EFFECTS OF NUMERACY AND FINANCIAL LITERACY

ON UNDESIRABLE FINANCIAL AND RELATED

ACADEMIC OUTCOMES IN

COLLEGE STUDENTS

by

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ABSTRACT

EFFECTS OF NUMERACY AND FINANCIAL LITERACY

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Numeracy was a better predictor of financial delinquency than financial literacy. The relationship between numeracy and undesirable academic effects was fully mediated by financial delinquency. It was also found that in a credit card related decision making task, the relationship between numeracy and performance was partially mediated by the deliberation time. This is similar to the finding in Ghazal et al. (2014) and supporting their conclusion that numeracy is just not facility with numbers, but also related directly to heuristic deliberation and metacognition. The findings also support the notion that people low in numeracy might be prone to various biases and fallacies that might lead to deleterious financial behavior and attitudes.

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1. Numeracy and Financial Literacy

Background

Financial Literacy

There has been an ever-increasing sophistication called for in the decision-making abilities in the financial environment that has been growing in complexity. The mortgage crisis followed by the great recession has resulted in passage of several consumer protection laws along with several public policy initiatives with a particular focus on financial literacy education. Although a consensus on the definition of financial literacy is elusive, Huston's (2010) review of extant scales succinctly defines it as the ability to understand and use personal finance-related information.

Numerous studies over the past couple of decades find low financial literacy is widespread, and it correlates with financial behaviors and outcomes. Lusardi, Mitchell and other researchers have produced a series of studies that assess financial literacy and its relationship to various outcomes. Lusardi and Mitchell (2006) devised and fielded a purpose-built module on planning and financial literacy for the 2004 wave of The University of Michigan Health and Retirement Study (HRS). The HRS is a longitudinal panel study with a nationally representative sample of over 26,000 individuals over the age of 50 years surveyed every two years. Lusardi and Mitchell added three simple questions to measure financial literacy to the HRS. This financial literacy scale has been added to several other longitudinal panel studies that have yielded valuable insights pertaining to financial literacy. Most studies consider an individual as financially literate if they answer all three of these questions correctly.

Using the 2004 HRS data, Lusardi and Mitchell (2006) report that financial literacy is highly predictive of financial planning for retirement and also success in that planning. The study

also showed the low levels of financial literacy with just a third of the respondents answering all

the three simple questions correctly. Other studies have confirmed this finding. Xu and Zia

(2012) say that studies and surveys done in high income countries show that financial literacy is

correlated with retirement planning, more sophisticated investment behavior, higher levels of

income and educational attainment. Lusardi and Tufano (2009) report that low financial literacy

is significantly associated with higher debt and at higher costs, even after controlling for income

levels, race and other demographic factors. Hilgert, Hogarth and Beverly (2003) analysis of the

2001 University of Michigan Surveys of Consumers found that knowledge about credit

management, savings and investment topics was significantly associated with reported behavior

in the corresponding area. Perry and Morris (2005) find that the propensity of people to save,

budget and control spending was significantly related to their financial knowledge.

Financial literacy is poorer among the young adults. The three questions were added to

the National Longitudinal Survey of Youth in 2007 for the 1997 panel. The respondents were

between the age of 23 and 28 at the time of the survey. Lusardi, Mitchell and Curto (2010) report

that just 27% of the respondents answered all three questions correctly. Cognitive ability though

correlated with financial literacy did not account for all the variance in financial literacy

implying the independence of the construct. Mandell (2008) report an almost steady decline in

financial literacy in high school seniors based on the biennial Jump$tart Survey of Financial

Literacy. The average score in the latest survey in 2008 of a large national sample of 12-graders

was 48.3% compared to the average score of 57% in 1997 when the survey was first

administered.

Several studies relate deleterious financial behaviors to financial literacy. Moore (2003)

report in their study in Washington State that people who were victims of predatory lending

practices scored significantly lower in their financial knowledge questionnaire. Agarwal, Skiba and Tobacman (2009) report using a sample of people who availed payday loans and also had a credit card from a major issuer had at least $1000 available in credit card liquidity the first time they took out a payday loan. This point to a serious deficit in financial literacy because the cost of borrowing from payday loan providers could be in excess of 400% annual interest, whereas the highest APR on credit card debt is less than 25% even for borrowers with very low FICO scores. This is in agreement with Elliehausen and Lawrence (2001) who report that 72% of payday borrowers were unable to recall the annual percentage rates for their loan. It should be understood that it is not just the poor or undereducated that use such alternate financial services (AFS) with usurious cost of borrowing. Lusardi and Scheresberg (2013) report that in a nationally representative large sample (survey data from 2009 US National Financial Capability Study), 20% of respondents with income between $50,000 and $75,000 and 10% of respondents with income above $75,000 had used an alternate financial service in the last five years. They also report that 55% of the users of alternate financial service had finished high school and had at least some college education. Importantly, they found that low financial literacy was significantly associated with heavy AFS utilization, even after controlling for various demographic characteristics, education, income, risk preferences and whether they had a bank account or not. Mottola's (2013) analysis of a large nationally representative sample show that respondents with low financial literacy were 6% more likely to engage in costly credit card behavior even after controlling for age, gender, education, income, experience of financial shock and self-reported math skills.

Efficacy of Interventions

In response to these findings, numerous initiatives have been launched to improve financial literacy over the years like employer-provided financial education oriented towards better retirement-planning and savings, state-mandated addition of financial education courses to high school curricula, credit and mortgage counseling provided by financial institutions or community-based programs.

Bernheim and Garrett (2003) report based on a national survey conducted in 1994, availability of financial education through the respondent's employer increased participation rates in retirement plans, rates of contributions and retirement account balances on average and for those at the 25th and 50th percentile of total net-worth. Lusardi (2002) analyzed the HRS data and found that although participation in an employer-provided financial education seminar did not affect any outcomes on average, the respondents in the lowest quartile of financial net-worth and those with low education showed significant increase in financial net worth and total net worth.

Another large-scale intervention has been the mandate in financial education in high schools by most states in several waves starting in 1957. Since these mandates were staggered in time, it provided an opportunity for researchers to compare the effectiveness of personal finance courses between states that implemented the mandates and those that did not have such a mandate. In their seminal study, Bernheim, Garrett, and Maki (2001) compared 14 states that had mandated a high school course in economics that included personal finance topics with the remaining states that had no such mandate. Their survey conducted in the year 2000 found that respondents who graduated five years after the mandate was implemented had saved 1.5% more compared to respondents in states without any such mandate. Lusardi and Mitchell (2011) used

state mandated financial education in high school as an Instrumental Variable and conclude that

it has a causal effect on retirement planning. Mandell and Klein (2009) report that there is no

difference in performance in the Jump$tart financial literacy tests between students who have

taken a semester-long high school financial education course and students who have not taken

such a course.

Cole, Paulson and Shastry (2013) compared state-mandated personal finance courses

(between 1957 and 1982) against state-mandated strengthened mathematics curriculum

(requiring at least three years of math in high schools between 1984 and 1994) in a large sample

set drawn from the 2000 US census data, multiple waves of the Survey of Income and Program

Participation and the Federal Reserve Bank of New York Consumer Credit Panel. In contrast to

Bemheim, et al. (2001), the requirement of personal finance courses in high school had no

detectable impact on any of the outcomes. The authors attribute this negative finding to the

simple difference-in-difference methodology used in Bemheim, et al. (2001) without controlling

for state-specific effects and birth-year heterogeneity. Perhaps more significantly, Cole et al.

(2013) report that improvement in high school mathematics courses showed positive downstream

effects in savings, investments, real estate equity and credit delinquencies even after controlling

for income.

But Brown, van der Klaauw, Wen, and Zafar (2013) analyzed the outcomes of a more

recent set of state-level policy changes in personal finance, economics and math education in

high school. They report that both math and finance high school course changes have a

significant effect expressed by increase in FICO credit scores, decrease in credit delinquency,

and overall amount of debt. Curiously, Brown et al. (2013) found that high school economics

course mandates correlated to both higher debt and greater debt delinquency.

Conversely, Brown, Collins, Schmeiser, and Urban (2014) find positive outcomes in debt behavior associated with state-mandated personal finance courses. Shim, Barber, Card, Xiao and Serido (2010) in a large sample of first year students in a large public university report that self-reported participation in high school financial education was a significant predictor of higher financial knowledge and better financial behavior, after controlling for several factors including socio-economic status and high school work experience.

Meta-analyses

There have been only two published meta-analysis that have looked at the effect of financial literacy and financial education. Fernandes, Lynch and Netemeyer (2014) report that measured financial literacy explains merely 1.79% of the variance in financial behaviors in their meta-analysis of 111 studies. Their analysis of 90 studies reveals that financial education interventions account for just 0.11% variance in financial behaviors. Miller, Reichelstein, Salas and Zia (2014) argue in their working paper that Fernandes, et al.'s (2014) results are untenable because they pool together studies that are fundamentally different on various characteristics including type of financial outcomes, quantity and quality of financial education interventions, delivery channel used, and target populations. Willis et al. (2014) identified four categories of financial behaviors and performed separate meta-analysis on them. They report that financial education interventions had positive relationship on past reported savings behavior and post-intervention record keeping behavior but not on loan defaults or savings for retirement. Their results do come with the caveat that the number of studies in each category is very low (four to six) due to their strict selection criteria.

Numeracy and financial outcomes

There is substantial evidence from the decision making research that numeracy is a distinct construct, and several studies have shown that low numeracy is associated with proneness to many biases. The Berlin Numeracy Test is a recently developed instrument that is fast and psychometrically sound, based on the items in the Lipkus Numeracy Scale (Lipkus, Rimer and Samsa, 2001). The primary form of this instrument is in a computer adaptive form that takes into account item difficulty and the response given by the test-taker to the previous question so that there will be at least two and at most three questions. The scale was developed using a three-parameter item response theory with the guessing parameter set to zero. Cokely, Galesic, Schulz, Ghazal and Garcia-Retamero (2012) showed that numeracy as measured by the Berlin Numeracy Test scale accounts for unique variance in risk comprehension tests (e.g., evaluating efficacy of cancer screening, weather forecasting) over and above common tests of cognitive abilities like working memory span, fluid intelligence and cognitive impulsivity. Several studies have shown that the framing effect is affected by individual differences in numeracy. Peters et al. (2006) showed that less numerate subjects rated the quality of work as far better in the positive frame condition (e.g., 74% correct) compared to the negative frame condition (e.g., 26% incorrect), even after controlling for self-reported SAT scores as a proxy for intelligence. In another study conducted in Japan, Okamoto et al. (2012) asked participants to rate the riskiness of a surgical procedure framed either as survival rate or as death rate. The high-numeracy group did not show any framing effect, but the low-numeracy group rated the negatively framed scenario as significantly riskier than the positively framed condition. Another cognitive illusion that is associated with low numeracy is the ratio bias or denominator neglect, which refers to the general tendency of people presented with two ratios to perceive the ratio of

larger numbers as larger than the ratio of smaller numbers, even if the objective probability is equivalent or lower. Peters et al. (2006) found that participants with low numeracy were significantly more likely to choose the more numerous but objectively worse option (9/100 versus 1/10) compared to highly numerate participants, and the difference was only marginally significant when controlled for SAT scores.

But, there have been only a few studies that looked at associations between actual financial outcomes and numeracy. Banks and Oldfield (2007) using the 2002 wave data from the English Longitudinal Study of Ageing with a large representative sample of the English population aged 50 and over found that numeracy was strongly correlated with retirement savings and investment portfolios after controlling for other cognitive abilities, financial wealth, age and education.

Gerardi, Goette, and Meier (2014) in a study using a sample of subprime mortgage borrowers found that numerical ability predicted both delinquency and foreclosure, and this relationship was not found with other aspects of cognitive ability like verbal IQ, response reaction times, etc. Numerical ability was measured by five questions adapted from Banks and Oldfield (2007). Controlled variables in addition to the cognitive measures mentioned earlier include several borrower characteristics like age, sex, ethnicity, education, household income, FICO score, time and risk preferences, and more importantly, financial literacy. Another important finding in this study was that the even after controlling for the type of mortgage (e.g., one with a low initial interest which is later reset to a high variable rate or a low-doc loan, which are taken by itself strong predictors of mortgage delinquency and default) did not affect the negative correlation between numeracy and mortgage outcomes. This indicates that irrespective

of the terms of the mortgage, numerical ability of the borrower mediated their behavior that affected mortgage outcomes.

Mottola (2013) reports that people who report higher self-reported mathematical ability are slightly less likely to indulge in costly credit card behaviors, after controlling for several factors including financial literacy. McArdle, Smith and Willis, using the 2002 wave of the HRS data with respondents at age 50 years and over, conclude that cognitive abilities are a stronger predictor of personal wealth over and above financial literacy, even though both variables are strongly correlated. On the contrary, Lusardi, Mitchell and Curto (2010) using the 2008-2009 wave of the National Longitudinal Survey of Youth panel data which had participants aged between 23-28 years old conclude that variance in financial literacy cannot be explained by cognitive factors alone, and that other socio-demographic factors like education and financial sophistication of parents have a critical predictive role.

Ritchie and Bates (2013) using data from the UK National Child Development Study, a longitudinal panel survey, which has a representative sample of more than 18000 individuals (born during one week in 1958) in the United Kingdom find that achievement scores in math and reading at age 7 (measured in 1965) had substantial positive correlation with Socio-economic Status at age 42 (measured in 2008 and 2009), even after controlling for SES at birth, intelligence (at age 11), motivation (at age 16) and years of education.

2. Financial Literacy, Financial Behavior among College Students

College students are particularly vulnerable to financial risks as many studies discussed in the earlier section (e.g., Chen & Volpe. 1998; Lusardi, Mitchell & Curto, 2010; Mandell, 2009) show they have rather poor financial literacy coupled with a lack of experience in financial decisions. Student debt has in recent years been in the spotlight because of the remarkable increase in outstanding student loan balances in the past decade. Costs of attending college have increased dramatically in the past few decades. According to Lochner and Monge-Naranjo (2014), the average net cost (tuition, fees, room and board after subtracting grants and financial aid) of attending a 4-year public college increased by 64% from 1990-91 to 2012-13. Concomitantly, the federal Pell Grant has failed to keep up with the increased cost. College Board (2014) report that the maximum Pell Grant covered fell to 63% of average public four-year college tuition and fees in 2013-14 from 99% in 2001-02.

This structural shift in funding for college education away from grants has resulted in a staggering increase in student debt. According to a recent report from the Federal Reserve Bank of New York (2014), student debt balances as of September 2014 increased by $100 billion from the previous year to $1.13 trillion and 11.1% of the aggregate debt is currently in delinquency or default. Strikingly, the default rate for the student loan borrowers who started paying back their loans in 2009 is historically high at 26%.

At least some of the gap in funding is being paid for by credit card loans. Lyons (2008) report in their 2003 survey with a large sample of undergraduate students in 10 Midwest campuses that nearly half of the students with financial assistance charge school-related items to credit cards, citing insufficient financial aid as the reason. Sallie Mae (2009) reports that in 2008, 84% of all college undergraduate students had at least one credit card and 50% of them had four

or more cards. Nearly two-thirds of the college seniors had four or more cards with a median debt of nearly $2495. Ninety-two percent of college students with credit card report using credit cards to pay for some type of college expense, with 30% using credit cards to pay tuition and more than 75% using them for textbooks and general school supplies (Sallie Mae, 2009)[1].

There have not been many studies that examined the relationship between credit card usage and academic outcomes. Pinto, Parente and Palmer (2001) found no association between outstanding credit card balance and number of hours worked and academic performance, but low academic performers were significantly more likely to report anxiety about debt, the need to work and its impact on their academic performance. Hogan, Bryant, and Overymyer-Day (2013) report that high credit card balance was associated with increased hours worked and reports of negative academic attitudes and behaviors (e.g., missing classes, considering dropping out). In addition, undesirable academic behaviors were associated with lower GPA.

The few studies that examined the relationship between various personality factors and student debt do not paint a clear picture. Norvilitis, Szablicki, and Wilson (2003) report that there was no association between the amount of debt and locus of control, impulsivity or positive attitude towards debt and spending. In a subsequent study, Norvilitis et al. (2006) found that though delay of gratification was predictive of higher debt, sensation seeking and materialism had no such association. Norvilitis (2014) confirmed the negative association between delay of gratification and debt level.

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[1] The data was collected from a pool of applicants of private loans and might have induced a sampling bias because more than 85% of student debt is in the form of federal student aid (Consumer Financial Protection Bureau, 2012). Though the use of private loans varies between institutions, nationally 30% of students who graduated in 2012 had some private loans, with an average debt of $13,600 (The Project on Student Debt, 2014).

A few cross-sectional studies have confirmed that higher financial literacy was correlated with responsible credit card usage. Norvilitis et al. (2006) report that higher scores in the Jump$tart Financial Literacy survey were associated with responsible credit card behavior. But, Robb and Sharpe (2009) report that higher financial knowledge was positively correlated with higher credit card balances even though the probability of having a credit card balance was not associated with scores in their financial literacy scale.

3. Current Study

Theoretical framework

As the literature review illustrated, numerous studies have confirmed that higher financial literacy is associated with positive financial behavior and outcomes like higher savings, better retirement planning, higher control of spending, budgeting, etc. Studies have also revealed a rather poor level of financial literacy irrespective of demographics or geography. This low financial literacy is seen associated with negative financial behaviors and outcomes like borrowing from predatory lenders, costly credit card behaviors, debt defaults and mortgage delinquencies. But, interventions to improve financial literacy through formal education or individual/group counseling do not seem to yield better downstream financial outcomes. A few studies point towards lower numerical ability rather than poor financial literacy as predictive of negative financial behaviors and outcomes, but this requires further investigation because of the limitations inherent in the sample or methodologies used. For instance, the Cole et al. (2013) study, discussed earlier, compared state-mandated personal finance courses and state-mandated strengthening of math courses in high schools, but did not attempt to measure the actual numerical ability or financial literacy of students.

Ghazal, Cokely and Garcia-Retamero (2014) posit that the construct of numeracy as tested using a statistical numeracy test does not just indicate facility with numbers but is also a superior predictor of heuristic-based deliberation and overall metacognition. They show that deliberation as measured by decision latency in making superior financial decisions partially mediated the relationship between numeracy and performance in the tasks.

In the current study, I used a sample of college students to understand the relationships between numeracy and financial literacy to undesirable financial behaviors and negative

academic outcomes due to financial matters. As had been confirmed in numerous studies (e.g., Lusardi and Tufano, 2009), I expected financial literacy to be predictive of undesirable financial behavior. As reported by Hogan et al. (2010), I expected undesirable financial behavior to be related to undesirable academic outcomes and attitudes. The central hypothesis of this study was that numeracy would be a stronger predictor than financial literacy of both undesirable financial behaviors and academic outcomes, after controlling for demographic and related variables.

Following Ghazal, et al. (2014) I combine the Berlin Numeracy Scale (Cokely et al. 2012) and the Schwartz et al. (2007) scale and use the composite score. Financial literacy was measured using the 13-item scale developed by Fernandes et al. (2014), which they report to have excellent psychometric properties.

In order to test if numeracy is indicative not just of facility with numbers but is also predictive of heuristic deliberation two credit card related decision making tasks were added. Adapted from Soll, Keeney and Larrick (2013), both questions involved paying down a credit card debt. The first question asked for the time it would take to pay down the debt given a regular monthly payment (e.g., $100 per month on a $10,000 debt with a 12% interest rate), and the second questioned asked the debt outstanding after an year when a regular monthly payment is made. (See appendix for the questions.) The time spent on the web page with the questions was taken as a proxy for deliberation time (Ghazal et al., 2014).

The first part of the composite measure of undesirable financial behavior was the financial delinquency scale (Hogan et al., 2013). This scale has three items about recent delinquencies in bill payments. Undesirable credit card use behavior is the second category of financial behavior. This includes the 12-item Risky Credit Card use Scale developed by Roberts

and Jones (2001), and several items about present credit card use, like number of credit cards,

typical amount charged per month, revolving credit card debt, etc.

The composite measure of undesirable academic outcomes include the undesirable

academic effects scale (Pinto, Parente and Palmer, 2001) which includes items to assess

perceived need to work due to debts and the perceived impact on academic performance due to

employment. In addition, several items regarding current academic behavior like current GPA,

credit hours registered, dropped classes, etc. is also included.

Hypotheses

Financial Delinquency

I hypothesized that numeracy would be a better predictor of financial delinquency than financial

literacy. Financial delinquency measure is a composite score comprising of items pertaining to

the previous year such as receiving overdue notices of any bill, late payment of some bills and

having charged a late fee. The rationale for this hypothesis is that despite financial knowledge of

the consequences of delinquency unless the import of these consequences are really understood

and internalized people might be prone to financial delinquency. Thus numeracy which is a

better marker of such metacognition (Ghazal et al., 2014) is likely to be a better predictor than

financial knowledge.

Alternate Financial Services Usage

I hypothesized that participants who score high in the financial literacy scale would be less likely

to use alternate financial services (AFS) such as payday loans, etc. This follows Elliehausen and

Lawrence (2001) finding that most of the AFS borrowers were unaware of critical information

like interest rates. I further predicted that numeracy would be a better predictor than financial literacy of AFS use.

Undesirable Credit Card Use Behavior

Robb (2011) reports that financial knowledge correlated with prudent credit card usage. Amongst credit card holding students, I expected that numeracy would be a better predictor than financial literacy of undesirable credit card use behavior like rotating credit card debts or being delinquent on credit card dues.

Undesirable Academic behaviors and attitudes

I hypothesize that numeracy would be a better predictor of undesirable academic attitudes and behaviors due to matters of money than financial literacy. The underlying rationale behind this hypothesis is that participants who score highly in numeracy have been shown to extract better affective information from numerical information (Peters et al., 2006) whereas financial literacy scale measure just knowledge of financial matters.

Financial Decision making task

In the two hypothetical tasks (adapted from Soll et al., 2013) involving repayment of credit card debt described earlier I expect numeracy to be a reliable predictor of performance. Further, I hypothesize that the relationship between numeracy and performance would be mediated by deliberation time as measured by the total time spent on the webpage while answering the two questions.

Methods

Participants

540 Undergraduate students (71% female; median age 21 years) from the University of

Texas at Arlington were recruited to participate in an online survey from the Psychology

department participant pool. Students obtained course credits for participation.

Thirty three percent of the respondents were white, 25% were Hispanic, 21% were Asian 14%

were African-American, and the rest (8%) reported to belong to other races. Forty percent of the

participants were freshmen, 25% were sophomores, 18% were juniors and 13% were seniors.

90% of the students reported to be going to school full-time.

Materials and Procedure

The online survey items are provided in the appendix. The survey items are in multiple

sections and were presented in the following order:

1. Schwartz et al. (2007) numeracy scale.
2. Adaptive Berlin Numeracy Test (Cokely et al., 2012).
3. Financial Decision Making Task (Soll et al., 2013).
4. Financial Literacy scale (Fernandes et al., 2014).
5. Credit Card Use Items, which includes the Risky Credit Card Use, scale (Roberts & Jones, 2001).
6. General Finance, including Financial Delinquency items from Hogan et al. (2013).
7. Undesirable Academic Behavior/Attitudes from Hogan et al. (2013).
8. Demographic questions

4. Results

Following Cokely et al. (2012), I combined the scores of the Berlin Numeracy Test and Schwartz et al.'s (1997) scale as a measure of numeracy in this study. Individually these two measures had considerable positive or negative skew, but the composite score (BNT-S) yielded a fairly normal distribution (Figure 1).
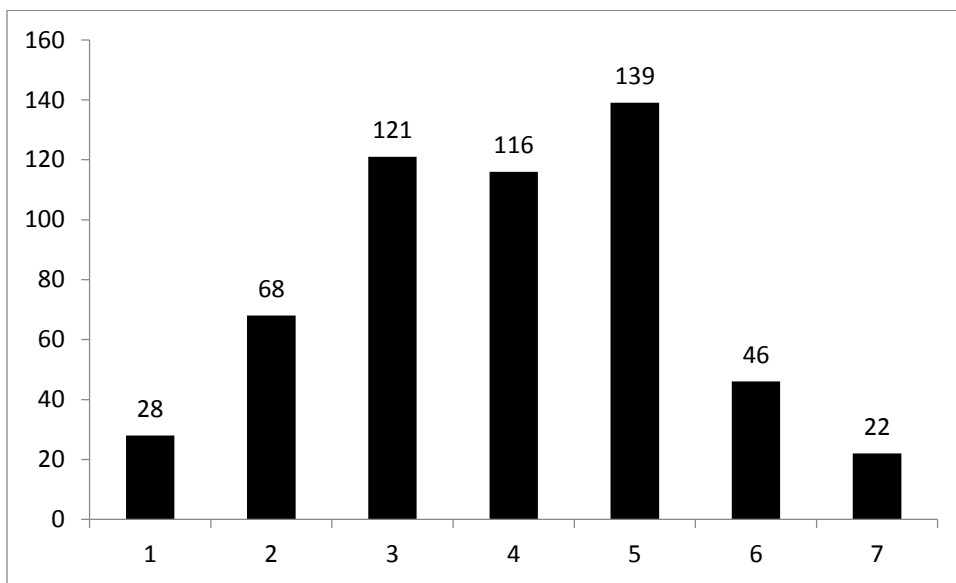
Figure 1. Distribution of Scores in BNT-S

The Financial literacy scores appeared not to be skewed as well (Figure 2).
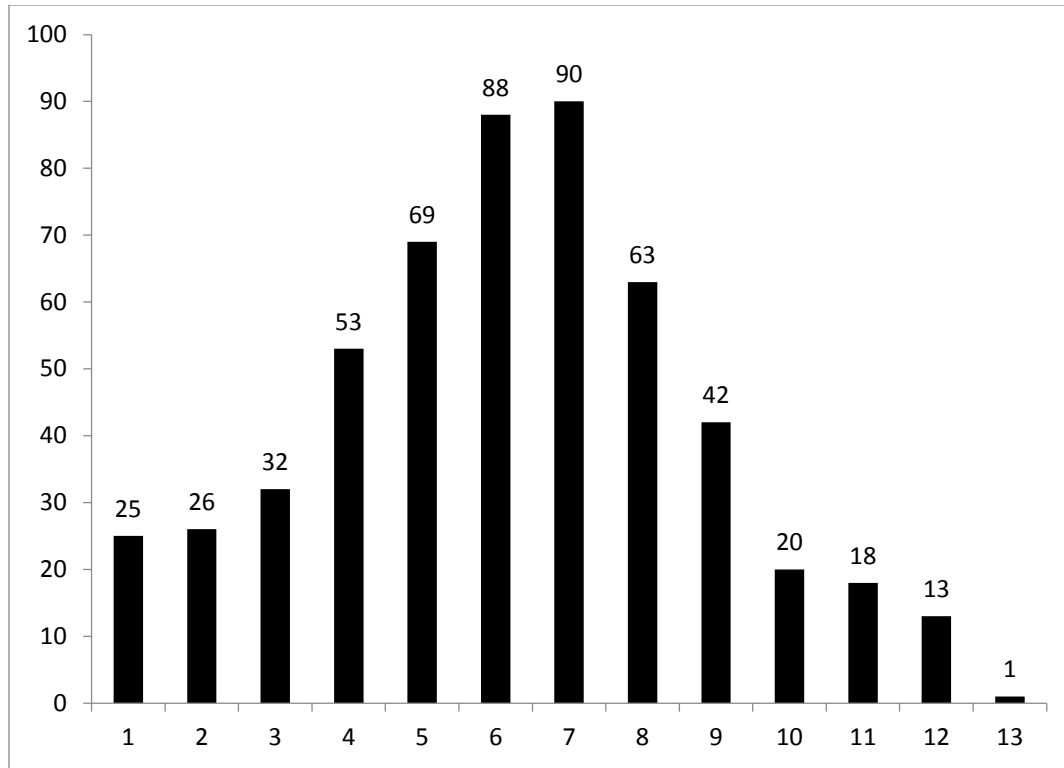
Figure 2. Financial literacy scores

As expected, numeracy and financial literacy scores were moderately correlated ($r = 0.272$, $p<.01$). Gender differences were observed both in numeracy and financial literacy. The average male numeracy score (4.39) was higher than the average numeracy score among females (3.73), $F(1, 536) =22.63$, $p<.001$. The pattern was repeated in financial literacy scores as well (Male: 7.06; Female: 5.79) $F(1, 536) =26.78$, $p<.001$. But, contrary to expectation, there were no gender differences in financial delinquency, undesirable academic effects or credit card usage.

Financial Delinquency

To test the hypothesis that numeracy would predict financial delinquency better than financial literacy, a set of hierarchical linear regression models were used, with gender and age (model 1), financial literacy (model 2), and numeracy (model 3). The full model significantly predicted

financial delinquency (R^2 = .05, $F(4, 520)$ = 6.806, $p < .001$). As hypothesized, numeracy but not

financial literacy was a significant predictor of delinquency (see Table 1 below).

Table 1: Models of Hierarchical regression predicting financial delinquency

Models and variables	β	R	R^2	ΔR^2	ΔF
Model 1		0.17	0.03	0.03	8.02 (*p<.001*)
Age	-0.16				
Gender	-0.06				
Model 2		0.18	0.03	<0.01	2.08 (*p=.150*)
Age	-0.17				
Gender	-0.05				
Fin. Lit.	0.07				
Model 3		.223	0.05	0.02	8.80 (*p=.003*)
Age	-0.16				
Gender	-0.03				
Fin. Lit.	0.03				
Numeracy	0.14				

Undesirable Academic Effects due to Financial Matters

To test the hypothesis that numeracy would predict undesirable academic effects better than financial literacy, a set of hierarchical linear regression models were used, with gender and age (model 1), financial literacy (model 2), and numeracy (model 3). Results did not support the hypothesis. The full model significantly predicted undesirable academic behaviors attributable to financial matters ($R^2 = 0.16$, $F(4, 520) = 3.59$, $p = .007$). But neither numeracy nor financial literacy were significant predictors over and above age.

Table 2: Models of Hierarchical regression predicting undesirable academic behaviors

Models and variables	β	R	R^2	ΔR^2	ΔF
Model 1		0.13	0.02	0.02	8.02 ($p=.009$)
Age	-0.13				
Gender	-0.02				
Model 2		0.15	0.02	0.01	2.87 ($p=.091$)
Age	-0.14				
Gender	-0.01				
Fin. Lit.	0.08				
Model 3		0.16	0.02	0.01	2.00 ($p=.157$)
Age	-0.14				
Gender	-0.01				
Fin. Lit.	0.06				
Numeracy	0.07				

It is possible that the relationship between numeracy and deleterious academic effects is mediated by financial delinquency. A mediation model was developed to test this. The correlation between the scores and deliberation time was low ($r(539) = 0.094$, $p = 0.029$). The figure below shows that financial delinquency fully mediates the relationship between numeracy and undesirable academic effects. The Sobel test was significant ($z = 3.59$, $p < .001$).
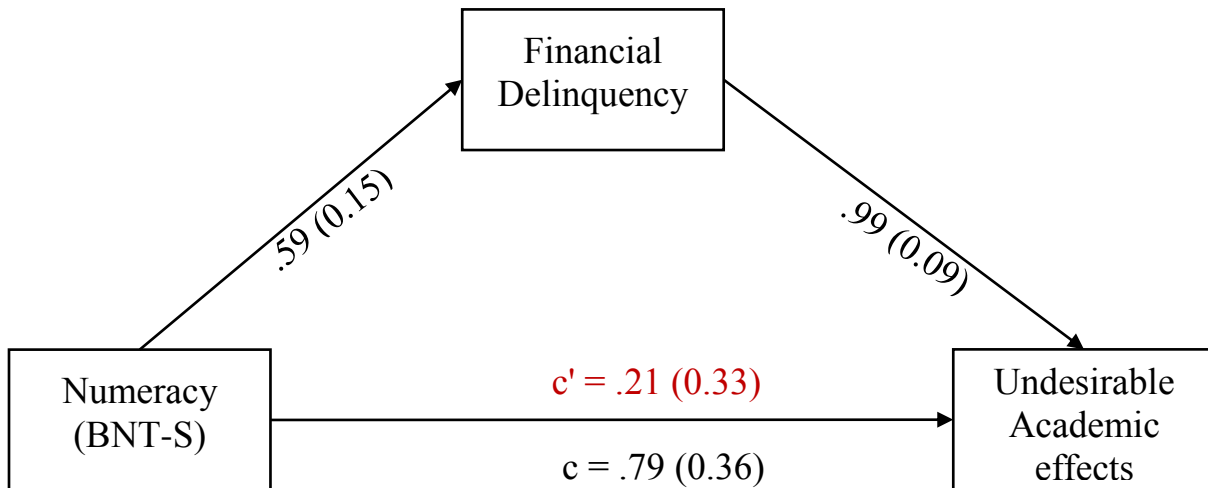
Figure 3. The relationship between numeracy and undesirable academic effects is fully mediated by financial delinquency.

Use of Alternate Financial Services

To test the hypothesis that numeracy would predict Alternate Financial Services use better than financial literacy, a set of hierarchical linear regression models were used, with gender and age (model 1), financial literacy (model 2), and numeracy (model 3). Results did not support the hypothesis ($R^2 = 0.02$, $F(4, 520) = 2.35$, $p = .053$).

Table 3: Models of Hierarchical regression predicting use of Alternate Financial Services

Models and variables	β	R	R^2	ΔR^2	ΔF
Model 1		0.13	0.02	0.02	4.31 (*p*=.014)
Age	0.13				
Gender	0.01				
Model 2		0.13	0.02	0.001	0.01 (*p*=.926)
Age	0.127				
Gender	0.015				
Fin. Lit.	0.004				
Model 3		0.16	0.02	0.01	0.81 (*p*=.368)
Age	0.122				
Gender	0.009				
Fin. Lit.	0.015				
Numeracy	-0.041				

Undesirable Credit Card Use Behavior

To test the hypothesis that numeracy would predict undesirable credit card use behavior

(amongst credit card holding students) better than financial literacy, a set of hierarchical linear

regression models were used, with gender and age (model 1), financial literacy (model 2), and

numeracy (model 3). The full model predicted significantly predicted financial delinquency ($R^2 =$

.12, $F(4, 186) = 6.535$, $p < .001$). Contrary to the hypothesis, financial literacy was a significant

predictor of undesirable credit card use behaviors amongst credit card holding students, but

numeracy scores had no effect (see Table 4 below). Age and gender had no effect on credit use

behavior as seen in the table below.

Table 4: Models of Hierarchical regression predicting undesirable credit card usage behavior

Models and variables	β	R	R^2	ΔR^2	ΔF
Model 1		0.13	0.02	0.02	1.68 ($p=.199$)
Age	-0.16				
Gender	-0.06				
Model 2		0.33	0.11	0.09	18.98 ($p<.001$)
Age	-0.04				
Gender	-0.05				
Fin. Lit.	0.32				
Model 3		.223	0.05	0.02	8.80 ($p=.070$)
Age	-0.03				
Gender	-0.03				
Fin. Lit.	0.28				
Numeracy	0.14				

Financial Decision Making Task

Finally, to test if numeracy predicts normative accuracy in hypothetical financial tasks, I

examined the relationship between the overall score in the two credit card related vignettes (Soll

et al., 2013). A set of hierarchical linear regression models were used, with gender and age

(model 1), financial literacy (model 2), and numeracy (model 3). The full model predicted

significantly predicted financial delinquency ($R^2 = .11$, $F(4, 517) = 16.380$, $p < .001$).

Table 3: Models of Hierarchical regression predicting scores in a credit card-related judgment task

Models and variables	β	R	R^2	ΔR^2	ΔF
Model 1		0.17	0.03	0.03	7.49 ($p=.001$)
Age	0.16				
Gender	0.03				
Model 2		0.29	0.08	0.05	30.68 ($p<.001$)
Age	0.12				
Gender	0.03				
Fin. Lit.	0.24				
Model 3		0.36	0.11	0.03	17.52 ($p<.001$)
Age	0.14				
Gender	0.05				
Fin. Lit.	0.19				
Numeracy	0.18				

Following Ghazal, Cokely and Garcia-Retamero (2012), a mediation model was developed to

test if the relationship between numeracy and performance in the decision making task was

mediated by deliberation (as measured by total time spent on the web page while answering the

two questions). The correlation between the scores and deliberation time was moderate and

positive (r(536) = 0.27, p<.001). The figure below shows the direct effects of numeracy on

performance as well as the indirect effects of numeracy on performance through deliberation

(measured by time spent on solving the problem). The Sobel test was significant ($z = 3.41, p <$

.001).
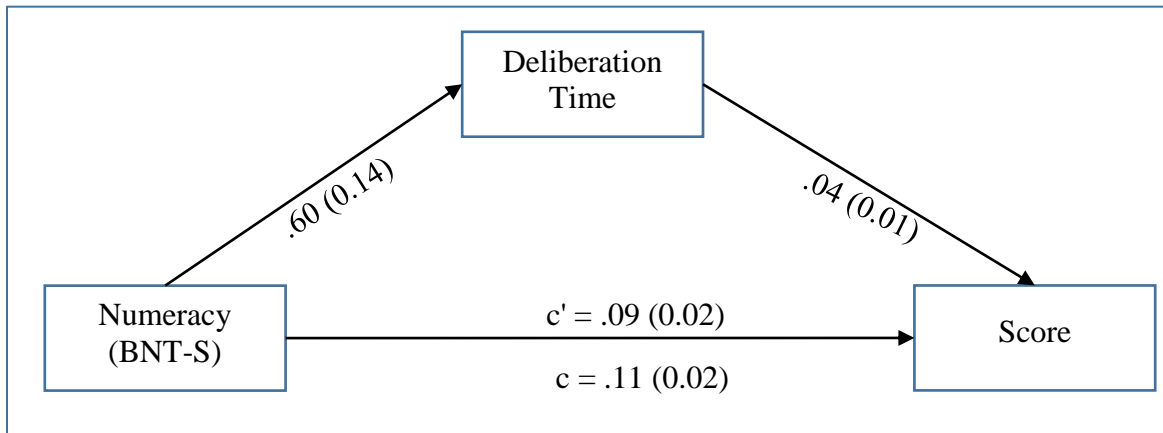
Figure 4. Numeracy is partially mediated by deliberation time in its relationship with score
in credit card related decision making tasks

Additional Analyses

A principal axis factor analysis was conducted on 21 items with oblique rotation (promax). The Kaiser–Meyer–Olkin measure verified the sampling adequacy for the analysis, KMO = .849. An initial analysis was run to obtain eigenvalues for each factor in the data. Six factors had eigenvalues over Kaiser's criterion of 1 and in combination explained 72.59% of the variance. The scree plot showed inflection that would justify retaining 6 factors. I retained all factors because of the large sample size and the convergence of the scree plot and Kaiser's criterion on this value. The table below shows the factor loadings after the rotation. The first row of the table gives the Cronbach's Alpha for each factor. The items that cluster on the same factor suggest that factor 1 represents undesirable academic effects, factor 2 represents financial delinquency, factor 3 represents credit card-related impulsivity, factor 4 represents credit card-related behavior, factor 5 represents financial worries and factor 6 represents credit card attitudes.

|	Factor Loadings					
	1	2	3	4	5	6
Cronbach's Alpha	0.884	0.891	0.831	0.699	0.834	0.682
I missed class in the past 6 months due to my financial situation.	0.898					
My GPA has suffered due to my financial debt.	0.866					
I am less committed to getting good grades because of my finances	0.852					
I take fewer classes in order to work more to pay off my debts.	0.819					
I have considered dropping out of school due to my financial situation.	0.750					
I have decreased hours studying because of my work schedule	0.661					
I have been charged a late fee in the past year		0.899				
I have paid some bills late in the past year		0.884				
I have received overdue notices for money I owe in the past year		0.874				
I am more impulsive when I shop with credit cards			0.879			
I am less concerned with the prices of a product when I use a credit card			0.856			
I spend more when I use a credit card			0.822			
My credit cards are usually at their maximum credit limit				0.826		
I frequently use available credit on one credit card to make a payment on another credit card				0.710		
I rarely go over my available credit limit (R)				0.659		
I often make only the minimum payment on my credit cards				0.617		
I frequently worry about post-graduation financial matters					0.987	
I regularly feel anxious or worried about money					0.953	
I have too many credit cards						1.002
I worry how I will pay off my credit card debt						0.625
I always pay off my credit cards at the end of each month (R)						0.429

To test the hypothesis that numeracy and several other factors would predict financial

delinquency a set of hierarchical linear regression models were used. Model 1 included

demographic variables like age, gender, class rank, GPA and parental SES. Model 2 added

numeracy and Model 3 added financial literacy. Model 4 included deliberation. Model 5

included undesirable academic effects and financial worries. Model 6 included credit-card

related impulsivity, behavior and attitudes. The full model predicted significantly predicted

financial delinquency ($R^2 = .361$, $F(13,126) = 5.473$, $p < .001$). Model 1 with demographic

variables was significant, but numeracy, financial literacy, and deliberation were not significant.

Model 5 with undesirable academic effects and financial worries was significant. Model 6 with

credit card related factors was also significant.

Models and variables	β	R	R^2	ΔR^2	ΔF
Model 1		0.356	0.127	0.127	3.886 ($p=.003$)
Age	-0.184				
Gender	-0.079				
Parental SES	0.009				
Class Rank	0.023				
GPA	0.261				
Model 2		0.377	0.142	0.016	2.421 ($p=.122$)
Age	-0.179				
Gender	-0.039				
Parental SES	-0.015				
Class Rank	0.032				
GPA	0.258				
Numeracy	0.135				
Model 3		0.399	0.160	0.017	2.715 ($p=.102$)
Age	-0.219				
Gender	-0.026				
Parental SES	-0.021				
Class Rank	0.027				
GPA	0.244				
Numeracy	0.067				
Fin. Lit.	0.155				
Model 4		0.400	0.160	0.000	0.033 ($p=.856$)

Age	-0.220				
Gender	-0.027				
Parental SES	-0.022				
Class Rank	0.028				
GPA	0.244				
Numeracy	0.066				
Fin. Lit.	0.155				
Deliberation	0.015				
Model 5		0.460	0.212	0.052	4.245(p=.016)
Age	-0.195				
Gender	-0.042				
Parental SES	-0.037				
Class Rank	0.021				
GPA	0.115				
Numeracy	0.066				
Fin. Lit.	0.115				
Deliberation	0.027				
Undesirable Acad. Effects	0.159				
Financial Worries	0.150				
Model 6		0.601	0.361	0.149	9.808(p<.001)
Age	-0.172				
Gender	-0.029				
Parental SES	-0.045				
Class Rank	0.071				
GPA	0.064				
Numeracy	0.057				
Fin. Lit.	0.086				
Deliberation	0.039				
Undesirable Acad. Effects	0.047				
Financial Worries	0.030				
Credit Card-related (CC) Impulsivity	-0.020				
CC Behavior	0.149				
CC Attitudes	0.380				

Further, a meditational model was developed to test if the relationship between numeracy and

financial delinquency was mediated by credit card related impulsivity, credit card use behavior,

credit card attitudes, undesirable academic effects, financial worries and deliberation. The figure

below shows the direct and indirect effects of numeracy on delinquency. Numeracy does seem to

predict financial delinquency, but it is not due to differences in financial literacy but rather

mediated through specific credit card use behaviors and attitudes.
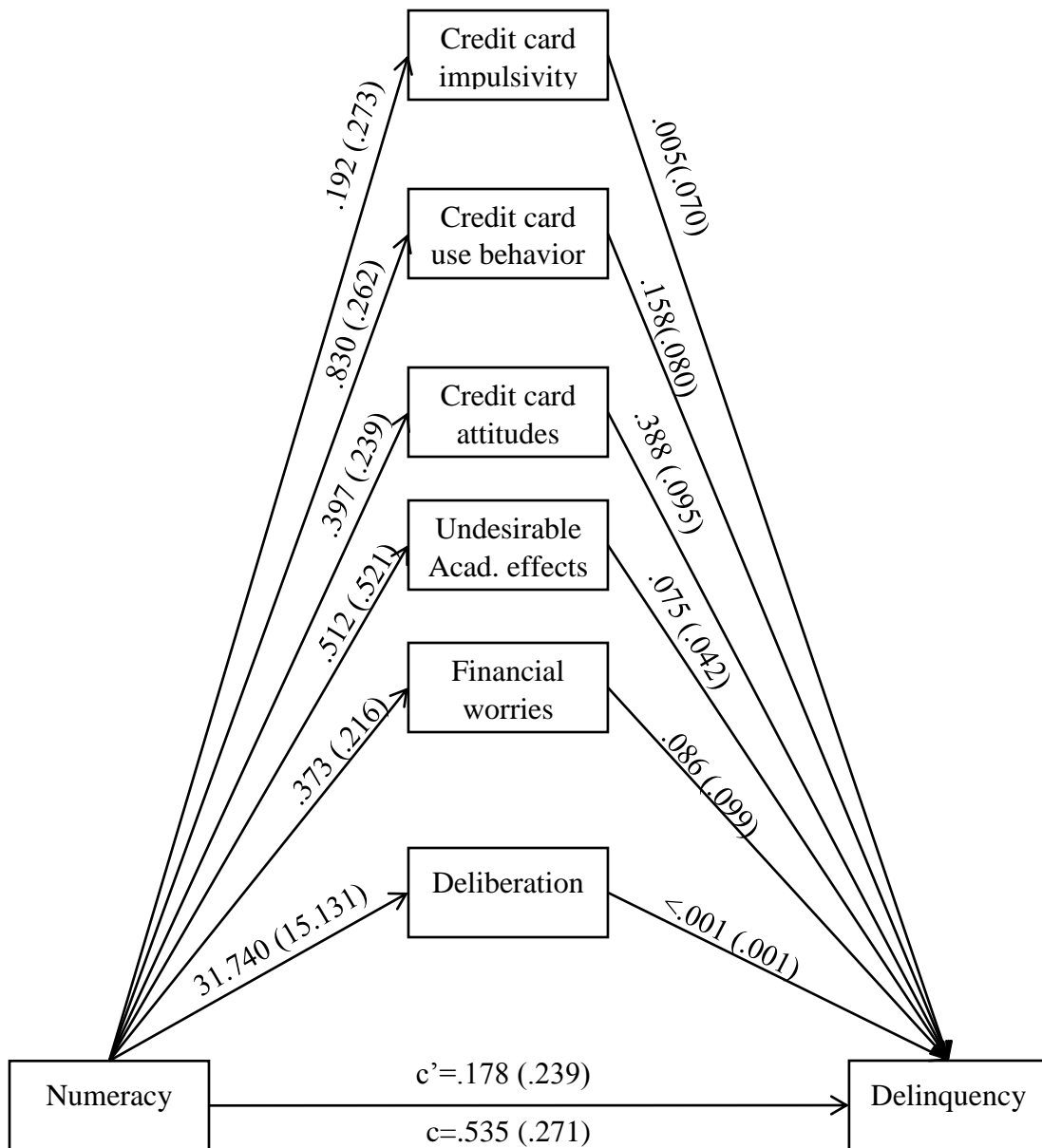
The main take away from this analysis is that numeracy is a significant predictor of financial

delinquency and it is not due to differences in financial literacy. Credit card use behavior and

attitudes seem to mediate the relationship between numeracy and delinquency.

5. Discussion

The main hypothesis that numeracy would be a better predictor of financial delinquency than financial literacy was proved. The results indicated that financial literacy was not correlated with financial delinquency ($r = .05$, $p = .23$). So, possession of financial knowledge does not seem to lead to better financial decisions in the student population. This could be due to the fact the students might not have enough real life experience making financial decisions. Since numeracy was a significant predictor of better financial decision making in real life, we can take it to support the notion that numeracy is more than just the ability to work with numbers and might be a marker for a broader ability to make better decision-making.

The hypothesis that finance-related undesirable academic behavior would be associated with numeracy and financial literacy was not supported. It is possible that financial literacy or numeracy has no bearing on deleterious academic attitudes and behavior. But it was shown that the relationship between numeracy and undesirable academic effects is mediated by financial delinquency.

The hypothesis that amongst credit card holding students numeracy rather than financial literacy would predict deleterious credit card use behavior was not supported. In fact financial literacy was a significant predictor of undesirable credit card use behavior. I found no statistical relationship between numeracy and this behavior. One explanation might be that the subjects overall had fewer credit cards than the national average. According to Sallie Mae (2009) 84% of undergraduate students in their sample had at least one credit card, with an average of 4.6 credit cards. But in our sample only 38% had at least one credit card, with an average of 1.64 credit cards.

Additionally, we showed that in a credit card related decision making task, the relationship between numeracy and performance was partially mediated by the deliberation time. This is similar to the finding in Ghazal et al. (2014) and supporting their conclusion that numeracy is just not facility with numbers, but also heuristic deliberation and metacognition.

Numeracy seems to influence people's time and risk preferences which in turn might affect financial decision making. For example, Ghazal et al. (2014) showed that numeracy was a significant predictor in intertemporal choices after controlling for age, gender and education. Similarly, in a study by Jasper, Bhattacharya, Levin, Jones and Bossard (2013) the highly numerate chose a risky alternative when it was advantageous while avoiding a risky choice when it was disadvantageous. The non-optimal time and risk preferences of the less numerate is likely to translate into poor financial decisions.

People low in numeracy have been shown to be more prone to various biases and fallacies. This might be one other reason that they make disadvantageous financial decisions. Peters et al. (2006) found that the highly numerate are less likely to be prone to framing effects. They further propose that the highly numerate are able to extract more accurate affective meaning from numerical information enabling them to make objectively better choices. Peters et al. (2006) also report that the low numerate are more prone to ratio bias or denominator neglect. Pachur and Galesic (2013) show that the more numerate participants are likely to choose the option with a normatively higher expected value compared to the less numerate participants. Traczyk and Fulawka (2016) show that the decisions of the less numerate are affected by task-irrelevant affect but the more numerate are able to ignore affect irrelevant to the task.

The main thrust of this study is that numeracy is a more accurate predictor than financial literacy of better financial decisions. Financial literacy is merely a test of financial knowledge, but

numeracy seems more than a measure of facility with numbers in addition assessing heuristic-based deliberation and metacognition (Ghazal et al. 2014). Extracting better affective meaning, and ignoring irrelevant affect seems to lead to better decision making (Peters et al., 2006; Traczyk & Fulawka, 2016).

Limitations and future research

One major limitation of this study is that the subjects were from the participant pool in the Psychology department, and is not representative of the university undergraduate population. Another limitation is that the two-thirds of the sample were either freshmen or sophomores, who are more likely to be at least partially dependent financially on their parents. Future research should try to remedy this by trying to recruit participants from the entire university population.

Another important improvement might be to understand the differences in the process of decision making in individuals with varying numeracy levels. In the current study, time spent on making the decision is taken as a proxy. We need to investigate a more direct way to get at the process.

This line of research has several important implications. If numeracy is more important than financial literacy, interventions to improve numeracy take primacy over financial education. The current study casts doubts on the emphasis based on financial education to improve financial decision. Numeracy and specifically understanding the basics of fractions, proportions and percentages might equip everyone to make superior decision making in financial and medical domains.

Future research should explore what specific components of numeracy and risk literacy are responsible for better financial decisions. Another avenue of research is to do a longitudinal

study with college students to see if numeracy and financial behaviors lead to dropping out of

college over the course of a year or more. This could lead to specific policy guidelines to reduce

the drop-out rate amongst students because more than half the students drop out of college and

do not earn a degree in eight years.

Appendix

Numeracy

Schwartz et al. Numeracy scale

1. Imagine that we flip a fair coin 1,000 times. What is your best guess about how many times the coin would come up heads in 1,000 flips?

2. In the BIG BUCKS LOTTERY, the chances of winning a $10.00 prize are 1%. What is your best guess about how many people would win a $10.00 prize if 1,000 people each by a single ticket to BIG BUCKS?_____

3. In the ACME PUBLISHING SWEEPSTAKES, the chance of winning a car is 1 in 1,000. What percent of tickets to ACME PUBLISHING SWEEPSTAKES win a car? _____

Adaptive Berlin Numeracy Test

1. Out of 1,000 people in a small town 500 are members of a choir. Out of these 500 members in the choir 100 are men. Out of the 500 inhabitants that are not in the choir 300 are men. What is the probability that a randomly drawn man is a member of the choir? (Please indicate the probability in percent). _____ %
2. Imagine we are throwing a five-sided die 50 times. On average, out of these 50 throws how many times would this five-sided die show an odd number (1, 3 or 5)?
   _____ out of 50 throws.
3. Imagine we are throwing a loaded die (6 sides). The probability that the die shows a 6 is twice as high as the probability of each of the other numbers. On average, out of these 70 throws, how many times would the die show the number 6?
   _____ out of 70 throws.
4. In a forest 20% of mushrooms are red, 50% brown and 30% white. A red mushroom is poisonous with a probability of 20%. A mushroom that is not red is poisonous with a probability of 5%. What is the probability that a poisonous mushroom in the forest is red?
   _____%

Financial Literacy

Financial Literacy Scale (Fernandes, Lynch & Netemeyer, 2014)

1. Imagine that the interest rate on your savings account was 1% per year and inflation was 2% per year. After 1 year, would you be able to buy:
○ more than today with the money in this account
○ exactly the same as today with the money in this account
○ less than today with the money in this account
○ Don't know
○ Refuse to answer

2. Do you think that the following statement is true or false? "Bonds are normally riskier than stocks."
○ True
○ False
○ Don't know
○ Refuse to answer

3. Considering a long time period (for example 10 or 20 years, which asset described below normally gives the highest return?
○ Savings accounts
○ Stocks
○ Bonds
○ Don't know
○ Refuse to answer

4. Normally, which asset described below displays the highest fluctuations over time?
○ Savings accounts
○ Stocks
○ Bonds
○ Don't know
○ Refuse to answer

5. When an investor spreads his money among different assets, does the risk of losing a lot of money:
○ Increase
○ Decrease
○ stay the same
○ Don't know
○ Refuse to answer

6. Do you think that the following statement is true or false? "If you were to invest $1000 in a stock mutual fund, it would be possible to have less than $1000 when you withdraw your money."
○ True

○ False
○ Don't know
○ Refuse to answer

7. Do you think that the following statement is true or false? "A stock mutual fund combines the money of many investors to buy a variety of stocks."
○ True
○ False
○ Don't know
○ Refuse to answer

8. Do you think that the following statement is true or false? "After age 70 1/2, you have to withdraw at least some money from your 401(k. plan or IRA."
○ True
○ False
○ It depends on the type of IRA and/or 401(k. plan
○ Don't know
○ Refuse to answer

9. Do you think that the following statement is true or false? "A 15-year mortgage typically requires higher monthly payments than a 30-year mortgage, but the total interest paid over the life of the loan will be less."
○ True
○ False
○ Don't know
○ Refuse to answer

10. Suppose you had $100 in a savings account and the interest rate is 20% per year and you never withdraw money or interest payments. After 5 years, how much would you have on this account in total?
○ More than $200
○ Exactly $200
○ Less than $200
○ Don't know
○ Refuse to answer

11. Which of the following statements is correct?
○ Once one invests in a mutual fund, one cannot withdraw the money in the first year
○ Mutual funds can invest in several assets, for example invest in both stocks and bonds
○ Mutual funds pay a guaranteed rate of return which depends on their past performance
○ None of the above
○ Don't know
○ Refuse to answer

12. Which of the following statements is correct? If somebody buys a bond of firm B:
○ He owns a part of firm B

○ He has lent money to firm B
○ He is liable for firm B's debts
○ None of the above
○ Don't know
○ Refuse to answer

13. Suppose you owe $3,000 on your credit card. You pay a minimum payment of $30 each month. At an Annual Percentage Rate of 12% (or 1% per month, how many years would it take to eliminate your credit card debt if you made no additional new charges?
○ less than 5 years
○ between 5 and 10 years
○ between 10 and 15 years
○ never
○ Don't know
○ Refuse to answer

Financial Decision Making Task

1. You owe $10,000 on the card and the interest rate is 12% annually. You have destroyed the card and will not use it any more. Suppose that you plan to pay a fixed amount of $110 per month until the card is completely paid off. What is your best estimate of how many months it will take to totally pay off the card?

2. Imagine that you owe $10,000 on a credit card with an interest rate of 24% annually. Since the interest rate is so high, you plan to cut up this card and not use this card. You plan to pay a fixed amount of $100 per month until the card is completely paid off. Assuming that you follow through with this plan, what is your best estimate of how much money you will still owe on this card after one year of making payments?

Credit Card

Credit Card Usage (General)
  1. Do you have a **credit card**? (that is not used primarily as a debit card)
     ○ Yes
     ○ No *(Skip to next section)*
  2. How many credit cards do you use, including store credit cards?
     ○ 1
     ○ 2
     ○ 3
     ○ 4 or more
  3. How many of these credit cards have been co-signed by a parent/guardian or a sibling?

○ 0
○ 1
○ 2
○ 3
○ 4 or more

4. 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?
   ○ Yes
   ○ No

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

6. In the last few years, have you ever been late on any of your credit card payments by 2 months or more?
   ○ Yes
   ○ No

7. What is the "annual percentage rate" (APR) for the credit card you use the most?
   ○ Less than 5% APR
   ○ 5%-9% APR
   ○ 10%-14% APR
   ○ 15%-20% APR
   ○ Higher than 20% APR
   ○ Not sure

8. Is the "annual percentage rate" (APR) on your credit card:
   ○ Variable
   ○ Fixed
   ○ A mix of fixed and variable
   ○ Don't Know

9. What is the maximum amount you can charge on the credit card you use the most?
   ○ Less than $500
   ○ $500 to $1,000
   ○ $1,000 to $2,499
   ○ $2,500 to $4,999
   ○ $5,000 to $9,999
   ○ More than $10,000
   ○ Don't know

10. When did you get your first credit card?
    ○ Before graduating high school
    ○ When I graduated from high school
    ○ When I started college
    ○ During my first year in college
    ○ After completing my first year of college

11. Who usually pays your credit card bills? (check all that apply)
    □ You
    □ A Parent or Guardian
    □ A Spouse or partner

12. What is the current outstanding balance on all of your credit cards? (estimate)

○ $0 to 499
○ $500 to $1,000
○ $1,000 to $2,499
○ $2,500 to $4,999
○ $5,000 to $9,999
○ More than $10,000
○ Don't know

Risky Credit Card Use Scale (Robert and Jones, 2001)

❖ **Please indicate how much you agree or disagree with each of the statements below based on the following scale:** *1 = Strongly Agree* **to** *7 = Strongly disagree*
1. My credit cards are usually at their maximum credit limit
2. I frequently use available credit on one credit card to make a payment on another credit card
3. I always pay off my credit cards at the end of each month
4. I worry how I will pay off my credit card debt
5. I often make only the minimum payment on my credit cards
6. I am less concerned with the prices of a product when I use a credit card
7. I am more impulsive when I shop with credit cards
8. I spend more when I use a credit card
9. I am seldom delinquent in making payments on my credit cards
10. I rarely go over my available credit limit
11. I seldom take cash advances on my credit cards
12. I have too many credit cards

Banking

1. Do you have a checking account?
   ○ Yes
   ○ No (if no, skip to next section)
2. How often have you bounced a check (had it returned for insufficient funds)?
   ○ Never
   ○ Once or twice in my lifetime
   ○ Once or twice per year
   ○ More than twice per year
3. How often do you balance your checkbook?
   ○ After every check, deposit and ATM withdrawal
   ○ About once a week
   ○ About once a month
   ○ Several times per year
   ○ Once or twice per year
   ○ Never
4. How many debit cards do you have?
   ○ 0
   ○ 1
   ○ 2
   ○ 3
   ○ 4 or more

Financial aid

1. What type(s) of financial aid have you received? (check all that apply)
   □ No financial aid at this time
   □ Stafford subsidized loans
   □ Stafford unsubsidized loans
   □ Perkins
   □ PLUS loans
   □ Health Professions Student Loans
   □ Private student loans
   □ Federal work-study
   □ Federal Pell Grant
   □ Other need-based grants
   □ Scholarships
   □ Tuition waiver
   □ Other: _____
2. Have you ever used your financial aid to pay your credit card bill(s)?
   ○ Yes
   ○ No
3. How much do you currently owe with respect to financial aid loans? (estimate)
   ○ $0, I have no financial aid loans
   ○ $l-$4,999
   ○ $5,000-$9,999
   ○ $10,000-$19,999
   ○ $20,000-$29,999
   ○ $30,000 or more
   ○ Not sure

General Finance

1. Have you checked your credit rating in the last 12 months?
   - ○ Yes
   - ○ No
2. In what form do you hold for your savings and investments? (Check ALL that apply)
   - ○ Savings account
   - ○ Certificates of deposit
   - ○ U. S. Savings Bonds
   - ○ Stocks
   - ○ Mutual funds
   - ○ Bonds other than U. S. Savings Bonds
   - ○ Retirement accounts such as 401k or IRA
   - ○ None
3. How would you rate the savings and investments that you have?
   - ○ Adequate for my needs right now
   - ○ Slightly less than I should have right now
   - ○ Much less than I should have right now
4. How much do you worry about your debts?
   - ○ Never
   - ○ A little
   - ○ Sometimes
   - ○ Often
   - ○ Nearly all the time
5. On average, how many hours a week do you work?
   - ○ 0 hours in a week, I am not employed at this time (if no, skip to Q7)
   - ○ 1-10 hours in a week
   - ○ 11-15 hours in a week
   - ○ 16-20 hours in a week
   - ○ 20-29 hours in a week
   - ○ More than 30 hours in a week
6. On average, what is your monthly income from work?
   - ○ $0 (I am not employed at this time.)
   - ○ $l-$249
   - ○ $250-$499
   - ○ $500-$749
   - ○ $750-$999
   - ○ $1,000-$1,999
   - ○ $2,000-$2,999
   - ○ $3,000-$3,999
   - ○ $4,000-$4,999
   - ○ More than $5,000
7. Have you ever dropped a class you were taking so that you could work more hours to pay your expenses?
   - ○ Yes

○ No
8. Have you ever dropped out for a semester so that you could work more hours to pay your expenses?
    ○ Yes
    ○ No
9. NOT including credit card debt and financial aid loans, approximately how much other debt do you currently owe?
    ○ $0
    ○ $l-$999
    ○ $1,000-$2,999
    ○ $3,000-$4,999
    ○ $5,000-$9,999
    ○ $10,000-$19,999
    ○ $20,000 or more
    ○ Not sure
10. When you finish your education, how much do you expect to owe in student loans? (Give an approximate amount)
    ○ Nothing
    ○ Less than $5,000
    ○ $5,000 to $9,999
    ○ $10,000 to $19,999
    ○ $20,000 to $29,999
    ○ $30,000 to $49,999
    ○ $50,000 or more
11. Aside from any credit card debt or student loans you might have, what other types of debt do you have? (check ALL that apply)
    □ Auto loans
    □ Home Mortgage
    □ Informal loan from family/friends
    □ Other debt
12. In the past five years, have you taken out an auto title loan?
    ○ Yes
    ○ No
13. In the past five years, have you taken out a short term "payday" loan?
    ○ Yes
    ○ No
14. In the past five years, have you gotten an advance on your tax refund (This is sometimes called a "refund anticipation loan" or "rapid refund")?
    ○ Yes
    ○ No
15. In the past five years, have you used a pawn shop?
    ○ Yes
    ○ No
16. In the past five years, have you used a rent-to-own store?
    ○ Yes
    ○ No

Financial Delinquency

❖ **Please indicate how much you agree or disagree with each of the statements below using the following scale: 1 = Strongly Agree to 7 = Strongly disagree**

   1. I have received overdue notices for money I owe in the past year.
   2. I have paid some bills late in the past year.
   3. I have been charged a late fee in the past year.

UNDESIRABLE ACADEMIC EFFECTS

❖ **Please indicate how much you agree or disagree with each of the statements below using the following scale: 1 = Strongly Agree to 7 = Strongly disagree**

   4. I have considered dropping out of school due to my financial situation.
   5. I missed class in the past 6 months due to my financial situation.
   6. I take fewer classes in order to work more to pay off my debts.
   7. I am less committed to getting good grades because of my finances.
   8. My GPA has suffered due to my financial debt.
   9. I regularly feel anxious or worried about money.
   10. I frequently worry about post-graduation financial matters.
   11. I have decreased hours studying because of my work schedule.
   12. I have less energy to study because I have to work.

Demographics

1. What is your age? ____
2. What is your gender?
   ○ Male
   ○ Female
3. What is the highest level of education you expect to achieve?
   ○ Associate degree (two-year)
   ○ Bachelor degree (four-year)
   ○ Master's degree
   ○ Doctorate, law or professional (six year or more)
4. What is your best estimate of your parents' total income last year? Consider annual income from all sources before taxes. (Give an approximate amount)
   ○ Less than $20,000
   ○ $20,000 to $39,999
   ○ $40,000 to $79,999
   ○ $80,000 or more
   ○ Don't know.
5. What is the highest level of schooling your mother completed?
   ○ Did not complete high school
   ○ Completed high school
   ○ Some college
   ○ College graduate or more than college
   ○ Don't know.
6. What is the highest level of schooling your father completed?
   ○ Did not complete high school
   ○ Completed high school
   ○ Some college
   ○ College graduate or more than college
   ○ Don't know.
7. Are you financially independent from your parents/guardians/others?
   ○ I pay for all of my expenses
   ○ I pay for most of my expenses, but I receive some help from parents/guardians/others
   ○ I pay for about half of my expenses, and my parents/guardians/others pay for the other half
   ○ I pay for some of my expenses, but most expenses are paid by my parents/guardians/others
   ○ My parents/guardians/others pay for all of my expenses
8. What is your race?
   ○ American Indian or Alaska Native
   ○ Black or African American
   ○ Chinese
   ○ Filipino
   ○ Hispanic, Latino or Spanish origin
   ○ Japanese
   ○ Korean
   ○ Middle-eastern or Arabic

○ Native Hawaiian or Pacific islander
○ South Asian (from Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, Sri Lanka)
○ Vietnamese
○ White or Caucasian, not Hispanic
○ Other (Specify) _____

9. When you start 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? (Give an approximate amount)
○ Under $30,000
○ $30,000 to $39,999
○ $40,000 to $49,999
○ $50,000 or more
○ Don't know

10. Are you currently a full-time or part-time student?
○ Full time
○ Part time

11. How many years have you been attending *any* college full-time?
This is my first year
This is my second year
This is my third year
This is my fourth year
I have been attending college for more than four years

12. What is your class standing?
○ Freshman
○ Sophomore
○ Junior
○ Senior
○ Other: _____

13. Which of the following best describes your major or area of interest in college?
○ Arts and Humanities
○ Biology
○ Business/Economics/Management
○ Computer and information sciences
○ Engineering
○ Nursing
○ Psychology
○ Other Sciences
○ Other: _____

14. What is your marital status?
○ Single with no children
○ Single with children
○ Married with no children
○ Married with children
○ Living as a couple with no children
○ Living as a couple with children

15. What is your current GPA?

○ 3.6-4.0
○ 3.0-3.5
○ 2.6-2.9
○ 2.0-2.5
○ Lower than 2.0
16. How many credit hours are you registered for this term?
   ○ Less than 6 hours
   ○ 6-12 hours
   ○ 13-15 hours
   ○ 16-18 hours
   ○ 19 or more hours
17. How many credit hours have you completed prior to this term towards your degree program?   _____.
18. Are you a transfer student to this institution?
   ○ Yes
   ○ No
19. What type of housing do you currently live in?
   ○ On-campus
   ○ Off-campus rented
   ○ Off-campus owned
   ○ Live with parents/relatives
   ○ Other (specify) _____
20. What is your residential status?
   ○ In-state student
   ○ Out-of-state student
   ○ International student

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