food or t-shirts in exchange for students opening an account.

It should be noted that the University of Missouri has banned active solicitation of credit cards on campus, which likely explains why such a small portion of the sample received cards on or near campus. While research regarding credit card attainment suggest that banning campus solicitation does not necessarily reduce the number of cards students hold overall, it does send a strong message to students in regards to the University's stance on the issue. Previous studies have found that students who receive cards from on-campus solicitations often incorrectly believe that the companies have the campuses approval, and are therefore trustworthy (Norvilitis et al., 2003). As previously noted, obtaining cards from a direct mail source had a relatively larger marginal effect on the likelihood of carrying a balance after controlling for financial knowledge. Interestingly, receiving cards from a parent had an inverse influence on one's financial knowledge score. This finding suggests that parents are not necessarily providing their

children with effective financial advice along with access to credit cards. Overall, student credit card attainment should be viewed as a learning opportunity, and if parents fail to take advantage of this event, students may find themselves less prepared to make financial decisions as they become financially independent adults.

In line with the initial hypothesis (Hypothesis 47), previous experience in a personal finance course was noted as being positively related to personal financial knowledge. Specifically, having had a course in personal finance was associated with a .370 point increase on the financial knowledge scale. Interestingly, while course experience appears to have a positive influence on individual financial knowledge, it was not significant in influencing observed credit card behaviors such as probability of revolving a balance and the log balance revolved.

As discussed previously, there are several reasons as to why having had a course in personal financial planning might be ineffective in improving observed financial behaviors in the case of credit card usage. First, credit cards represent only one particular type of financial instrument, and may not necessarily receive a great deal of attention in an introductory level course on personal finance. Thus, greater knowledge of financial matters obtained from a personal finance course might not be easily applied to everyday decision-making involving credit cards. Second, introductory courses cover a great deal of material in a short amount of time, and retention is likely an issue. If concepts are not perceived as being relevant to the students involved, they are less likely to be incorporated into their basic skill-set. The effect on financial knowledge might be improved, and actual behavioral changes might be more likely to occur in cases where individuals were exposed to a few courses, or if individuals were a personal finance

major. Third, without a clear indication of when and where personal finance courses were taken, it is difficult to draw broad conclusions as to their overall effectiveness. These statements are not intended to suggest that introductory courses are entirely ineffective. However, it does appear that there may be room for improvement in such courses through the introduction of practical examples and applications that are relevant to college student audiences.

Hypothesis 48 was confirmed, as individuals reporting more responsible credit card use behavior general scored higher on the measure of personal financial knowledge. This result provides further evidence to suggest that there is a connection between financial knowledge and reported behaviors. However, the current measure of credit card use is limited in that it relies on individuals' self-reported behaviors. A similar analysis utilizing actual observed behaviors might be more helpful in establishing a connection between knowledge and behavior, though such data is more difficult to obtain.

A number of additional variables were included as controls (financial status, reception of financial aid, credit attitudes, marital status, employment status, and the presence of other forms of debt). Interestingly, a number of these variables had a significant impact on the financial knowledge scores (financial status, reception of financial aid, marital status, and the presence of other debt), but other were not significant (credit attitudes and employment status).

While there was little previous research to suggest how being financially independent might impact personal financial knowledge, being financially independent was associated with higher scores on the knowledge measure. It is possible that those individuals who are independent from their parents are more likely to have had

experience paying bills and taking care of their own financial matters. Future research should consider further analyzing the role of experience on both financial knowledge and financial behaviors. Similarly, being married was associated with a significantly higher score on the financial knowledge scale, though the reasoning for such an effect is not entirely clear. This effect may be due to the fact that married students are more likely to run their own households, and thus benefit from greater experience with financial issues.

Those carrying other forms of debt had higher financial knowledge scores. This result may reflect experience. Individuals who have taken on other loans in the market may be more familiar with some of the financial terminology utilized in the financial knowledge measure. Similarly, receipt of financial aid was positively associated with personal financial knowledge. Individuals receiving financial aid might be more knowledgeable due to their experience in dealing with the relevant processes or paperwork required to obtain or maintain eligibility in financial assistance programs. Both individuals receiving financial aid and those carrying other forms of debt were probably more likely to see the importance of personal financial knowledge in their own lives.

From the outset, it was uncertain as to what influence consumer attitudes or employment status might have on personal financial knowledge. Neither variable was noted as having any significant influence on student financial knowledge. The available evidence does provide some insights into what variables might influence individuals' financial knowledge, but it is simply a first step.

In summary, results of this study support the idea that individuals who perceive financial issues as being particularly relevant will be more likely to score higher on a

measure of financial knowledge. The model used in this study appears to do a fairly good job of predicting a person's personal financial knowledge score, although a large portion of the variance remains unexplained. As this is a relatively new method of measuring personal financial knowledge, there is very little information in the available literature to which the present results might be compared. However, the present study does represent a viable starting point for a further exploration of college student financial knowledge in terms of how it might be measured, and raises some interesting questions for future research. Specifically, what other factors might be considered as playing a strong role in students' personal financial knowledge? It might be interesting to consider including a measure of aptitude such as one's ACT or SAT score. In terms of the financial knowledge measure, it is unclear as to whether the six questions selected are the most effective measures of personal financial knowledge. Future analyses should be designed to further explore personal financial knowledge as a construct in more detail. Testing the financial knowledge measure utilized in the present analysis against a variety of samples (some being similar to the present sample and others being different) should provide some insight into the overall consistency and generalizability of the measure. It might also be interesting to examine the relationship between the current measure of financial knowledge and other financial behaviors such as saving.

Table 5.5: Summary of Hypothesized Effects versus Observed Outcomes for the OLS Regression Analysis

VARIABLE	HYPOTHESIZED EFFECT	OBSERVED EFFECT
Female	(-)	(-)
White	(+)	(+)
Year in School	(+)	(+)
Parent's Income	(+)	(+)
Parent's Education	(+)	NS
Business Major	(+)	(+)
Course in Personal Finance	(+)	(+)
Number of Credit Cards	(-)	NS
Origin of Card		
Bank	(+)	NS
Parent	(-)	(-)
Direct Mail	(-)	(+)
Campus	(-)	(+)
Retail	(-)	NS
Other	(-)	NS
Credit Card Use	(+)	(+)

Chapter 6

Conclusion:

The purpose of this study was to develop a better understanding of personal financial knowledge among college students and the potential relationship between financial knowledge and credit card use behavior. College students are a desirable target group for credit card marketers because they offer a number of key advantages over other consumers. College students typically have not yet developed credit card brand loyalties, and they have yet to develop strong financial habits and attitudes. College students are also in the unique situation of having limited resources combined with expectations of greater resource availability in the near future. Thus, borrowing might be more realistic among this population, even if the interest rates are not the most favorable. Given that these individuals will live and work in an increasingly complex financial marketplace, understanding how college students make financial decisions, and what influence knowledge has over their behavior are increasingly important issues for consumer researchers.

Based on the findings from the this study, personal financial knowledge does appear to have a significant influence on how individuals use their credit cards, and there do appear to be some relationships between credit card knowledge, credit card attainment, and credit card usage. It should be noted, however, that results from this study did not always support the findings of prior research nor were all hypotheses supported. Most importantly, the data from the present sample suggested that personal financial

knowledge and financial behavior are related at the college level. However, the observed relationships did not behave as expected, given that more knowledgeable students were noted as carrying larger log balances. Further, exposure to a course in personal finance did not appear to have the expected impact on individuals' financial behavior. These data do not necessarily suggest that financial education programs such as Jump\$Start and introductory level personal finance courses are ineffective, but it does raise questions as to how college students obtain and utilize financial information. The present findings in regards to course experience may be due to the fact that many individuals have only taken a large survey-type course in personal finance. Such a course might contain a wealth of useful information, but it may be difficult for students to really benefit from these classes without more experience.

The timing of personal financial classes might also have a significant impact on how well received these classes are. If students do not perceive personal financial issues as being particularly relevant to their lives then they are not likely to absorb the material. Today's students may benefit more from an educational program that is designed to complement and continue that which a program like Jump\$Start starts. In general, better results might be yielded if state institutions worked together to implement a multi-step program of financial education beginning in middle school and going into college.

While the present analysis suggests that personal finance course experience improves knowledge as measured by a six-question scale, it does not appear that knowledge improvement necessarily translates to behavioral changes, at least with respect to credit cards. Also, credit card behaviors as measured by a credit card use scale indicated that those who reported more responsible use behavior had higher scores on the

financial knowledge measure. Further research should consider the analysis of other important financial behaviors such as savings as they relate to personal financial knowledge and educational experiences.

A number of questions remain in regards to causality. While the present study presents evidence that knowledge of key financial issues is related to individuals' reported financial behaviors (specifically, credit card behavior), further research must address the direction of these relationships. As the data indicate, among individuals already carrying a balance, greater financial knowledge is associated with larger overall log balances. Questions regarding causality would be better addressed through the use of longitudinal data or a pre-test post-test experimental design. As anticipated, it appears that the relationship between personal financial knowledge and actual financial behavior is a complex one. The present analysis highlights some key links between knowledge and behavior while also raising new questions for future research. Some of the previous research suggests that college students tend to seek financial knowledge retroactively, waiting until after they have made mistakes to seek assistance. The present results appear supportive of this notion, as higher knowledge scores are associated with greater log balances. If balance size is an effective indicator of financial risk, the current results either suggest that more knowledgeable individuals are taking on more debt, or that people with greater debt levels seek financial knowledge.

Another relevant issue that must be addressed has to do with parental involvement. As noted, there was no observable relationship between the probability of carrying a revolving balance and parental education level. However, based on the present findings, more knowledgeable individuals appear to be those that see financial issues as

being relevant to their daily lives. Parents could potentially play a strong role in their children's financial development by giving their children more financial responsibility prior to their beginning college. Thus, it may be worthwhile to consider educational programs that are more holistic in nature, which incorporate the parents, or the household as a whole. By targeting parents who lack the necessary resources to teach their own children good financial habits, programs may have a more lasting effect.

In recent years, a large number of personal financial literacy initiatives have begun in the United States (Fox, Bartholomae, & Lee, 2005). While these programs have a variety of settings and often differ in their intended outcomes, they all share the common goal of making Americans more financially literate. One primary shortcoming of these varied initiatives has been noted in regards to outcome measurement. Often there is little data to support the argument that a particular program had any real influence on participants. Due to this shortcoming, many theorists have continued to ask the question of whether or not financial education actually makes a real difference in the consumer decision-making process. The present analysis represents a valuable first step in clarifying this issue, as it notes a clear connection between financial knowledge and financial behavior. Unfortunately, the observed outcome was the opposite of what would be expected theoretically. More detailed analyses are necessary to further understand the issues of causality and the strength of these relationships across different groups.

Fundamentally, the limitations of the instrument itself must be addressed in discussing the outcomes from the present analysis. The personal financial knowledge measure was created for this analysis, and thus should undergo further research to analyze its consistency. While the instrument is soundly based on questions available in

the literature, it is unclear as to whether it is the most effective means for measuring the construct of personal financial knowledge. What is most significant about the present analysis is the link that it establishes between knowledgeable responses to personal finance questions and reported credit card use behaviors. This is an extremely powerful outcome. It lends support to previous analyses that note ties between financial knowledge and actual financial behavior while expanding the findings to a new target audience, college students.

Also, the initial assertion that credit card origin might impact credit card use does appear to be somewhat supported, as significant differences in reported balance behaviors existed depending on what types of cards individuals used. Data from the primary analysis are not entirely supportive of the notion that the level of active involvement in credit card attainment might play a role in how individuals use those cards. Future analyses should attempt to analyze individual card types with respect to their balance levels, APR, other key features, and the reported amount of research involved in choosing each card. Without a clear measure of the search process, it is difficult to draw conclusions about consumer decision-making with regards to credit card attainment.

Still, the present findings did indicate that direct mail cards were associated with less responsible use behaviors. Direct mail card offers tend to provide little information to the consumer, and are fairly easy to obtain, as they do not even require one to leave their home. This finding may be of even greater significance considering that direct mail is such a common source of credit cards for the sample population (23.89%, second only to bank source). Such findings have further implications for how students are educated, and what topics might be helpful. Credit card attainment appears to be an increasingly salient

matter for discussion given the overall societal shift away from savings and towards debt accumulation in recent years.

In closing, there are several methodological limitations that should be addressed, particularly in terms of the data collection process. As mentioned previously, a number of key variables of interest allowed respondents with the opportunity to provide open-ended responses. This feature of the survey likely led to a number of mistakes on the part of respondents, and thus is likely to have had an impact on the data itself. Other questions did not provide adequate detail, or received poor response rates. While individuals were differentiated based on whether or not they had had a course in personal finance, the source and level of the course remains unknown. A personal finance course offered as part of a high school program is likely to differ from one offered in a business program, which is likely to differ from one that is part of a degree program in personal financial planning. The lack of an adequate response on the APR variable is a negative as well. APR is the most effective measure of the actual cost of borrowing with a credit card. While revolving a balance is viewed negatively in the present analysis, an individual with a \$500 balance and an APR of 24 percent is likely to be under greater financial stress than an individual with a \$500 balance and an APR of 5%, all other factors being equal.

Despite these limitations, results from the present survey were generally encouraging, and the potential for growth should be enough to justify another data collection of this type in the near future. These data suggest that there is a clear link between individuals' scores on the measure of personal financial knowledge and reported credit card behaviors, which is a significant addition to the literature. Further testing of the personal financial knowledge measure is needed, and it would be helpful if it were

possible to measure individuals' credit card use more directly. Without a clear understanding of how financial education programs impact consumer decision-making, it is difficult to justify their continued existence and proliferation.

BIBLIOGRAPHY:

- Allen, J. L. & Jover, M. A. (1997). Credit card behaviors of university students: Ethnic differences. *Consumer Interests Annual*, 43, 162.
- Ando, A. & Modigliani, F. (1963). The “life-cycle” hypothesis of saving: Aggregate implications and tests. *American Economic Review*, 53(1), 55-84.
- Armstrong, C. J. & Craven, M. J. (1993). Credit card use and payment practices among a sample of college students. *Proceedings of the 6th Annual Conference of the Association for Financial Counseling and Planning Education*. 48-159.
- Ausubel, L. (1991). The failure of competition in the credit card market. *American Economic Review*, 81(1), 50-81.
- Avard, S., Manton, E., English, D., & Walker, J. (2005). The financial knowledge of college freshmen. *College Student Journal*, 39(2), 321-339.
- Baek, E. (2001). Financial Concerns and problems of college students. *Proceedings of the Association for Financial Counseling and Planning Education*, 148-159.
- Barron, J. M., & Staten, M. E. (2004). Usage of credit cards received through college student-marketing programs. *Journal of Student Financial Aid*, 34(3), 7-26.
- Baum, S. & O'Malley, M. (2003). College of credit: How borrowers perceive their education debt. *NASFAA Journal of Student Financial Aid*, 33(3), 7-19.
- Braunsberger, K., Lucas, L. A., & Roach, D. (2004). The effectiveness of credit-card regulation for vulnerable consumers. *Journal of Services Marketing*, 18(5), 358-370.
- Bryant, W. K. & Zick, C. D. (2006). *The economic organization of the household*. New York: Cambridge University Press.
- Castranova, E. & Hagstrom, P. (2004). The demand for credit cards: Evidence from the survey of consumer finances. *Economic Inquiry*, 42(2), 304-318.
- Chakravorti, S. (2003). Theory of credit card networks: A survey of the literature. *Review of Network Economics*, 2(2), 50-68.
- Chen, H. & Volpe, R. P. (1998). An analysis of personal financial literacy among college students. *Financial Services Review*, 7(2), 107-128.
- Chen, H. & Volpe, R. P. (2002). Gender differences in personal financial literacy among college students. *Financial Services Review*, 11(3), 289-307.

- Chien, Y. & DeVaney, S. A. (2001). The effects of credit attitude and socioeconomic factors on credit card and installment debt. *Journal of Consumer Affairs*, 35(1), 162-179.
- Craver, R. (2002). North Carolina Attorney General warns college students of credit cards. *Knight Ridder Tribune Business News*, 27 August, 1.
- Credit Card Monitor (October, 2007). Weekly credit card monitor. Retrieved October 18, 2007 from <http://www.indexcreditcards.com/creditcardmonitor/>
- Davies, E. & Lea, S. E. G. (1995). Student attitudes to student debt. *Journal of Economic Psychology*, 16, 663-679.
- Doll, K. (2000). Who would use financial counseling and planning services on university campuses? evidence from students, staff and faculty. *Proceedings of the Association for Financial Counseling and Planning Education*, 122-131.
- Durkin, T. A. (2000). Credit cards: Use and consumer attitudes, 1970-2000. *Federal Reserve Bulletin*. 623-634
- Feinberg, R. A. (1986). Credit cards as spending facilitating stimuli: a conditioning interpretation. *The Journal of Consumer Research*, 13(3), 348-356.
- Finke, M. S. & Huston, S. J. (2004). Risk and Myopic financial decisions. *Journal of Personal Finance*, 3(3), 99-112.
- Fox, J., Bartholomae, S., & Lee, J. (2005). Building the case for financial education. *Journal of Consumer Affairs*, 39(1),
- Fuchs, V. R. (1982). Time preference and health: An exploratory study. In V.R. Fuchs (Ed.), *Economic Aspects of Health* (pp. 93-120) Chicago: University of Chicago Press.
- Gartner, K. & Todd, R. M. (2005). Effectiveness of online “early intervention” financial education for credit cardholders.
- Godwin, D. D. (1997). Dynamics of households’ income, debt, and attitudes toward credit, 1983-1989. *Journal of Consumer Affairs*, 31(2), 303-325.
- Grossman, M. (1999). The human capital model of the demand for health. National Bureau of Economic Research, Working Paper 7078.
- Hayhoe, C. R. (2002). Comparison of affective credit attitude scores and credit use of college students at two points in time. *JFCS*, 94(1), 71-77.

- Hayhoe, C. R., Leach, L., Allen, M. W., & Edwards, R. (2005). Credit cards held by college students. *Financial Counseling and Planning*, 16(1), 1-10.
- Hayhoe, C. R., Leach, L., & Turner, P. R. (1999). Discriminating the number of credit cards held by college students using credit and money attitudes. *Journal of Economic Psychology*, 20, 643-656.
- Hayhoe, C. R., Leach, L. J., Turner, P. R., Bruin, M. J., & Lawrence, F. C. (2000). Differences in spending habits and credit use of college students. *Journal of Consumer Affairs*, 34(1), 113-133.
- Heckman, James J. (1979). Sample selection bias as a specification error. *Econometrica*, 47, 153-162.
- Hilgert, M. A., Hogarth, J. M., & Beverly, S. G. (2003). Household financial management: The connection between knowledge and behavior. *Federal Reserve Bulletin*, 309-322.
- Hogarth, J. M., & Hilgert, M. A. (2002). Financial Knowledge, experience and learning preferences: Preliminary results from a new survey on financial literacy. *Consumer Interests Annual*, 48, 1-7.
- Institute for Higher Education Policy (1998). *Credit risk or credit worthy? College students and credit cards*. Washington, DC: Institute for Higher Education Policy.
- Jones, J. E. (2005). College students' knowledge and use of credit. *Financial Counseling and Planning*, 16(2), 9-16.
- Joo, S., Grable, J. E., & Bagwell, D. C. (2003). Credit card attitudes and behaviors of college students. *College Student Journal*,
- Kara, A., Kaynak, E., & Kucukemiroglu, O. (1994). Credit card development strategies for the youth market: The use of conjoint analysis. *International Journal of Bank Marketing*, 12(6), 30-36.
- Kidwell, B. & Turrisi, R. (2000). A cognitive analysis of credit card acquisition and college student financial development. *Journal of College Student Development*, 41(6), 589-598.
- Kim, H. & DeVaney, S. A. (2001). The determinants of outstanding balances among credit card revolvers. *Financial Counseling and Planning*, 12(1), 67-78.
- King, A. S. (2004). Untangling the effects of credit cards on money demand: convenience usage vs. borrowing. *Quarterly Journal of Business and Economics*, 43(1/2), 57-80.

- Kinsey, J. & McAlister, R. (1981), Consumer knowledge of costs of open-ended credit, *Journal of Consumer Affairs*, 7(1), 23-36.
- Lawrence, F. C., R. C. Christofferson, S. Nester, B. Moser, J. A. Tucker, and A. C. Lyons. (2003). Credit card usage of college students: Evidence from Louisiana State University. Louisiana State University Agricultural Center, Research Information Sheet Number 107, 1-28.
- Lea, S. E. G., Webley, P., & Walker, C. M. (1993). Psychological factors in consumer debt: Money management, economic socialization, and credit use. *Journal of Economic Psychology*, 16, 681-701.
- Lee, J. & Hogarth, J. M. (1998). Shopping for a credit card: Does information search pay off? *Consumer Interests Annual*, 44, 30-35.
- Lee, J. & Hogarth, J. M. (1999). The price of money: Consumer's understanding of APRs and contract interest rates. *Journal of Public Policy & Marketing*, 18(1), 66-76.
- Liebermann, Y. & Flint-Goor, A. (1996). Message strategy by product-class type: A matching model. *International Journal of Research in Marketing*, 13, 237-249.
- Lyons, A. C. (2003). The credit usage and financial education needs of Midwest college students. University of Illinois at Urbana-Champaign, report released December 2003.
- Lyons, A. C. (2004). A profile of financially at-risk college students. *The Journal of Consumer Affairs*, 38(1), 56-80.
- Lyons, A. C., & Hunt, J. L. (2003). The credit practices and financial education needs of community college students. *Financial Counseling and Planning*, 14(1), 63-74.
- Manning, R. D. (2000). Credit card nation: The consequences of America's addiction to credit. New York: Basic Books.
- Manning, R. D., & Kirshak, R. (2005). Credit cards on campus: Academic inquiry, objective empiricism, or advocacy research? *NASFAA Journal of Student Financial Aid*, 35(1), 39-48.
- Markovich, C. A., & Devaney, S. A. (1997). College Seniors' Personal Finance Knowledge and Practices. *Journal of Family and Consumer Sciences*,
- Marshall, S. & Weagley, R. O. (2006). The impact of knowledge, social involvement, and financial independence in college student credit card behavior. *MU McNair Journal*, 14, 10-15.

- Mattson, L., Sahlhoff, K., Blackstone, J., Peden, B., & Nahm, A. Y. (2004). Variables influencing credit card balances of students at a Midwestern university. *Journal of Student Financial Aid*, 34(2), 7-18.
- Micomonaco, J. P. (2003). Borrowing against the future: Practices, attitudes, and knowledge of financial management among college students. Unpublished Master's Thesis at Virginia Polytechnic Institute and State University.
- Min, I. & Kim, J. (2003). Modeling credit card borrowing: A comparison of type I and type II tobit approaches. *Southern Economic Journal*, 70(1), 128-142.
- Munro, J. & Hirt, J. B. (1998). Credit cards and college students: Who pays, who benefits? *Journal of College Student Development*, 39(1), 51-57.
- Nellie Mae. (2002). Undergraduate students and credit cards: An analysis of usage rates and trends. Retrieved September 15, 2006 from <http://www.nelliemae.com/library/research.html>.
- Nellie Mae. (2005). Undergraduate students and credit cards in 2004: An analysis of usage rates and trends. Retrieved January 25, 2007 from <http://www.nelliemae.com/library/research.html>.
- Newton, C. (Mar/Apr 1998). Today's college students: Responsible, self-reliant, realistic. *Credit World*, 86(4), 16-17.
- Norvilitis, J. M. & Santa Maria, P. (2002). Credit card debt on college campuses: causes, consequences, and solutions. *College Student Journal*, 36, 357-364.
- Norvilitis, J. M., Szablicki, P. B., & Wilson, S. D. (2003). Factors influencing levels of credit-card debt in college students. *Journal of Applied Social Psychology*, 33(5), 935-947.
- Palmer, T. S., Pinto, M. B., & Parente, D. H. (2001). College students' credit card debt and the role of parental involvement: Implications for public policy. *Journal of Public Policy and Marketing*, 20(1), 105-113.
- Pinto, M. Parente, D. H., & Palmer, T. S. (2001). Credit card solicitation policies in higher education: Does "protecting our students make a difference? *Journal of College Student Development*,
- Pinto, M. B., Parente, D. H., & Palmer, T. S. (2001). College student performance and credit card usage. *Journal of College Student Development*, 42(1), 49-58.
- Priyambodo, N. (2005). College students victims of credit cards. *Campus Times*. Retrieved May 30, 2007 from http://www.ulv.edu/campustimes/web_exclusives_stories/creditcards.htm

- Reynolds, L. M., Hogarth, J. M., & Taylor, A. (2006). Cohort analysis of consumer credit card behaviors: Will consumers be ready for retirement? *Consumer Interests Annual*, 52, 141-156.
- Roberts, J. A. (1998). Compulsive buying among college students: An investigation of its antecedents, consequences, and implications for public policy. *The Journal of Consumer Affairs*, 32(2), 295-319.
- Roberts, J. A., & Jones, E. (2001). Money attitudes, credit card use, and compulsive buying among American college students. *The Journal of Consumer Affairs*, 35(21), 213-240.
- Simon, R. & Whelan, C. (2003). The new credo on campus: "Just charge it" – credit card companies target students before freshman year; should your kid get one? *Wall Street Journal*, 3 September, D1.
- Sharpe, D. L., Finke, M. S. & Weagley, R. O. (2005). Relationship between credit card management and likelihood that financial situation will make college completion difficult. Proceedings of the Association for Financial Counseling and Planning Education, Annual Conference 2005.
- Steidle, R. E. P. (1994). Determinants of bank and retail card revolvers: An application using the life-cycle income hypothesis. *Consumer Interests Annual*, 40, 170-177.
- Stigler, G. J. (1961). The economics of information. *The Journal of Political Economy*, 69(3), 213-225.
- Tokunaga, H. (1993). The use and abuse of consumer credit: Application of psychological theory and research. *Journal of Economic Psychology*, 14, 285-316.
- U. S. General Accounting Office. (2001). Consumer finance: College students and credit cards. Report to Congressional Requesters (GAO-01-773)
- Varcoe, K., Peterson, S., Garrett, C., Martin, A., Rene, P., & Costello, C. (2001). What teens want to know about financial management. *Journal of Family and Consumer Sciences*, 30-34.
- Warwick, J., & Mansfield, P. (2000). Credit card consumers: college students' knowledge and attitude. *Journal of Consumer Marketing*, 17(7), 617-626.
- Xiao, J. J., Noring, F. E., & Anderson, J. G. (1995). College students' attitudes towards credit cards. *Journal of Consumer Studies and Home Economics*, 19, 155-174.
- Yamauchi, K. T. & Templer, D. I. (1982). The development of a money attitude scale. *Journal of Personality Assessment*, 46(5), 522-528.

Yang B., James, S., & Lester, D. (2005). Reliability and validity of a short credit card attitude scale in British and American subjects. *International Journal of Consumer Studies*, 29(1), 41-46.

Zhu, L. Y., & Meeks, C. B. (1994). Effects of low income families' ability and willingness to use consumer credit on subsequent outstanding credit balances. *Journal of Consumer Affairs*, 28(2), 403-421.

APPENDIX A:

First E-mail to Students:

Student Credit Use and Personal Financial Management Survey

Hi MU Students,

We are faculty members at the University of Missouri, and we would like to invite you to participate in a research project on personal financial management among college students.

We are working with educators from University of Missouri Extension to develop a new financial literacy program. The purpose of the program is to develop resources and materials to help college students make informed financial decisions related to credit usage and paying for their college education. **We need your help in learning more about how students manage their money**, and we hope that you will choose to participate in our survey.

Your participation is strictly voluntary. You may refuse to participate or discontinue participation at any time without penalty. Your decision to participate will not affect your present or future relations with your college or the University of Missouri. If you decide to fill out the survey, your feedback will provide us with valuable information about how money issues are affecting today's college students.

Any and all information we receive will be kept strictly confidential and will only be seen by authorized members of our staff. Data gathered from the survey will be analyzed as a whole, excluding all references to any individual students. Only the results of our analysis will be shared with researchers and organizations that are interested in providing services to educate students about money management.

By completing this survey, you acknowledge that you are 18 years or older. The survey will take you about **10-15 minutes to complete** and you will have a chance to win one of three **\$150 gift certificates** to the Columbia Mall! Good Luck!

Please respond no later than February 22. **Click below to access the survey now:**

Student Credit Use and Personal Financial Management Survey
<http://www.surveymonkey.com/s.asp?u=447362572799>

Thank you in advance for taking the time to help with this important project.

Sincerely,

Deanna L. Sharpe, Ph.D.
239 Stanley Hall
University of Missouri
882-9652
sharped@missouri.edu

Robert O. Weagley, Ph.D.
239 Stanley Hall
University of Missouri
882-9651
weagleyr@missouri.edu

Second E-mail to Students:

Student Credit Use and Personal Financial Management Survey

Hi MU Students,

This is a reminder. If you haven't already filled out our survey you have another opportunity to help us out! The survey will take about 10-15 minutes to complete and you will have a chance to win one of three \$150 gift certificates to the Columbia Mall. We are working with educators from University of Missouri Extension to develop a new financial literacy program. The purpose of the program is to develop resources and materials to help college students make informed financial decisions related to credit usage and paying for their college education. **We need your help in learning more about how students manage their money**, and we hope that you will choose to participate in our survey.

Your participation is strictly voluntary. You may refuse to participate or discontinue participation at any time without penalty. Your decision to participate will not affect your present or future relations with your college or the University of Missouri. If you decide to fill out the survey, your feedback will provide us with valuable information about how money issues are affecting today's college students.

Any and all information we receive will be kept strictly confidential and will only be seen by authorized members of our staff. Data gathered from the survey will be analyzed as a whole, excluding all references to any individual students. Only the results of our analysis will be shared with researchers and organizations that are interested in providing services to educate students about money management.

By completing this survey, you acknowledge that you are 18 years or older.

Please respond no later than February 22. **Click below to access the survey now:**

Student Credit Use and Personal Financial Management Survey
<http://www.surveymonkey.com/s.asp?u=447362572799>

Thank you in advance for taking the time to help with this important project.

Sincerely,

Deanna L. Sharpe, Ph.D.
239 Stanley Hall
University of Missouri
882-9652
sharped@missouri.edu

Robert O. Weagley, Ph.D.
239 Stanley Hall
University of Missouri
882-9651
weagleyr@missouri.edu

Final E-mail to Students:

Student Credit Use & Personal Financial Management Survey

Hi MU Students,

This is a final REMINDER ... if you haven't already filled out our survey ... you have one more opportunity to help us out! The survey will take you about **10-15 minutes to complete** and you will have a chance to win one of three **\$150 gift certificates** to the Columbia Mall!

We are working with educators at the University of Missouri Extension to develop a new financial literacy program. The purpose of the program is to develop resources and materials to help college students make informed financial decisions related to credit usage and paying for their college education. **We need your help in learning more about how students manage their money**, and hope that you will choose to participate in our survey.

Your participation is strictly voluntary. You may refuse to participate or discontinue participation at any time without penalty. Your decision to participate will not affect your present or future relations with your college or the University of Missouri. If you decide to fill out the survey, your feedback will provide us with valuable information about how money issues are affecting today's college students. If you do not wish to receive any more e-mails about this survey, please contact Dr. Sharpe at the e-mail address below.

Any and all information we receive will be kept strictly confidential and will only be seen by authorized members of our staff. Data gathered from the survey will be analyzed as a whole, excluding all references to any individual students. Only the results of our analysis will be shared with researchers and organizations that are interested in providing services to educate students about money management.

By completing this survey, you acknowledge that you are 18 years or older.

Please respond no later than _____. **Click below to access the survey now:**

Student Credit Use & Personal Financial Management Survey

<http://www.surveymonkey.com/s.asp?u=447362572799>

Thank you in advance for taking the time to help with this important project.

Sincerely,

Deanna L. Sharpe, Ph.D.
239 Stanley Hall
University of Missouri
882-9652
sharped@missouri.edu

Robert O. Weagley, Ph.D.
239 Stanley Hall
University of Missouri
882-9651
weagleyr@missouri.edu

APPENDIX B:

Student Financial Management Survey January 2007

Conducted by Faculty at the University of Missouri

Thank you for choosing to participate in our survey. Drs. Deanna Sharpe and Robert Weagley from the University of Missouri and their colleagues are conducting research to learn more about student financial management and the ability of students to pay for their college education. Your answers are very important because they will help us in developing financial education programs that will help students have a successful college experience.

Your participation in this survey is strictly voluntary and you may refuse to participate or discontinue participation at any time. You may also skip any question that you do not wish to answer. Your decision to participate will not affect your present or future relations with your college or the University of Missouri

All of your survey responses will be kept strictly confidential. Your responses will be seen only by authorized researchers working on the project. Data gathered for this project will be analyzed as a whole, excluding references to any individual student. ONLY the results of our analysis will be shared with researchers and organizations interested in providing services to students about financial education and student success.

By completing this survey, you acknowledge that you are 18 years or older. The survey will take you about 10-15 minutes to complete and you will have a chance to win one of three \$150 gift certificates to the Columbia Mall. Good luck!

Questions or concerns about the survey may be directed to Dr. Deanna Sharpe (573.882.9652; SharpeD@missouri.edu). For information about your rights as a research subject, please contact the MU IRB (573.882.9585; irb.missouri.edu).

Section 1: Current Credit Usage and Shopping Behavior

This section asks about your credit card usage and shopping behavior.

Please use the following definitions when answering questions in section 1:

A CREDIT CARD is different from a DEBIT CARD.

CREDIT CARD: With a credit card, an issuer lends money to the consumer (or the user). Transactions are billed to the cardholders account and are paid for at a later date.

DEBIT CARD: When purchases are made with a debit card, money is immediately withdrawn from your account.

NOTE: There are also cards available that serve as both credit and debit cards

1. Do you have a **credit card**? (that is not used primarily as a debit card)

a. Yes

b. No (if no, skip to question 14)

2. Approximately, how many **credit cards** do you use on a regular basis? _____

3. Please indicate how each credit card was acquired (source) below: (check all that apply)

____ Parents ____ Direct Mail ____ Flyer/Leaflet on Campus

____ On-Campus Solicitation ____ Your Local Bank ____ Gas Station

____ Retail/Department Store ____ Other, please specify _____

4. Which of the following types of credit cards do you own: (check all that apply)

____ Visa ____ Mastercard ____ Discover ____ American Express

____ Other (please specify) _____

5. What do you usually **purchase** with your credit card(s)? (Check all that apply)

____ Tuition and fees ____ Clothes and accessories ____ Eating Out

____ Computer/related supplies ____ Gas/Auto maintenance/repair

____ Expenses related to Fraternity/Sorority/Professional Organizations

____ Textbooks/School Supplies ____ Cosmetics or other personal items

____ Electronics equipment ____ Home Furnishings and Furniture

____ Travel (airfare, hotel, rental car) ____ Emergency Situations Only

____ General books (not textbooks) ____ Groceries

____ Videos/DVDs/CDs ____ Entertainment (concert tickets, movies, clubs, etc)

____ Rent/utilities/cable/internet/cell phone

____ Other, please specify _____

6. Do you charge school items (i.e. textbooks, tuition, fees) on your credit card(s), because student financial aid is **not enough to cover the cost**?

a. Yes

b. No

7. What is the **TOTAL** amount you **usually charge** on all of your credit cards in one month? _____

8. After you made your last payments on your credit card accounts, what was the **TOTAL amount** you still owed on those accounts? _____

9. Please indicate the highest APR from among the credit cards that you USE: _____

10. Is the APR on your credit card: (check one)

a. Variable _____

b. Fixed _____

c. A mix of fixed and variable _____

d. Don't Know _____

11. How many credit cards do you have charged to the **credit limit**? _____

12. Who usually **pays** your credit card bills? (check all that apply)

a. You _____

b. A Parent or Guardian _____

c. A Spouse _____

13. Do you use your financial aid to pay your **credit card bill(s)**?

a. Yes

b. No

14. Have you checked your credit rating in the last 12 months?

a. Yes

b. No

15. Do you have a **debit card**?

a. Yes

b. No (if no, skip to Question 16)

16. How many **debit cards** do you have? _____

Section 2: Personal Financial Knowledge

The following section is designed to gauge how comfortable you are with concepts related to personal finance.

17. Which of the following credit card users is likely to pay the GREATEST dollar amount in finance charges per year, if they all charge the same amount per year on their cards?

- a. Someone who always pays off their credit card bill in full shortly after it is received
- b. Someone who only pays the minimum amount each month
- c. Someone who pays at least the minimum amount each month, and more when they have more money
- d. Someone who generally pays their card off in full, but occasionally will pay the minimum when they are short on cash
- e. Don't know

18. Which of the following types of investment would best protect the purchasing power of a family's savings in the event of a sudden increase in inflation?

- a. A twenty-five year corporate bond
- b. A house financed with a fixed-rate mortgage
- c. A 10-year bond issued by a corporation
- d. A certificate of deposit at a bank
- e. Don't know

19. Which of the following statements best describes your right to check your credit history for accuracy?

- a. All credit records are the property of the U.S. Government and access is only available to the FBI and Lenders
- b. You can only check your credit report for free if you are turned down for credit based on a credit report
- c. Your credit report can be checked once a year for free
- d. You cannot see your credit report
- e. Don't know

20. Which of the following loans is likely to carry the highest interest rate?

- a. A car loan
- b. A home equity loan
- c. A credit card loan
- d. A student loan
- e. Don't know

21. Which of the following is NOT TRUE about the annual percentage rate (APR)?

- a. APR is expressed as a percentage on an annual basis
- b. APR takes into account all loan fees
- c. APR is the actual rate of interest paid over the life of the loan
- d. APR should not be used to compare loan costs
- e. Don't know

22. A high-risk and high-return investment strategy would be most suitable for:

- a. An elderly retired couple living on a fixed income
- b. A middle-aged couple needing funds for their children's education in two years
- c. A young married couple without children
- d. All of the above because they all need high returns
- e. Don't know

Section 3: Internet Buying

This section asks about your use of the Internet and issues related to security.

23. Have you ever been a victim of credit card theft?

- a. Yes
- b. No

24. Have you ever been a victim of identity theft?

- a. Yes
- b. No

25. Do you know how to recognize a **secure site** on the Internet?

- a. Yes
- b. No (if no, skip to Question 26)

26. Which of the following ways do you use to identify a secure site (check all that apply)?

- a. Lock icon _____
- b. https in web address _____
- c. Theft insignia _____
- d. Other, please specify _____

27. Do you make **purchases** on the Internet?

- a. Yes
- b. No (if no, skip to question 31)

28. What do you **buy** on the Internet? (Please check all that apply)

_____ Textbooks/School Supplies _____ Cosmetics/Other Personal items

- Computer and related supplies General books (not textbooks)
 Electronics equipment Home furnishings and furniture
 Travel (airfare, hotel, rental car) Clothes and accessories
 Videos/DVDs/CDs Entertainment (concerts, movies, clubs)
 Car Other, please specify _____

29. When you make purchases from **the Internet sites**, how often are your purchases from secure sites?

- a. Always
- b. Frequently
- c. Sometimes
- d. Seldom
- e. Don't know

30. How often do you use a credit card for your **Internet purchases**?

- a. Always
- b. Frequently
- c. Sometimes
- d. Seldom
- e. Never

31. In the past 12 months, have you used the internet for the purpose of gambling?

- a. Yes
- b. No

32. Do you pay bills on the internet?

- a. Yes
- b. No (if no, skip to question 33)

33. Please indicate which bills you pay on the internet from among the following: (Check all that apply)

- Rent Utilities Cable Credit Card
 Internet Telephone Cell Phone Other (specify)

Section 4: Money Attitudes

This section asks about your attitudes toward money and credit card.

34. Please indicate **how often** you have or have not done the following things by the following scale:

1 = Very Often 2 = Often 3 = Sometimes 4 = Rarely 5 = Never

Felt others would be horrified if they knew of my spending habits _____

Bought things even though I couldn't afford them _____

Wrote a check when I knew I didn't have enough money in the bank to cover it _____

Bought myself something in order to make myself feel better _____

Felt anxious or nervous on the days I didn't go shopping _____

Made only the minimum payments on my credit cards _____

Have exceeded the limit on my debit card _____

Checked my credit card statement(s) for fraudulent activity _____

35. Please indicate how much you **agree or disagree** with each of the statements below based on the following scale:

1 = Strongly Agree 2 = Agree 3 = Neutral 4 = Disagree 5 = Strongly Disagree

If I have any money left at the end of the pay period, I just have to spend it.

My credit cards are usually at their maximum credit limit _____

I frequently use available credit on one credit card to make a payment on another credit card _____

I always pay off my credit cards at the end of each month _____

I worry how I will pay off my credit card debt _____

I often make only the minimum payment on my credit cards _____

I am less concerned with the prices of a product when I use a credit card _____

1 = Strongly Agree 2 = Agree 3 = Neutral 4 = Disagree 5 = Strongly Disagree

I am more impulsive when I shop with credit cards _____

I spend more when I use a credit card _____

I am seldom delinquent in making payments on my credit cards _____

I rarely go over my available credit limit _____

I seldom take cash advances on my credit cards _____

I have too many credit cards _____

I let my friends influence how much I spend _____

I have taken a course on personal finance _____

I have been in credit card debt _____

I am concerned with establishing good credit _____

36. Please indicate how much you **agree or disagree** with each of the statements below using the following scale:

1 = Strongly Agree 2 = Agree 3 = Neutral 4 = Disagree 5 = Strongly Disagree

Although I should judge the success of people by their deeds, I am more influenced by the amount of money they have _____

It bothers me when I discover I could have gotten something for less elsewhere _____

I seem to find that I show more respect to people with more money than I have _____

When I make a major purchase, I have a suspicion that I have been taken advantage of _____

I behave as if money were the ultimate symbol of success _____

After buying something, I wonder if I could have gotten the same for less elsewhere _____

I am bothered when I have to pass up a sale _____

I must admit that I purchase things because I know they will impress others _____

1 = Strongly Agree 2 = Agree 3 = Neutral 4 = Disagree 5 = Strongly Disagree

I automatically say, "I can't afford it" whether I can or not _____

I show signs of nervousness when I don't have enough money _____

I argue or complain about the cost of things I buy _____

People I know tell me that I place too much emphasis on the amount of money a person has as a sign of success _____

I worry that I will not be financially secure _____

I hesitate to spend money, even on necessities _____

I spend money to make myself feel better _____

In all honesty, I own nice things in order to impress others _____

It's hard for me to pass up a bargain _____

I show worrisome behavior when it comes to money _____

When I buy something, I complain about the price I paid _____

I use money to influence other people to do things for me _____

37. Do you have your **social security number** on any of the following: checks, your driver's license, or other personal identification?

- a. Yes b. No c. Do not have a driver's license

Section 5: Lifestyle Factors

How we live our lives, and our willingness to take risks, can affect how we spend our money. This section asks about aspects of your lifestyle and risk taking.

38. When you are driving in a car how likely is it that you are wearing your **seatbelt**?

- a. I never wear a seatbelt
b. I occasionally wear a seatbelt
c. I sometimes wear a seatbelt
d. I often wear a seatbelt
e. I always wear a seatbelt

39. How often have you engaged in **unprotected sex** during the last year or so?

- a. I have not engaged in any sexual activity in the last year

- b. I have not engaged in any unprotected sexual activity in the last year
- c. I have engaged in unprotected sex with my spouse or long-time partner only during the last year
- d. I have engaged in unprotected sex with one partner during the last year
- e. I have engaged in unprotected sex with a couple of partners during the last year
- f. I have engaged in unprotected sex with several partners in the last year

40. How often do you **smoke** cigarettes?

- a. I never smoke at all
- b. I rarely smoke
- c. I sometimes smoke
- d. I smoke often
- e. I smoke every day

41. How often do you engage in strenuous **physical exercise**?

- a. I never engage in strenuous exercise
- b. I exercise on occasion (less than once per week)
- c. I sometimes exercise (at least once or twice a week)
- d. I exercise regularly (at least 3-5 times a week)
- e. I exercise almost every day (6-7 times a week)

42. How often do you use **nutrition labels** to select the foods you buy?

- a. I never use nutrition labels
- b. I use nutrition labels on occasion
- c. I sometimes use nutrition labels
- d. I often use nutrition labels
- e. I always use nutrition labels

43. How often do you **choose foods for** the purpose of creating a **diet** that will reduce your chances of having a diet-related illness in the future?

- a. I never use foods for the reason that they will keep me healthy
- b. On occasion I will choose foods to keep me healthy
- c. I sometimes choose foods that will keep me healthy
- d. I often choose foods that will keep me healthy
- e. I always choose foods for reasons of healthiness

44. Bill has just finished college and has been offered a job which covers his living expenses and comes with a **\$500 signing bonus to be received immediately, or a guaranteed bonus of \$1,000 to be received in five years** whether he is with the company or not. Do you think Bill should take the \$500 now or wait five years for the \$1,000?

- a. Take the \$500 now
- b. Take the \$1,000 in one year

45. Shelley, who is 55 years old and single, has won a **\$50,000 lottery that pays her \$5,000 a year for 10 years**. She has also been offered a single lump-sum payment of \$25,000 immediately. Should she accept the \$5,000 per year over 10 years, or \$25,000 right now?

- a. \$5,000 per year for 10 years
- b. \$25,000 right now

46. When you graduate from college and get a job, how important will it be to you to start **saving for retirement**?

- a. Not important
- b. A little important
- c. Pretty important
- d. Very important
- e. Extremely important

47. If your employer automatically enrolled you in a retirement savings program, which of the following mutual fund categories would you prefer?

- a. Guaranteed return with no risk of financial loss
- b. A bond mutual fund
- c. A mixed stock/bond mutual fund
- d. A stock fund of larger, less risky companies
- e. A stock fund of smaller, more risky companies

48. What is the most important characteristic when choosing a mutual fund for your retirement savings?

- a. Past returns
- b. Management fees
- c. Level of investment risk
- d. Composition of assets
- e. Reputation of the mutual fund company

Section 6: Paying For Your College Education

This section asks about going to college, and how you pay for your college education.

49. How likely is it that your **consumer debt** will make it difficult to complete your college degree?

- a. Very likely
- b. Likely
- c. Somewhat likely
- d. Not likely
- e. Not at all likely

50. Have you ever reduced the number of **credit hours** you were taking so that you could work more hours for any of the following reasons:

- a. Never reduced credit hours for any of these reasons
- b. To “make more money”
- c. To make money to “live on”
- d. To pay your credit card bills
- e. To pay your school loans
- f. To pay for other loans

51. Have you ever **dropped out** of college for any of the following reasons:

- a. Never dropped out of college for any of these reasons
- b. To “make more money”
- c. To make money to “live on”
- d. To pay for your credit card bills
- e. To pay your school loans
- f. To pay for other loans

52. Are you financially independent from your parents (i.e. parents do not claim you on their tax return)?

- a. Yes
- b. No

53. What is YOUR **annual income**? (Give an approximate amount)

- a. Less than \$25,000
- b. \$25,000-\$49,999
- c. \$50,000-\$74,999
- d. \$75,000-\$99,999
- e. \$100,000-\$149,999
- f. \$150,000 or more
- g. Not Sure

54. What is YOUR PARENTS **annual income**? (Give an approximate amount)

- h. Less than \$25,000
- i. \$25,000-\$49,999
- j. \$50,000-\$74,999
- k. \$75,000-\$99,999

- l. \$100,000-\$149,999
- m. \$150,000 or more
- n. Not Sure

55. Do you receive Financial Aid?

- a. Yes
- b. No

56. What type(s) of **Financial Aid** are you currently receiving? (Check all that apply)

- ___ Federal work study
- ___ Federal student loans (i.e. Stafford, PLUS)
- ___ Need-based grants (i.e. PELL, MAP)
- ___ Scholarships
- ___ Tuition Waiver
- ___ Other (please specify) _____

57. Approximately, what is the **TOTAL** amount of financial aid that you receive in a given year?

58. How much do you currently owe with respect to **financial aid loans**?

- a. \$0, I have no Financial Aid loans
- b. \$1-\$4,999
- c. \$5,000-\$9,999
- d. \$10,000-\$19,999
- e. \$20,000-\$29,999
- f. \$30,000-\$39,999
- g. \$40,000-\$49,999
- h. \$50,000 or more
- i. Not Sure

59. How likely is it that the emotional burden associated with receiving and repaying this aid will make it difficult for you to complete your college degree?

- a. Very likely
- b. Likely
- c. Somewhat likely
- d. Not very likely
- e. Not at all likely

60. Excluding any financial aid, how much does it cost you out of pocket, each year, to go to college (including all expenses and room and board)?

61. Do you currently have any other type(s) of loans (do not include loans for which you are not personally responsible for repayment)?

- a. Yes b. No

62. What **other type(s) of loans** do YOU personally have (do not include loans for which you are NOT personally responsible for the repayment)? (Check all that apply)

___ No other loans at this time

___ Mortgage

___ Informal loan from family/friends

___ Car loan

___ Installment loan (i.e. for stereo, PC, or other electronics, furniture)

___ Private loan from a financial institution (bank, credit union)

___ Other, please specify _____

63. NOT including credit card debt and financial aid loans, approximately **how much other debt** do you currently owe?

- a. \$0
- b. \$1-\$999
- c. \$1,000-\$2,999
- d. \$3,000-\$4,999
- e. \$5,000-\$9,999
- f. \$10,000-\$19,999
- g. \$20,000 or more
- h. Not Sure

64. Do you currently have a job?

- a. Yes b. No (if no, skip to question 64 in section 7)

65. In terms of your employment are you currently:

- a. Employed on campus
- b. Employed off campus
- c. Employed both on and off campus

66. How many hours do you generally work per week? _____

67. What is your hourly wage rate/monthly income if salaried? (If you have more than one job, please use your highest wage rate) _____

Section 7: Some Information About You

The following section is interested in gathering information about you in terms of your demographics and interests

68. What is your **age**? _____

69. What is the highest level of schooling your father or mother completed?

- a. Neither completed high school
- b. Completed high school
- c. Some college
- d. College graduate or more than college
- e. Don't know

70. What is your **year** in school?

- a. Freshman
- b. Sophomore
- c. Junior
- d. Senior
- e. Graduate student
- f. Professional student
- g. Law student
- h. Medical student

71. What college/school is your major in? Check all that apply if more than one

- a. Agriculture
- b. Arts & Science
- c. Education
- d. Journalism
- e. Engineering
- f. Business
- g. Human Environmental Sciences
- h. Health Professions
- i. Nursing
- j. Medical School
- k. Law School
- l. Undeclared

72. When you begin to work full-time, after you finish your education, how much do you expect to make per year before deductions for taxes and other items?

- a. Under \$15,000
- b. \$15,000-\$19,999
- c. \$20,000-\$29,999
- d. \$30,000-\$39,999
- e. \$40,000-\$59,999
- f. \$60,000-\$74,999
- g. \$75,000 or more
- h. Don't know

73. As a freshman, did you or do you belong to: (Check all that apply if more than one)

- a. A FIG (freshman interest group)
- b. Fraternity or Sorority
- c. A Sponsored Learning Community (SLC)
- d. None of the above

74. Do you currently belong to a **sorority or fraternity**?

- a. Yes
- b. No

75. Do you currently have a **car** with you at school?

- a. Yes
- b. No

76. Are you **enrolled**:

- a. Full-time
- b. Part-time

77. What is your overall **G.P.A.**? If you are a first semester student, what was your GPA at the last school you attended? _____

78. What is your **gender**?

- a. Male
- b. Female

79. What is your **marital status**?

- a. Married
- b. Single (never married, divorced, widowed)

80. How many **children** do you have? (put zero if none) _____

81. What is your **race**?

- a. African American
- b. Caucasian
- c. Native American
- d. Asian
- e. Hispanic
- f. Other (please specify) _____

82. How would you describe your **hometown**?

- a. Urban
- b. Suburban (near a large urban area)
- c. Medium size town
- d. Small town in a rural area
- e. Rural

83. We are very interested in learning as much as possible about issues facing college students related to money management, credit card use, and paying for their college education. **Also we are interested in any advice you might give to incoming freshmen.** Please use this space below to tell us anything else you think might be important for us to know.

84. Thank you very much for taking the time to complete our survey. If you are interested in entering your name in the drawing for a chance to win one of three \$150 gift certificates, please enter your e-mail address below:

VITA

Cliff Robb was born in 1978 in Bloomington, Indiana. He is the son of John and Kaye Robb, and has one sibling, his brother, Ian. He grew up in Tuscaloosa, Alabama where he attended Tuscaloosa Academy. He attended the University of the South in Sewanee, TN and earned a Bachelor's degree in psychology. He earned his Masters in Consumer Sciences at the University of Alabama before attending the University of Missouri beginning in the spring of 2005. He currently lives in Tuscaloosa, Alabama with his wife Ebba. He works as an Assistant Professor in the Department of Consumer Sciences within the College of Human Environmental Sciences at the University of Alabama.