Financial Literacy and Behaviors of Private College Undergraduates

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The decisions college students make regarding taking on debt can have long-lasting impacts. This study relies on survey data collected in 2018 and 2019 from two private colleges in Illinois and Washington state. The focus of the study is to examine the actual and perceived financial literacy of college students and their subsequent financial behaviors with a focus on student loan debt and credit card usage. Our findings indicate that collegiate administrators, staff, and faculty should focus efforts on increasing students' financial literacy, particularly first-generation students and women, to encourage healthy financial behaviors to improve financial decision-making throughout a student's college experience and life.

Many financial literacy studies focus their attention on the poor financial behaviors and financial literacy of working adults in America (Chen & Volpe, 2002). However, only recently has more focus been placed on financial behaviors and the (lack of) financial literacy of college students (Carlin & Robinson, 2012). Focusing on the financial literacy of individuals still receiving a formal education is critical as these individuals are on the verge of making several long-lasting and impactful financial decisions such as marriage, starting a family, and homeownership. Analyzing the financial behaviors of college students will also allow researchers and policymakers to understand the financial background of younger workers. Students in better financial positions will undoubtedly be more capable of making healthier financial decisions, thereby setting themselves up for a promising financial life, while those in worse positions may not fare as well.

Academics, politicians, and civil society groups have recently focused on the debt levels of Americans of all ages. Young professionals who graduate college with less credit card and student loan debt will be in better positions to take on additional debt such as a mortgage. For student debt, the average cumulative loan amounts (in 2017-2018 dollars) among undergraduate

degree/certificate holders who took a loan during the 2015-2016 academic year were as follows according to the United States Department of Education (2019):

- $16,200 for certificate holders
- 19,300 for associate degree holders
- $31,200 for bachelor's degree holders

Among bachelor's degree holders, those balances were as follows:

- $28,000 for those attending public institutions
- $33,200 for those attending private non-profit institutions
- $43,000 for those attending private for-profit institutions

These amounts have only increased since the 2015-2016 academic year. Current data on card debt indicate that approximately 57 percent of students carry a credit card, with an average outstanding balance of $1,183 in 2019 (Sallie Mae 2019).

This analysis seeks to study the relationship between financial knowledge and financial behaviors while students are in college. An individual's lack of knowledge regarding rules, regulations, strategies, and options related to financial decisions can directly affect their decision-making. As Zafar et al., (2014) show, student financial literacy concerning loans is poor, and many borrowers lack the necessary understanding of the consequences of poor debt management (e.g., delinquency, default).

Across much of the United States, personal finance education, before, and during, college is limited. Only 21 colleges require that a personal finance course be taken before graduation (Council for Economic Education, 2020). Additionally, five states plus the District of Columbia do not have personal finances included in their state educational standards. Furthermore, there are no federal or state requirements to teach financial education at the college level. With only 21 states requiring students to receive financial education before they graduate from high school, most of the United States population has not been exposed to financial education throughout their high school years, and there is substantially less exposure to these topics at the collegiate level for non-finance major students.

Given the landscape of financial education in the US, this study draws on student survey data from two colleges: one located in Illinois and one in Washington state. Our goal is to understand the financial literacy and corresponding financial behaviors of students at these two colleges and add to the growing chorus for increased financial education, literacy, and awareness on issues such as credit card management and student debt levels.

This study adds to the current literature by analyzing the financial literacy of current college students as well as their subsequent financial behaviors while in college. We also address

what post-secondary institutions can do about these worrying trends. We aim to encourage interventions during a young person's college years which can alter their financial trajectory throughout their life.

We employ rigorous statistical methods through probit regressions and generate corresponding marginal effects to discern the relationship between financial literacy and financial behaviors. The remainder of the paper is organized as follows. We discuss prior literature on financial literacy and behaviors. We then describe our data collection and estimation methodology. Next, we summarize our findings and takeaways for educational institutions. Finally, we present our takeaways for higher education.

Prior Research

One of the first steps in studying an individual's financial literacy and financial behaviors is measuring their financial literacy. Throughout various studies, the number of questions analyzed by survey participants to measure financial knowledge can range from a minimum of three questions to a maximum of 70 questions (Allgood & Walstad, 2016). Defined more specifically, financial literacy is the use of knowledge that allows individuals to make sound financial decisions (Solesbee, 2015). It has also been defined as the ability to use knowledge and skills to manage financial resources effectively for a lifetime of financial well-being (Hung, Parker, & Yoong, 2009). Remund (2010) more generally states that "financial literacy is a measure of the degree to which one understands key financial concepts and possesses the ability and confidence to manage personal finances through appropriate short-term decision-making and sound, long-range financial planning, while mindful of life events and changing economic conditions." This study utilizes a frequently observed set of questions to measure financial knowledge, mainly found in economic literature studies. These questions measure what participants know about basic financial topics.

We wish to remain consistent with well-documented measures of financial knowledge. There are a few fundamental concepts based on most financial decision-making. Three such concepts are (1) numeracy as it relates to the capacity to do interest rate calculations and understand interest compounding; (2) understanding of inflation; and (3) understanding of risk diversification. Lusardi and Mitchell (2008, 2011a, 2011b) have designed a standard set of questions around these concepts that have been used worldwide to measure financial knowledge.

As detailed in Lusardi and Mitchell (2014), four principles informed the design of these questions: (i) simplicity, the questions should measure knowledge of the building blocks fundamental to decision making in an intertemporal setting; (ii) relevance, the questions should relate to concepts pertinent to peoples' day-to-day financial decisions over the life cycle; (iii) brevity, the number of questions must be kept short to secure widespread adoption; and (iv) capacity to differentiate, meaning that questions should differentiate financial knowledge to

permit comparisons across people. The following questions are commonly referred to as the "Big Three" questions to measure financial literacy. Correct answers are bolded.

1. Suppose you had $100 in a savings account and the interest rate was 2 percent per year. After five years, how much do you think you would have in the account if you left the money to grow? **(a) [More than $102]**; (b) Exactly $102; (c) Less than $102; (d) Do not know.

2. Imagine that the interest rate on your savings account was 1 percent per year and inflation was 2 percent per year. After one year, would you be able to buy more than, the same as, or less than today with the money in this account? (a) More than today; (b) The same as today; **(c) [Less than today]**; (d) Do not know.

3. Do you think that the following statement is true or false? "Buying a single company stock usually provides a safer return than a stock mutual fund." (a) True; **(b) [False]**; (c) Do not know.

The first question measures numeracy, or the capacity to do a simple calculation related to the compounding of interest rates. The second question measures understanding of inflation, again in the context of a simple financial decision. The third question is a joint test of knowledge about "stocks" and "stock mutual funds" and risk diversification since the answer to this question depends on knowing what a stock is and that a mutual fund is composed of many stocks (Lusardi and Mitchell 2014).

It has become common for two additional questions to be added to create what is often called the "Big Five" financial education literacy questions.

4. 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. **(a) [True]**; (b) False; (c) Do not know.

5. If the interest rate rises, what should happen to bond prices? (a) Rise; **(b) [Fall]**; (c) Stay the same; (d) Do not know.

The fourth question requires an understanding of how mortgages, and the interest payments associated with different terms, operate. The final question requires an understanding of how interest rates impact bond prices, which necessitates knowledge on how bonds operate and investor incentives when interest rates in the economy change.

The Big Five questions utilized to create financial literacy in this study are increasingly common in the academic literature. We leverage summary work performed by Allgood & Walstad (2016) regarding the prior use of these questions. Table 1 notes studies that have relied upon each question when determining financial literacy.

Table 1

Big Five Prior Studies

Question Number	Prior Studies
1	Hastings et al. (2013); Lusardi and Mitchell (2008, 2014); Lusardi, Mitchell, and Curto (2010); Fonseca et al. (2012); Allgood and Walstad (2016); Annabi et al. (2018)
2	Hastings et al. (2013); Lusardi and Mitchell (2008, 2014); Lusardi, Mitchell, and Curto (2010); Fonseca et al. (2012); Allgood and Walstad (2016); Annabi et al. (2018)
3	Hastings et al. (2013); Lusardi and Mitchell (2014); Fonseca et al. (2012); Lusardi and Mitchell (2009); Allgood and Walstad (2016)
4	Hastings et al. (2013); Hilgert et al. (2003); Allgood and Walstad (2016)
5	Hastings et al. (2013); Lusardi, Mitchell, and Curto (2010); Fonseca et al. (2012); Allgood and Walstad (2016); Annabi et al. (2018)

Questions 1, 2, and 5 have also been utilized in the Financial Industry Regulatory Authority (FINRA) Foundation's National Financial Capability Study (NFCS) every three years since 2009. Results show that financial literacy did not increase since 2009; if anything, it shows a small decline: Thirty-nine percent of survey respondents showed a basic financial literacy level in 2009, and the percentage decreased to thirty-four percent in 2012 and thirty-two percent in 2015 (Lusardi, 2017). These same three questions (i.e., 1, 2, 5) have also been utilized in the Financial Literacy around the World (FLAT World) project created by the Global Financial Literacy Excellence Center (GFLEC). The FLAT World project covers 15 countries around the world. Recently, the NFCS has incorporated questions three and four into their surveys (FINRA, 2018).

Recent studies on financial literacy have focused on how individuals, largely adults, actually use what they know about financial topics to inform/ alter their financial behaviors (Mojtaba & Yi, 2011). Furthermore, certain academic research has consistently shown a positive relationship between financial literacy and better financial judgment (Chen & Volpe, 2002). Most of these prior studies have focused on the relationship between financial literacy and financial decisions and outcomes in adult populations (Martin, 2007). Particularly, these studies have

focused on retirement planning (Parker et al., 2012), saving and investing (Abreu and Mendes, 2010), and other financial behaviors (Martin, 2007). Allgood & Walstad (2016) utilized the NFCS to analyze adult financial literacy and subsequent financial behavior. They found that individuals with higher levels of financial literacy make better financial decisions. For example, individuals with high levels of perceived and actual financial literacy were more likely to pay their credit card balances in full each month, less likely to carry a credit card balance, less likely to make only a minimum payment, and less likely to be charged late fees or over-the-limit fees. As one might expect, varying levels of financial literacy are correlated with varying degrees of good/poor financial behaviors. They also found similar results when analyzing investment, home purchases, and insurance behaviors.

While studying the link between financial literacy and financial behaviors in adults is certainly important, we argue that it is critical to understand where these adults "start" their financial journey. This start is often after formal education has ended and one's professional working life has begun. During a student's college experience, they are likely to be facing budgeting, saving, spending, and debt decisions by themselves for the first time. Therefore, studying the financial literacy and financial behaviors of college students is an integral part of understanding the footing young people have as they begin their adult lives. This aim ties well into the general public discussion within the United States in recent years, particularly through presidential election cycles. The attention placed on student loan debt and financial behaviors has brought the issue of financial literacy at the college level rightfully to the forefront. However, there is not a substantial body of literature focused on college students, their financial literacy, and financial behaviors from an academic research perspective.

A recent study by Perkins et al. (2016), sought to understand student loan behavior by having in-class conversations regarding student loan debt. By having conversations about student debt in the classroom (and thereby intending to increase the students' financial literacy) students reported an increase in their awareness of the financial burden of student loans and an increase in motivation to decrease their student debt burden before graduation. However, this study, while important, only utilized a small, non-random, sample (n = 45), reported essentially no demographic information, and did not measure actual financial behaviors. A more recent study by Annabi et al. (2018) analyzed 553 college students at a Lasallian Catholic not-for-profit college in the Northeast region of the United States utilizing nine financial knowledge questions. This study sought to understand what characteristics of a student were statistically related to getting certain financial literacy questions correct. Annabi et al. (2018) found that being a business major, having a higher GPA, being white, being a male, and not being a first-generation student positively affect a student's financial literacy. However, a major limitation of this study was that they did connect financial literacy to the actual financial behaviors of college students.

Regarding college students and credit card usage, Robb (2011) studied 1,354 students from a major Southeastern university and found that greater personal financial knowledge is associated with more responsible credit card use behavior. The college environment comes at a critical junction in one's life as it may be the first time the individual is living away from home and

is becoming more independent in decision making. Much of the recent literature posits that a higher learning institution can greatly increase the knowledge of an individual and allow for habits, whether good or bad, to form (Teague, 2015). In terms of financial behaviors, Manning (2000) claims that poor financial knowledge, due to the lack of education provided, can create complacency and acceptance of false paradigms. This fact can be especially true for students who are unaware of their financial responsibilities. Inaction that leads to poor financial habits can cause tremendous financial stress, physical and mental health issues, and professional dissatisfaction thereby highlighting the important role that institutions of higher education can play in improving financial behaviors. Numerous studies have hypothesized financial stress can lead to missed schooling and work, health issues to begin or go unchecked, poor job satisfaction, and reduced productivity (Barboza & Smith, 2014).

It is clear from prior research that the United States lacks formal financial education in our education system, one's college years are when many life-changing financial decisions are made, and increased financial knowledge can lead to healthier financial decisions and better financial outcomes in the short and long term.

This study aims to add to the chorus of needed financial education at the college level by providing relevant information regarding college-aged students from two colleges in two different states (and parts of the country) to highlight that financial literacy is essential for healthy financial behaviors.

Data and Estimation Methodology

Financial literacy questions and related variables

Our data are generated from an electronic survey conducted using Qualtrics during the 2018 – 2019 academic year at two private colleges in Illinois and Washington state. Before administering our survey, the institutional review board (IRB) approval process was completed at both schools. Per IRB guidelines, (i) participation in the survey was voluntary and anonymous, (ii) no identifying questions were asked, (iii) responses were confidential and access to the data generated was limited to the researchers, and (iv) student responses had no bearing on their academic standing or performance. The survey yielded 243 usable responses. Eighty-one of these students were from the Illinois college and 162 were from the Washington state college. This sample size falls in the middle of the range of prior studies that have analyzed college student financial literacy and financial behaviors, with a minimum of 41 students (Rosacker et al., 2009) and a maximum of 1,354 students (Robb, 2011).

Two primary research agendas were sought using the survey. First, the level of each student's financial literacy is based on their ability to pass the "Big Five" questions commonly used by financial educators and literacy scholars to establish financial literacy. As discussed above, the Big Five questions consist of five financial concepts: (i) compound interest; (ii) inflation and the changing value of money; (iii) diversification; (iv) mortgage duration and payment amounts; and (v) the relationship between bond prices and interest rates. These questions

highlight fundamental financial concepts inherent in major financial decisions and their subsequent outcomes.

Second, we sought to understand the financial behaviors of students in two broad categories: (i) credit card use and (mis)management; and (ii) student loans (public and private). In accomplishing these tasks, the survey provides a basis for understanding the relationship between financial literacy and financial behavior among college students.

Estimation Methodology

We utilize a probit model and generate the marginal effects of financial literacy and student-specific characteristics on financial behaviors that belong in two broad categories: (i) credit card use and (mis)management; and (ii) student loan usage. In doing so, we follow the methodology employed by Allgood & Walstad (2016). An improvement and contribution of this paper are its unique data from two colleges in two geographies with differing characteristics and approaches to financial literacy. We describe our variables in Table 2.

Table 2

Variables for Estimation

Variables	Definition
Dependent	
Credit card usage	1 – at least one credit card 0 - otherwise Yes or no responses to questions concerning carryover balances, only making minimum payments, and over the limit fees.
Credit card (mis)management	0 – "No" to all 3 1 – "Yes" to 1 or 2 2 – "Yes" to all
Loan	1 – has either a private or public loan 0 – otherwise
Public Loan	1 – has a public loan 0 – otherwise
Independent	
Business	1 – if the major of study is a business field 0 – otherwise
Expect >$50k Salary	1 – expects first job's salary to be greater than $50,000 0 – otherwise
Family Income > $75k	1 – family income is $75,000 or more

Variables	Definition
	0 – family income is $75,000 or less
Female	1 – gender identity is "female"
	0 – otherwise
Financially Literate	1 – answered all of the Big Five questions correctly
	0 – otherwise
First-Generation	1 – first member of the family to attend college
	0 – otherwise
High Financial Need	1—Students reported receiving $20,000+ in financial aid per year
	0 – otherwise
Personal Income < $10K	1 – personal income is $10,000 or less
	0 – personal income is $10,000 or more
Prior Financial Literacy Course	1 – recalls taking a class with an element of financial literacy in it
	0 – otherwise
Savings > 11%	1 – Students thought one should save 11% or more
	0 – otherwise
Senior	1 – senior academic standing
	0 – otherwise
Student-Athlete	1 – student-athlete
	0 – otherwise
Transfer	1 – transfer student
	0 – otherwise
White	1 – identify ethnicity as "white"
	0 – otherwise

Results

Summary statistics

Table 3 provides summary statistics of the variables in our model. The results show that every student has at least one credit card and possibly two, while 56% have outstanding loans. Only around 20% have ever taken a financial literacy course. Most of the students surveyed were white and/or business majors. 51% were females. 36% of the population was first-generation, and 60% of the students demonstrated that they needed substantial financial aid (i.e. $20,000+).

Table 3

Descriptive Statistics

Variable	Observations	Mean	Percentage	Std. Dev	Min	Max
Dependent						
Credit card usage	227	1.55	NA	0.573	1	3
Credit card (mis)management	221	0.475	NA	0.754	0	3
Loan	211	0.559	55.9%	0.498	0	1
Public Loan	211	0.436	43.6%	0.497	0	1
Independent						
Business	225	0.760	76.0%	0.428	0	1
Expect >$50k Salary	227	0.577	57.7%	0.495	0	1
Family Income > $75k	226	0.566	56.6%	0.497	0	1
Female	227	0.515	51.5%	0.501	0	1
Financially Literate	226	0.239	23.9%	0.427	0	1
First-Generation	227	0.366	36.6%	0.483	0	1
High Financial Need	193	0.606	49.0%	0.490	0	1
Personal Income < $10K	225	0.640	48.1%	0.481	0	1
Prior Financial Literacy Course	227	0.198	40.0%	0.400	0	1
Savings > 11%	227	0.775	41.8%	0.418	0	1
Senior	227	0.238	42.7%	0.427	0	1
Student-Athlete	227	0.264	44.2%	0.442	0	1
Transfer	227	0.313	46.5%	0.465	0	1
White	227	0.599	49.1%	0.491	0	1

T-tests

We also performed difference-in-difference t-tests to understand what demographics correlated to performing better on the financial literacy questions. Table 4 provides the means of the dependent variables in question and the controls to demonstrate if there are statistically significant differences in financially literate and financially illiterate individuals.

Table 4

Financially Literate Characteristics

Variable	Financially Illiterate	Financially Literate	T-stat
Dependent			
Credit card usage	1.535	1.574	-0.437
Credit card (mis)management	0.506	0.060	1.174
Loan	0.525	0.673	-1.869*
Public Loan	0.399	0.558	-2.014**
Independent			
Business	0.754	0.792	-0.568
Expect >$50k Salary	0.576	0.574	0.020
Family Income > $75k	0.558	0.604	-0.584
Female	0.547	0.407	1.789*
First Generation	0.355	0.389	-0.455
High Financial Need	0.588	0.659	-0.846
Personal Income < $10K	0.645	0.635	0.141
Prior Financial Literacy Course	0.186	0.241	-0.876
Savings > 11%	0.773	0.778	-0.069
Senior	0.221	0.296	-1.131
Student-Athlete	0.256	0.296	-0.586
Transfer	0.297	0.370	-1.018
White	0.576	0.685	-1.436

*** p<0.01, ** p<0.05, * p<0.1

Concerning the primary variables in question, financially literate individuals are more likely to take out loans, both private and public. This may be due to their relative confidence in their financial prowess, knowledge of how to access such means to pay for college, or comfort level in taking out debt since they may view education as an investment with a high likelihood of a high return. Business majors are more likely to be financially literate. This may be due to their interest in the subject or because of their prior learning in other introductory courses. Female students are less likely to be financially literate, which further demonstrates gender inequality.

Not only are women traditionally underrepresented in business and quantitative disciplines but are also less likely to be financially literate independent of their major. This supports findings from Lusardi and Mitchell (2014) who find that women are less likely to answer financial literacy questions correctly than men, and they are also far more likely to say they 'do not know' an answer to a question, a result that is strikingly consistent across countries. Higher education should not only be working to create a more diverse representation in all majors but also to directly target females when it comes to financial education. This is not only true in a college atmosphere, but also with adults and working professionals. Women have historically not been the target of financial advisors. This is changing as women have begun to take a more active role in managing their finances. Further, women control a third of total US household financial assets, which equates to more than $10 trillion (McKinsey & Company, 2020). We encourage the provision of financial education programs run by women, for women.

Table 5 provides the marginal effects of an indicator variable if an individual uses any credit cards.

Credit card cards use and (mis)management

Table 5
Credit Card Use

Dependent variable: Credit card usage	Marginal Effects	Coefficients
Female	-0.006	-0.016
	(0.072)	(0.018)
White	-0.101	-0.254
	(0.076)	(0.193)
Business	-0.069	-0.172
	(0.082)	(0.206)
First-Generation	0.165**	0.418**
	(0.074)	(0.189)
Senior	0.314***	0.830***
	(0.077)	(0.227)
Student-Athlete	-0.145*	-0.366
	(0.083)	(0.213)
Transfer	0.052	0.130
	(0.077)	(0.193)
Family Income > $75K	0.049	0.122
	(0.076)	(0.191)
Prior Financial Literacy Course	-0.132	-0.333
	(0.086)	(0.221)
Financially Literate	0.153**	0.385**
	(0.071)	(0.182)
Observations	224	
Pseudo R^2	0.107	

Standard errors in parentheses below parameter estimates
*** p<0.01, ** p<0.05, * p<0.

In table 5, we found First-Generation students are 16.5% more likely to use credit cards at the 5% confidence level. This may in part be because they are out on their own and have little family financial support; thus, they must gain access to financial capital somehow. At the 1% confidence level, senior students are 31.4% more likely to use credit cards. Student-athletes are 14.4% less likely to have a credit card at the 10% confidence level. Financially literate individuals (answered all Big Five questions correctly) are 15.3% more likely to use a credit card at the 5% confidence level.[1] They may feel more confident in their financial knowledge to obtain and to use a credit card successfully. We specifically test this in the next model where we gauge credit card management at differing levels using an ordered probit model.

Table 6 provides results concerning credit card (mis)management. In table 6, We divide credit mismanagement into three categories based on yes or no responses to credit card questions concerning carryover balances, only making minimum payments, and over the limit fees.

Table 6

Credit card (mis)management

Dependent variable: Credit card (mis)management	Outcome = 0	Outcome = 1 or 2	Outcome = 3
Female	-0.130	0.118	0.012
	(0.097)	(0.090)	(0.009)
White	0.190**	-0.170**	-0.019
	(0.096)	(0.084)	(0.016)
Business	0.146	-0.130	-0.16
	(0.118	(0.101)	(0.019)
First-Generation	-0.067	0.061	0.006
	(0.094	(0.085	(0.009
Senior	0.058	-0.053	-0.005
	(0.101	(0.092	(0.009
Student-Athlete	-0.130	0.115	0.014
	(0.116)	(0.102)	(0.016)
Transfer	-0.209*	0.185**	0.023
	(0.108)	(0.094)	(0.018)
Family Income > $75k	-0.063	0.58	0.006
	(0.108)	(0.099)	(0.010)
Prior Financial Literacy Course	-0.009	0.008	0.001
	(0.142)	(0.128)	(0.013)
Financially Literate	0.224**	-0.208**	-0.017
	(0.093)	(0.089)	(0.010)
Observations		112	
Pseudo R^2		0.113	

Standard errors in parentheses below parameter estimates
*** p<0.01, ** p<0.05, * p<0.1

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[1] For more information on the "Big Five", see https://gflec.org/education/questions-that-indicate-financial-literacy/.

In Table 6, an outcome of "0" means the person responded "No" to all three questions. An outcome of "1 or 2" means the respondent answered "Yes" to one or two of the questions. An outcome of "3" means the respondent answered "Yes" to all three questions. According to the odds ratios, we find the variables White, Transfer, and Financially Literate statistically significant. Concerning outcome 0, a White student is 19% more likely to not mismanage their credit cards. The probability increases by 22.5% if a student is Financially Literate. This is in line with Robb (2011) who finds that greater personal financial knowledge is associated with more responsible credit card use behavior. Further, Munro and Hirt (1998) find that minorities were more likely to engage in less financially responsible behaviors.

Healthy credit card usage can be a fantastic tool to improve one's finances through a higher credit score and lower interest payments when one takes on debt. It should be no surprise that we find that the more financially literate individuals use credit cards more often and are less likely to mismanage their credit cards. The key here is to create financially literate college students, who then know how to manage their finances, and are more likely to understand how to utilize credit cards wisely.

The other lens we see here is through first-generation students. Many colleges and universities have first-generation programs. However, we strongly encourage robust first-generation programs that have a financial education component. Particularly, targeting different financial concepts at each grade level can be an effective way not to overwhelm students with education on new topics. We touch on this point later in the paper, but we now turn to a larger financial decision in a college student's life: educational loans.

Loans

Table 7 provides marginal effects related to the probability of a student taking out loans (any loans and public loans). Concerning all loan debt, the statistically significant variables were: (i) Financially Literate, (ii) Business, (iii) First-Generation, (iv) Student-Athlete, and (v) White.

Table 7

Loans

Dependent variables: Loans, and Public Loan	Loan	Public Loan
Financially Literate	0.232***	0.221**
	(0.077	(0.089)
Business	-0.143*	-0.159*
	(0.083)	(0.092)
Expect > 50K Salary	-0.006	0.064
	(0.081)	(0.084)
Family Income > $75k	0.090	-0.002
	(0.081)	(0.084)
Female	0.040	0.079
	(0.079)	(0.082)
First-Generation	0.196**	0.129
	(0.080)	(0.087)
High Financial Need	-0.034	-0.093
	(0.078)	(0.081)
Personal Income < $10K	0.096	0.007
	(0.087)	(0.088)
Prior Financial Literacy Course	-0.135	-0.063
	(0.103)	(0.101)
Savings > 11%	-0.121	-0.033
	(0.851)	(0.094)
Senior	0.027	0.026
	(0.095)	(0.100)
Student-Athlete	-0.199**	-0.123
	(0.098)	(0.094)
Transfer	0.020	-0.034
	(0.089)	(0.090)
White	0.231***	0.223***
	(0.088)	(0.085)
Observations	179	179
Pseudo R^2	0.111	0.086

(a) Standard errors in parentheses below parameter estimates
(b) *** p<0.01, ** p<0.05, * p<0.1

Here, we find students who identify as White are 23.1% more likely to take out a loan at the 1% confidence level. First-Generation students are 19.6% more likely to take out a loan at the 5% confidence level. We find respondents who answered all the Big Five questions correctly were 23.2% more likely to take out a loan at the 1% confidence level. When looking at other definitions

of financial literacy (at least three or at least four) the results are no longer robust. This may be because taking out a student loan is more financially constrained than obtaining other types of financing, such as obtaining a credit card or establishing a bank account. Student-athletes are 19.9% less likely to have a loan at the 5% confidence level, due in part to some or all their education being funded by athletic scholarships or other forms of financial aid. Business majors were 14.3% less likely to take out a loan at the 10% confidence level. This may be due to having access to other means of financial capital, such as their parents or getting the degree to help them with their entrepreneurial efforts.

Parsing out the student loan debt into public yields interesting details. Concerning public student loan debt, the statistically significant variables were: (i)Financially Literate, (ii) Business, and (iii) White. White and Financially Literate students were 22% more likely to take out a public loan at the 1% confidence level. About financial literacy, this variable could have been affected by "required" education before taking out a loan, but in ad-hoc interviews with other students, they described to us a brief financial consultation with our respective financial aid offices at intake and outtake. No required course or other demonstration of financial knowledge was required to obtain a loan. Business students were 15.9% less likely to take out a loan at the 1% confidence level. In unreported results, we ran this model for private loans and find no significance for any variable, regardless of various robustness checks and alternative definitions. This may be due to our sample taking out fewer private loans.

The takeaways here relate again to financially literate individuals making different choices than their financially illiterate peers, at a statistically significant level. First-generation students are more likely to take out student loans, which likely makes sense as they are the cohort that is less likely to have financial support from their families. However, viewing our findings together, first-generation students are more likely to have student loan debt and are more likely to be financially illiterate. This combination drives a concerning view for their post-college life as they try to pay off these student loans without the appropriate financial education. Again, we urge institutions of higher education to provide financial education directly to first-generation students in dedicated programs. First-generation students have different family backgrounds than their financially literate peers which may necessitate specific, targeted, financial education programs.

Conclusion

This study adds to the current literature by analyzing the financial literacy of current college students and their subsequent financial behaviors. Prior studies only analyzed financial literacy or financial behaviors. We employ rigorous statistical methods through probit and ordered probit regressions and generate corresponding marginal effects to discern the relationship between financial literacy and financial behaviors. This study aligns with prior research as the Big Five financial literacy questions have been used in many prior studies analyzing financial literacy (Lusardi and Mitchell, 2008, 2014; Hastings et al., 2013; Allgood and Watson, 2016; FINRA, 2018).

We find financial knowledge, specifically realized by answering all of the Big Five correctly, to demonstrate positive financial knowledge. Similar to Robb (2011), we find evidence that individuals identifying as White are more likely to use credit cards appropriately and are more likely to be financially literate. Transfer students struggle in one or more areas of good credit card use, especially in dealing with only making minimum payments, paying over the limit fees, and paying on time. Individuals identifying as White and/or First-Generation are more likely to take out a loan to go to college. Individuals who we identify as financially literate are also more likely to take out loans, particularly public ones.

It is clear from these results, and prior studies, that financially literate individuals make healthier financial decisions. One can view post-secondary education as preparing students for life after college. Regardless of what the student pursues after college, they are sure to face important financial decisions. Academic scholars have discussed a systemic lack of financial literacy for decades. This unfortunately still holds today, more than 20 years later. This issue not only plagues our K-12 education system and colleges, but because students graduate without much (if any) exposure to personal financial education in an academic setting, they are ill-equipped to make financial decisions as young adults in the workforce. The burden is placed on that individual to pursue the education themselves, rely on not-for-profit organizations, or even their employer to provide the necessary financial education.

Colleges and universities are in a good position to provide financial education to students since these institutions are in the business of providing education, and students are making significant financial decisions, perhaps on their own for the first time in their lives. Additionally, 96% of the participants in this study indicated that such education should be provided by their institution. Overall, campus-wide, financial education is needed; however, as discussed above, certain cohorts should receive targeted financial education programs. First-generation and female students should be specifically targeted as they are historically underrepresented in business fields and the financial decision-making process.

Further, we note that substantially all (96.5%) of the students surveyed stated they believed personal finance should be taught at the high school level, with 95.6% believing it should be taught at the college level. Students know they lack this education and believe they should receive this education from their educational institutions. We agree with them and suggest institutions listen to their voices.

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APPENDIX A – SURVEY INSTRUMENT

Demographic Information

1. What College do you Attend?

[Illinois college]   [Washington state college]

2. Gender:

Male   Female   Other   Prefer Not to Answer

3. Age : _____

4. Race:

American Indian or Alaska Native   Asian   Black or African American   White

Native Hawaiian or Other Pacific Islander   Hispanic or Latino or Spanish Origin   Prefer Not to Answer

5. Employment or work status:

Self-employed   Full-time for an employer   Part-time for one employer

Part-time for two or more employers   Permanently sick, disabled, or unable to work

Currently do not work

6. If you currently work, do you work on campus:

Yes   No   N/A (I do not currently work)

7. Living arrangements:

Live with parents   Live on campus   Live off-campus alone

Live off-campus with 1 roommate   Live off-campus with two or more roommates

8. Personal Income (best estimate of individual income):

$0 (zero) $1 - $9,999 $10,000 - $19,999 $20,000 - $34,999 $35,000 - $49,999

$50,000 - $74,999 $75,000 - $99,999 $100,000 - $149,999 $150,000+   Don't know

9. Family income (best estimate of parental income):

$0 (zero) $1 - $9,999 $10,000 - $19,999 $20,000 - $34,999 $35,000 - $49,999

$50,000 - $74,999 $75,000 - $99,999 $100,000 - $149,999 $150,000+   Don't know

10. What year of school are you currently considered?

Freshman   Sophomore   Junior   Senior   5th Year Senior   Graduate School

11. Major (or undeclared): _____

12. Did you attend a college before your current college?

Yes, a community/ 2-year college   Yes, another 4-year college   No

13. Are you a first-generation college student? (Both of your parents do not have a college degree.)

Yes   No

14. Are you currently, or have you been, a college student-athlete?

Yes   No

15. If yes, what sport? _____

16. Are you currently, or have you ever been, an active member of the military (veteran)?

Yes   No

17. Are you a domestic or international student?

 U.S. Citizen/ Permanent Resident   International Student

18. What is your current college GPA? _____

19. before college, did you take a course in finance/ personal finance?

Yes   No

20. What high school did you attend? If homeschooled, state homeschooled. If international, state your home country)? _____

Financial Literacy Questions

21. How would you assess your overall financial knowledge?

0 (very poor)   1   2   3   4   5   6   7   8   9   10 (very good)

22. Suppose you had $100 in a savings account and the interest rate was 2 percent per year. After five years, how much do you think you would have in the account if you left the money to grow?

a)   More than $102*

b)   Exactly $102

c)   Less than $102

d)   Do not know

23. Imagine that the interest rate on your savings account was 1 percent per year and inflation was 2 percent per year. After one year, would you be able to buy more than, the same as, or less than today with the money in this account?

a)   More than today

b)   the same as today

c)   Less than today*

d)   Do not know

24. Do you think that the following statement is true or false? "Buying a single company stock usually provides a safer return than a stock mutual fund."

a)   True

b)   False*

c)   Do not know

25. 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.

a)   True*

b)   False

c)   Do not know

26. If the interest rate rises, what should happen to bond prices?

a)   Rise

b)   Fall*

c)   Stay the same

d)   Do not know

Financial Behavior Questions – Credit Cards

27. How many debit cards do you currently have open? (Does NOT include credit cards? _____

28. How many credit cards do you currently have open? (Does NOT include Debit card. Does include specific store-specific credit cards.)? _____

29. I always pay my credit cards in full each month (I do not carry a balance over to the next month).

Yes   No

30. In some months, I carry over a balance and was charged interest (including "promotional interest" of 0%).

Yes   No

31. In some months, I pay the minimum payment only.

Yes   No

32. In some months, I am charged an "over the limit fee" for going over my credit limit.

Yes   No

Financial Behavior Questions – Student Loans

33. How much do you expect to make (annual income) after graduating college? _____

34. How much in student loans do you expect to have when you graduate from college (this does not include any anticipated graduate school debt)? _____

35. Which of the following best describes your student loan picture:

a)   My student loans are mostly private student loans

b)   My student loans are mostly subsidized government loans

c)   My student loans are mostly unsubsidized government loans

d)   I do not have any student loans

e)   I don't know

36. Do you receive financial aid from the university?

Yes   No

37. If yes to the prior question, approximately how much per year? If you don't know, say I don't know? _____

38. How are you funding your undergraduate education? Select All that apply.

Family contributions   Personal Contributions   Public Student Loans   Private Student Loans

Grants (e.g., Pell Grants)   Financial Aid from University   Work-study program   Scholarships
Parent Loans (e.g., Parent PLUS)   Military Contributions   Tuition Remission Programs
Credit Cards   Other

39. If you were to be in an emergency, how much could you personally cover given your checking and savings accounts? A rounded figure is ok. (Examples of possible answers: $50, $100, $500, $1000) _____

<u>Please rate the following statements. (Remember, survey responses are anonymous.)</u>

40. I am confident that I can manage my money.

Strongly Agree   Agree   Neutral   Disagree   Strongly Disagree   Prefer Not to Answer

41. I have enough savings to pay for a $100 emergency.

Strongly Agree   Agree   Neutral   Disagree   Strongly Disagree   Prefer Not to Answer

42. I understand how to create a budget.

Strongly Agree   Agree   Neutral   Disagree   Strongly Disagree   Prefer Not to Answer

43. I understand why it is important to follow a budget.

Strongly Agree   Agree   Neutral   Disagree   Strongly Disagree   Prefer Not to Answer

44. What level of stress do you feel about your finances right now?

0 (no stress)   1   2   3   4   5   6   7   8   9   10 (Extreme Stress)

45. I believe I should save _____% of my income.

a)   0%

b)   1-5%

c)   6-10%

d)   11-15%

e)   16-20%

f)   21-25%

g)   25% or more

46. Do you believe personal finance should be taught in high school?

Yes   No

47. Do you believe personal finance should be taught in college?

Yes   No