Risk Tolerance and the Financial Satisfaction of Credit Card Users

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This study tests whether risk tolerance mitigates the effects of credit card mismanagement on users' financial satisfaction. We used data from the Health and Retirement Study and found results showing that credit card mismanagement reduces the financial satisfaction of lower-risk-tolerance users only. The results also suggest that the psychic costs of credit card mismanagement (i.e., stress and anxiety), not the monetary costs (fees and higher interest rates), may be the biggest contributors to the dissatisfaction associated with credit card use.

Keywords: credit, credit cards, financial satisfaction, Health and Retirement Study, risk tolerance

If used properly, credit cards can be an effective tool to increase the overall financial satisfaction of consumers. Credit cards can be used to increase utility over the life cycle by transferring resources from periods of low marginal utility of consumption to periods of high marginal utility of consumption and by smoothing consumption in the face of short-term income shocks (Ando & Modigliani, 1963; Godwin & Carroll, 1986; Hira, 1987; Hira & Mueller, 1987; Titus, Fanslow, & Hira, 1989). Credit cards also represent an effective tool for building credit, which, for the responsible user, can provide increased access to preferred interest rates on installment notes used to purchase major assets such as homes and automobiles. These benefits, along with the ability to receive valuable rewards from credit card companies, make credit cards a valuable consumer tool (Scholnick, Massoud, Saunders, Carbo-Valverde, & Rodríguez-Fernández, 2008).

Despite the benefits, there is ongoing concern about Americans' use of credit cards to fund consumption. While credit cards increase consumers' access to credit, the use of credit cards creates debt on the household balance sheet and debt by nature places an obligation on future income. Credit card balances that are not paid in full are subject to interest charges and other fees that lead to an overall higher cost of consumption. According to the 2015 Report on the Economic Well-Being of U.S. Households, 77% of Americans reported owning a credit card and 31% reported carrying an ongoing credit card balance (Federal Reserve Board of Governers, 2016). Data from the 2015 U.S. Bureau of the Census indicated that the average balance carried by households with credit card debt was $16,000, with an average interest rate of approximately 13%.

Given the exposure to a possible loss from credit card use, it is reasonable to assume that risk tolerance will be a determinant of how consumers use credit cards and the utility they derive from that use. Risk tolerance is conceptualized as an individual's willingness to engage in behavior where the attainment of a desirable outcome is uncertain and there is exposure to a possible loss (Irwin, 1993; Kogan & Wallach, 1964; Okun, 1976).

The inherent risk in credit card use is found in the uncertainty of future income needed to repay the debt obligation. Consumer economic theory suggests that more risk-tolerant individuals face smaller reductions in utility in the presence of future financial uncertainty than their less-risk-tolerant counterparts (Irwin, 1993; Von Neumann & Morgenstern, 1947). This suggests that consumers' use of credit cards, and

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the satisfaction they derive from that use, will be impacted by their risk tolerance. Consistent with this, Fan, Chang, and Hanna (1994) found that more risk-tolerant consumers were more willing to borrow on credit cards when future income was uncertain.

This study contributes to the literature by testing the impact of risk tolerance on the financial satisfaction of credit card users. We expect credit card users who are more risk tolerant to be more active users and to report higher levels of financial satisfaction than users who are less risk tolerant. We also expect that credit card mismanagement, which increases the risks of credit card use, will have a larger negative effect on the financial satisfaction of users with lower risk tolerance than on users with higher risk tolerance.

Literature Review and Hypotheses

Factors Associated With Credit Card Use

There are a number of factors that have been found to influence credit card use. Increased access to credit has been found to be positively related to higher levels of credit card borrowing (Canner & Cyrnak, 1986; Kim & DeVaney, 2001; Kinsey, 1981). This relationship between access and borrowing has been found to be further influenced by consumers' time preference and borrowing habits. Individuals that have a stronger preference for current consumption have been found to be more likely to carry a credit card balance (Godwin, 1998). Furthermore, once individuals fall into the habit of carrying a balance, the likelihood of continuing to carry a balance has been found to increase (Kim & DeVaney, 2001).

The level of liquid assets also has been found to impact consumers' willingness to carry a credit card balance. Consumers with higher levels of liquid assets have been found to be more likely to pay their credit card balances in full each month (Canner & Cyrnak, 1985; Zhang & DeVaney, 1999). Older consumers have been found to be less likely to carry a credit card balance (Bei, 1993; Canner & Cyrnak, 1985; Choi & DeVaney, 1995; Rutherford & DeVaney, 2009; Wasberg, Hira, & Fanslow, 1992), while married consumers and those with larger households have been found to be more likely to carry a credit card balance (Godwin, 1998; Kinsey, 1981; Steidle, 1994).

Factors Associated With Financial Satisfaction

The Jekyll and Hyde nature of credit cards arouses interest in how their use impacts financial satisfaction. Easterlin (2006) has found that financial satisfaction is a more significant predictor of overall happiness than satisfaction from other domains. After controlling for debt, Archuleta, Dale, and Spann (2013) have found financial satisfaction to be the most important predictor of financial stress. Lown and Ju (1992) have found that feelings of concern about credit card use are strongly negatively related to financial satisfaction. Joo and Grable (2004) also have found overall debt levels to be related negatively to financial satisfaction, while income, comparative income adequacy, and age have been found to be related positively to financial satisfaction (Clark, Senik, & Yamada, 2013; Grable, Cupples, Fernatt, & Anderson, 2013; Hsieh, 2004). Cao and Liu (2017) also have found that the source of personal finance information may affect financial satisfaction.

Factors Associated With Risk Tolerance

Risk tolerance has been found to increase with education, income, net worth, and debt levels (Chen & DeVaney, 2002; Chen & Finke, 1996; Grable & Lytton, 1998; Gutter, Fox, & Montalto, 1999; Hawley & Fuji, 1993; Lee & Hanna, 1995; Warner & Cramer, 1995). Individuals that are male, White, and married also have been found to have higher levels of risk tolerance (Badu, Daniels, & Salandro, 1999; Grable & Lytton, 1998; Gutter et al., 1999; Sung & Hanna, 1996), while age has been found to have both a negative and curvilinear relationship with risk tolerance. Morin and Suarez (1983) have found that risk tolerance decreases with age, while Wang and Hanna (1997) have found that risk tolerance increases with age until approximately age 55 and then begins to decrease. There also is evidence that risk preferences related to finances are consistent with risk preferences related to other aspects of an individual's life (Grable & Rabbani, 2014).

Hypothesis

Credit cards can be used to increase satisfaction over the life cycle by transferring resources from periods of low marginal utility of consumption to periods of high marginal utility of consumption. Credit cards also represent an effective tool for building credit and gaining access to valuable rewards from credit card companies. Despite these benefits, the use

of credit cards creates debt on the household balance sheet and an obligation on future income.

Given the exposure to a possible loss from credit card use, it is reasonable to assume that risk tolerance will be a determinant of how consumers use credit cards and the utility they derive from that use, with more risk-tolerant individuals facing smaller reductions in utility in the presence of future financial uncertainty than their less-risk-tolerant counterparts. We hypothesize that credit card users who are more risk tolerant will be more active users and report higher levels of financial satisfaction. We also hypothesize that credit card mismanagement, which increases the risks of credit card use, will have a greater negative effect on the financial satisfaction of lower-risk-tolerance users than on higher-risk-tolerance users.

Method

Data

The analysis in this study uses data from the 2010 wave of the Health and Retirement Study (HRS). The focus of this study is Americans over the age of 50, and it is designed to be nationally representative of this group. The study contains questions about a wide array of topics, including cognitive ability, life circumstances, health, and socioeconomic status. The 2010 survey wave was administered between February 2010 and 2011.

Variables

Our dependent variable, financial satisfaction, is taken from the leave-behind questionnaire portion of the main survey. This questionnaire was left with the respondent to complete at his/her leisure after the completion of the main survey. Its purpose was to allow expanded collection of data at minimal risk of fatiguing the respondent.

The Leave-Behind Questionnaire was divided into two subsets of questions, the Participant Lifestyle Questionnaire and the Participant Questionnaire on Work and Health. Survey respondents were divided randomly into two groups upon completion of the main survey. Respondents assigned to Group A were given the Lifestyle Questionnaire subset of questions to complete and Group B respondents were given the Work and Health Questionnaire subset of questions. The groups then switched questions at the next wave. The financial satisfaction variables are contained in the Participant Lifestyle Questionnaire.

The financial satisfaction measure used in the analyses in this study is constructed from a simple 5-point Likert scale response to the question "How satisfied are you with your present financial situation?" where 1 = *completely satisfied* and 5 = *not at all satisfied*. We reverse the coding of this variable so that a higher value is associated with a greater degree of financial satisfaction.

Our key explanatory variable, risk tolerance, is constructed from information in the main body of the survey. The survey presented respondents with two jobs and asked them to choose between the two under a variety of different circumstances. Job A would pay a guaranteed income while job B had an even chance of either paying double or paying a reduced salary. Subsequent questions progressively reduced the salary offered by job B until the respondent was no longer willing to accept the income risk posed by accepting job B.

Others have also used this data to attempt to answer a wide range of risk-related research questions. Barsky, Juster, Kimball, and Shapiro (1997) relate the risk preferences revealed in this data to the failure to purchase insurance, a preference for treasury bills over stocks, and the tendency to smoke and drink. This data has also been used to explain differences in asset allocations across households, the effect of market volatility on measured risk tolerance, the role of bargaining in intra-household risk-taking decision processes, and the changes in measured risk preferences over time (Kimball, Sahm, & Shapiro, 2007; Sahm, 2012; Yao & Curl, 2011; Yilmazer & Lich, 2015). Changes in risk preferences also have been found to vary across households depending on their economic situation (Schooley & Worden, 2016). The relatively broad sample available in the HRS also has been useful for estimating the determinants of risk preferences and examining the difference between subjective and objective measures of risk (Fang, Hanna, & Chatterjee, 2013; Hanna & Chen, 1997)

While most of these studies measure risk tolerance using a six-point ordinal metric, our sample size (which relies on answers to the question about financial satisfaction) does not allow this many categories. Therefore, we group the six possible response categories into a simple binary variable to reflect individuals' willingness to accept uncertainty in their income. The first group is comprised of those who demonstrate at least some tolerance for risk by being willing to risk

TABLE 1. Distribution of Risk-tolerance Responses (*n* = 305)

Highest Probability of Income Loss Accepted	Number Observed	Percentage of Sample	Willing to Accept Income Loss
75%	16	5	Yes
50%	20	7	Yes
33%	29	10	Yes
20%	40	13	Yes
10%	65	21	Yes
0%	135	44	No

at least 10% of their income for a chance to double their salary. The second group is composed of those who refused to accept any level of uncertainty in their future salary, no matter how great the potential reward. This categorization is reasonable because it separates respondents who are willing to accept some level of risk from those who are unwilling to take a risk at any level for a chance at an income gain. Table 1 shows that approximately 56% of the sample of 305 respondents is willing to accept some uncertainty in future income, while the remaining 44% is unwilling to accept any level of risk for the chance of an income gain.

Unfortunately, this series of questions was terminated in 2006. Even in the existing data there are some nonresponse problems that make it difficult to rely upon a single survey wave to produce a risk-tolerance measure for every respondent in the survey. Therefore, it is necessary to use observations from multiple waves of the survey to obtain as many useful observations as possible. The 2006 risk-tolerance response is used for a respondent if it is available. If not, then the 2004 response is used. If the 2004 response is not available, then the 2002 response is used. Any respondent lacking a risk-tolerance response in at least one of these three waves is excluded from the sample. The distribution of available risk-tolerance responses is presented in Table 1.

The 2010 wave of the study includes a module that contains data regarding the use and management of credit cards. These data are available in no other wave or module of the HRS, thus making it uniquely useful for this study. The credit card use and management data in this wave are used to create our other key explanatory variables. These include two measures of the degree of credit card use: the number of cards owned and the balance of all credit card debt, in hundreds of dollars.

We also use this module data to create two measures of the degree to which the respondent mismanages his/her credit cards. The first of these is the number of negative credit management behaviors reported by the respondent. The second measure is an indicator for whether or not the respondent considers himself or herself a revolving or convenience user. The questions that identify these behaviors are provided in Table 2. Questions 1 through 7 are used to measure negative credit card mismanagement behaviors, and question 8 is used to determine if the respondent is a convenience or installment user.

For the first measure, questions 1, 2, and 4 indicate credit mismanagement because late payments indicate either an inability to repay or a lack of attentiveness to the management of the credit card. Individuals who pay only the minimum payment (as indicated in question 3) are likely to be paying larger amounts of interest, and also are likely to be struggling with credit card repayment. Individuals who answer "true" to question 5, "In some months you borrowed over the limit and had to pay an over the limit credit card fee" may not be paying close enough attention to the management of their credit cards. Lastly, questions 6 and 7 provide evidence that the individual is not solving liquidity issues in the most efficient manner available to him/her. The credit card mismanagement variable is built by counting the total number of credit card mismanagement behaviors reported.

For the second measure we define revolving users as those who generally carry a balance from month to month, and convenience users as those who generally pay off their balance each month (Bird, Hagstrom, & Wild, 1997). The measure used is a dichotomous variable that takes a value of one if the individual is a revolving user, and zero otherwise.

TABLE 2. Credit Management Questions

Question Text	Response Indicating Mismanagement of Credit Cards
Introduction: Which of the following describes your experience with credit cards in the past 12 months? For each statement, please indicate whether it is true for you or not.	
1. In the past 12 months you have been two or more payments behind on your credit cards.	TRUE
2. In the past 12 months you always paid your credit card bills on time.	FALSE
3. In some months you paid only the minimum credit card payment.	TRUE
4. In some months you were charged a fee for a late credit card payment.	TRUE
5. In some months you borrowed over the limit and had to pay an over the limit credit card fee.	TRUE
6. In some months you used a credit card for a cash advance.	TRUE
7. In some months you borrowed on your credit cards even when you had money in a bank account.	TRUE
8. In some months you carried over a credit card balance and got charged interest.	TRUE

The model also includes controls for demographic and economic characteristics taken from the main body of the survey. These characteristics are included in the model because they have been found to influence financial satisfaction and they may also reflect preferences and constraints indicated by the standard model of utility maximization. We control for marital status with an indicator variable that takes a value of 1 if the respondent is married and zero otherwise (Jakobsson, Hallberg, & Westergren, 2004; Pinquart & Sörensen, 2000). We also control for age, in number of years (Grable & Joo, 2004; Mroczek & Spiro, 2005), and for the natural log of income (Diener, Suh, Lucas, & Smith, 1999). We also include a control for gender (equal to 1 if the respondent is female and 0 otherwise), educational attainment (equal to 1 if the respondent graduated from college and 0 otherwise), and the natural log of financial wealth, which has been found to be highly correlated with risk tolerance (Sung & Hanna, 1996). Hispanic households are less likely to own a credit card than are non-Hispanic households (Bertaut, Haliassos, & Rabbani, 2009; Fisher, 2016). We therefore include controls for race (equal to one if the respondent is black and zero otherwise) and for ethnicity (equal to 1 if the respondent is Hispanic and 0 otherwise). Lastly, we include a control for the number of earners in the household because having multiple sources of income provides a cushion against individual income shocks, affecting the amount of risk that an individual faces, or perceives that he or she faces.

The available sample for this study was obtained first by identifying respondents who have completed the credit card usage portions of the study. The sample was then further narrowed down to those who have a financial satisfaction response and those for whom a risk tolerance measure is available. The final sample consisted of those remaining respondents who also had reported financial information.

Data Analysis

We specify an ordered probit model for this analysis. We divide the survey sample into two groups, based upon their risk tolerance, and estimate the model separately for each group. The ordered probit model is appropriate because the reported financial satisfaction variable is ordered, nominal, and discrete and there is an underlying or latent continuous measure of satisfaction that is unobserved.

The ordered probit model estimates the probability that respondent i will select alternative j. In the current model, the various alternatives (j) are the reported levels of financial satisfaction.

The ordered probit model is written as:

$$Y_i^* = X_i'\beta + \varepsilon$$

$$Y_i = 0 \text{ if } Y_i^* \leq 0 \quad \text{(very dissatisfied)}$$

$$Y_i = 1 \text{ if } 0 < Y_i^* \leq \mu_1$$

$$Y_i = 2 \text{ if } \mu_1 < Y_i^* \leq \mu_2$$

TABLE 3. Descriptive Statistics by Level of Risk-Tolerance (*n* = 305)

	Total Sample	Willing to Accept Income Loss Subsample	Unwilling to Accept Income Loss Subsample
Mean financial satisfaction	3.38	3.5	3.36
Count of respondents	305	170 (53% of total)	135 (47% of total)
Credit use variables			
Mean number of cards	3.56	4.18	2.79
Mean amount owed on cards	$2,431	$3,242	$1,410
Credit-management variables			
Mean credit mismanagement count	0.75	0.78	0.71
Fraction revolving users	0.31	0.29	0.32
Control variables			
Mean financial assets	$213,156	$245,263	$172,724
Mean household	$55,916	$64,800	$44,729
Fraction female	0.643	0.600	0.696
Mean age	66.00	65.48	66.65
Fraction married/partnered	0.675	0.688	0.659
Fraction college graduates	0.308	0.365	0.237
Fraction black	0.121	0.112	0.133
Fraction hispanic	0.069	0.041	0.104
Mean number of earners	0.843	0.906	0.763

$$Y_i = 3 \text{ if } \mu_2 < Y_i^* \leq \mu_3$$

$$Y_i = 4 \text{ if } \mu_3 < Y_i^* \leq \mu_4 \qquad \text{(very satisfied)}$$

where Y_i^* is the latent financial satisfaction of individual *i*, μ_k is each level of observed financial satisfaction where $k = 1, \cdots, 4$, and X_i is a matrix of several credit card use, credit card management, and other explanatory variables.

Results

Table 3 shows descriptive statistics by risk-tolerance category. More-risk-tolerant respondents have more credit cards and higher credit card balances, are less likely to be revolving users, and have more negative credit management practices on average than those who are less risk tolerant. Those who are more risk tolerant also seem to be slightly more financially satisfied on average.

Table 4 reports the estimated coefficients from the ordered probit model. They show that use of credit cards does not affect financial satisfaction, only mismanagement of such cards does, and only for those users with lower risk tolerance. This result is consistent with our hypothesis that the financial satisfaction of less risk-tolerant credit card users should be more affected by credit card mismanagement than that of more risk-tolerant credit card users. The results also support the findings of Fan et al. (1994).

Neither the number of cards owned nor the amount owed on all credit cards have significant effects on the financial satisfaction of less risk-tolerant users, suggesting that any dissatisfaction produced by using credit cards comes from the problems associated with mismanagement and not from the actual loan itself.

Conclusions

We find that only poor credit card management has a negative impact on the financial satisfaction of individuals with lower risk-tolerance. Thus, more risk-tolerant individuals may be more willing to engage in risky credit card behavior. Aware of this, financial planners, educators, and counselors may find it advantageous to spend more time discussing the consequences of poor credit management behaviors with

TABLE 4. Ordered Probit Parameter Estimates—Effects of Credit Card Use, Mismanagement Behaviors, and Controls on Financial Satisfaction

	Willing to Accept Income Loss Sample		Unwilling to Accept Income Loss Sample	
	Estimate	**Standard Error**	**Estimate**	**Standard Error**
Credit use variables				
Number of cards	.041	.029	-.023	.043
Log of amount owed on cards	-.043	.032	.013	.037
Credit management variables				
Credit mismanagement behaviors	.024	.146	-0.448***	.125
Revolving user	-.548	.351	-.075	.332
Control variables				
Log of financial assets	.036	.040	.018	.040
Log total household income	.624***	.181	.280*	.152
Female	.214	.186	-.097	.277
Age	.020	.014	.003	.018
Married/partnered	-.501*	.291	-.235	.350
College graduates	-.199	.207	.007	.290
Race (non-Black excluded)	.300	.356	-.881**	.373
Ethnicity (non-Hispanic excluded)	.314	.426	.101	.400
Number of earners	-.081	.167	-.183	.223
Number of observations	170		135	
Pseudo R-Squared	0.1138		0.1143	

*$p < .10$. **$p < .05$. ***$p < .01$.

their high-risk-tolerant clients and students, especially those that have shown a tendency to overuse or misuse their credit cards.

It also is interesting to note that income is related positively to financial satisfaction levels, but total wealth is not. This may be related to the liquidity differences between an individual's income and wealth. For many households, most of their financial assets are held in retirement accounts or homes. Taking money out of retirement accounts incurs sizeable penalties for premature withdrawals. These penalties reduce the desirability of using retirement assets to service or repay debts. There may be tax consequences, potential investment losses, and illiquidity issues even for assets not held in retirement accounts. Restrictions such as these would reduce further the usefulness of wealth as a tool for managing credit use. Home equity also is highly illiquid (Poterba, 2000). Income, by contrast, is highly liquid and readily available for the maintenance of credit obligations.

It also should be noted that this analysis focuses on adults, aged 50 and over. Thus, the results may not apply to younger generations. The oldest Millennials experienced a major bear market shortly after reaching adulthood in 2000, while most of the rest of the generation experienced the Great Recession very early in their adulthoods. It is known that the Great Depression affected the risk preferences and perceptions of those who experienced it (Malmendier & Nagel, 2011), and that the timing of the occurrence of macroeconomic events can influence risk attitudes generally (Yao, Sharpe, & Wang, 2011). This suggests that there may be significant differences in the ways Millennials perceive and react to credit card risk, and that future research into these effects for younger cohorts may be beneficial.

Implications

While clients of financial planning firms are likely more financially sophisticated than the average consumer, it still may be valuable for planners to educate their clients on the costs of credit card use. By educating clients about the high cost of using credit cards to increase current consumption,

clients will be more aware of how poor mismanagement can negatively impact their ability to make progress toward and achieve their long-term financial goals. This may be especially important for clients with higher risk tolerance and rates of time preference (Fan et al., 1994; Godwin, 1998).

Knowing that increased risk tolerance minimizes the impact of credit card mismanagement on financial satisfaction may require planners and counselors to monitor the balance sheets of their clients more closely. Canner and Cyrnak (1985) and Zhang and DeVaney (1999) found that individuals with higher levels of liquid assets were more likely to pay their credit cards in full each month. Therefore, clients who carry an ongoing credit card balance may be more likely to pay off credit card balances if they are carrying higher levels of liquid assets. This may be effectively accomplished by giving the emergency savings goal increased priority in the plan, and perhaps even by increasing the amount of money held in emergency reserves. Prior research also has found simple liability management to be an effective way to minimize people's likelihood of overusing their credit cards. Kinsey (1981) and Lee and Hogarth (1998) found a positive relationship between access to credit and credit card use. By encouraging clients to decrease the number and credit limits of credit cards they carry, those providing advice may be able to effectively decrease their clients' willingness to borrow on credit cards.

Lastly, planners and counselors must recognize that their clients' credit card behaviors are in some capacity a function of their credit habits. By nature of their habits, individuals that consistently carry a balance and/or make their payments late may be more likely to accumulate higher levels of credit card debt (Kim & DeVaney, 2001). Knowing how credit card use and mismanagement affect both the risk tolerant and intolerant is important to the management of the overall client relationship. For the risk tolerant, planners and counselors will be better equipped to give advice that minimizes the costs of credit card use, making it easier for these clients to efficiently pursue their financial goals. For the less risk tolerant, planners and counselors can make their clients more aware of the credit card behaviors that impact their overall financial satisfaction negatively and can help them set goals and give advice that minimizes these behaviors. By considering the findings of this study, counselors and planners can help their clients manage their credit cards in a way that leads to higher levels of overall financial satisfaction and, in turn, increase commitment in the client-planner/counselor relationship (Anderson & Sharpe, 2008; Sharma & Patterson, 1999).

These results are also applicable to financial educators and coaches. Financial knowledge has been found to increase the quality of financial decisions, an effect that leads to higher overall levels of financial satisfaction (Grable & Lytton, 1998; Roszkowski, 1999; Xiao & Porto, 2017). Financial education regarding the long-term cost of credit card use also may impact people's perceptions of credit card use. Bei (1993), Canner and Cynark (1986), and Steidle (1994) found that people with more positive attitudes toward credit cards were more likely to be revolving users. Consistent with this, Rutherford and DeVaney (2009) found that those who believed using credit cards was a negative financial choice were less likely to carry a credit card balance.

Financial counselors, coaches, and educators can use the results of this study to improve their understanding of the psychology behind poor credit card management. Those who chronically mismanage credit cards may not be experiencing the level of distress that the professional might expect because of high risk-tolerance levels. The professional can use a risk-tolerance assessment to identify which clients/students have high risk-tolerance, and then begin working to counsel and instruct the client/student on the dangers and risks of credit card misuse. Such educational efforts could be effective in helping these individuals to recognize the riskiness of their behaviors and find additional motivation to improve their credit card management.

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