

# Attitudes of college seniors toward graduate student loan debt: the role of financial education

Role of  
financial  
education

Manuel Salas-Velasco

*Department of Applied Economics, Universidad de Granada, Granada, Spain*

Received 11 September 2023  
Revised 23 March 2024  
Accepted 23 March 2024

## Abstract

**Purpose** – This paper aims to examine prospective graduate students' attitudes toward educational loan borrowing in an experimental setting.

**Design/methodology/approach** – Participants were randomly assigned to two treatment groups and one control group. Subjects in experimental group 1 received financial education: a short online course on the economic viability of getting a master's degree and how to finance it with a graduate student loan, while subjects in experimental group 2 received financial education along with information on the availability bias.

**Findings** – Relying on a control group in the assessment of financial literacy education intervention impacts, this research finds positive causal treatment effects on individuals' attitudes toward debt-financed graduate education. In comparison to the control group, experimental subjects perceived the possibility of going into debt with a graduate loan to complete a master's degree as less stressful and worrying.

**Practical implications** – This study has important educational policy implications to prevent students from stopping investing in human capital by perceiving educational loan debt as something stressful or worrying. The results can help potential (and current) grad students develop a feasible financial plan for graduate school by encouraging higher education institutions to implement educational loan information and financial education into university seminar courses for better graduate student loan decision-making.

**Originality/value** – Student attitudes toward debt have been analyzed in the context of higher education, but only a few researchers internationally have used an experimental design to study personal financial decision-making.

**Keywords** Behavioral economics, Econometric modeling, Cost-benefit analysis, Economics education

**Paper type** Research paper

## 1. Introduction

It is a well-known result in the economics literature that credit market imperfections can curb individuals' human capital investment decisions (e.g. [Kodde and Ritzen, 1985](#)). Financial aid in the form of educational loans is, thus, a relevant instrument for financing a degree for millions of students, mainly in the Anglo-Saxon higher education model (e.g. [Debande, 2004](#)). Nevertheless, around the world, student loan debt is rising as growing

---

© Manuel Salas-Velasco. Published by Emerald Publishing Limited. This article is published under the Creative Commons Attribution (CC BY 4.0) licence. Anyone may reproduce, distribute, translate and create derivative works of this article (for both commercial and non-commercial purposes), subject to full attribution to the original publication and authors. The full terms of this licence may be seen at <http://creativecommons.org/licenses/by/4.0/legalcode>

*Conflict of interest statement:* The author declares that he has no conflict of interest.

*Funding:* FUNCAS Foundation through the FUNCASEDUCA Program of financial education research grants (Ref. EF021/2018).



---

numbers of students rely on student loans to pay for their higher education (De Gayardon *et al.*, 2018). In the case of postcollege education, the average debt levels are alarming. For example, in the USA, a student's cumulative amount borrowed for graduate education was \$52,141.3 on average in 2016; this figure was \$37,271.5 for a master's degree [1]. Student loan debt has become an increasingly important component on the balance sheets of many Americans (Ratcliffe and McKernan, 2015), and it has influenced young adults' postgraduation decisions, affecting personal choices regarding starting a family or business, buying a home, and saving for their children's future education (Akers, 2014) [2]. The increase in student loan debt has also caught many noneconomists' attention since the implications are not just financial. Student loan debt is of concern because higher levels of debt may lead borrowers to lower levels of psychological well-being (e.g. Walsemann *et al.*, 2015). These situations of excessive indebtedness, along with the stress and worry that can cause student loan debt, may foster an anti-debt attitude among potential university students and discourage investments in human capital, especially among individuals from lower social classes. Nevertheless, if people underinvest in human capital because they are unwilling to borrow, this underinvestment will have negative implications for individuals as higher education leads to higher earnings on average but also negative implications for society as higher education is strongly correlated with productivity and economic growth and provides a greater tax base for government funding (Organisation for Economic Co-operation and Development, 2016).

In this context of the relevance of investments in human capital, financial education programs aimed at prospective (under)graduate students are essential so that they are aware of the value of obtaining a good education. These programs must also educate people about available financing options and assist them in choosing loans that will allow them to repay their debts. A well-designed program is expected to help create a pro-indebtedness attitude among potential borrowers of educational loans. Some academic papers have already shown that receiving a financial education is negatively associated with student-loan worry (e.g. Fan and Chatterjee, 2019), but they are only correlational studies. "Existing research often encounters methodological issues related to selectivity and endogeneity, precluding the ability to draw causal inference" (Montalto *et al.*, 2019, p. 9). Only through an experimental design can be established causal relationships between financial education initiatives and financial outcomes such as debt attitudes and behaviors. Unfortunately, such experiments are rare in financial education studies. There is still little empirical evidence of the causal impacts of financial education programs at the personal level (Hastings *et al.*, 2012). Lusardi and Mitchell (2014) already reported that few empirical studies can be deemed credible evaluations of the effectiveness of financial education programs.

This article tried to fill that gap using data generated from a randomized controlled experiment aimed at college seniors at a public business school in Spain within the so-called FUNCAS project [3]. The experiment team developed Web-based training resources to guide undergraduates on the advisability of pursuing a master's degree and help them make informed decisions about incurring student loan debt for graduate education. For example, the training explained the fundamentals of cost-benefit analysis (CBA) applied to investment in a master's degree, how much to borrow to complete a master's program and what the consequences of debt-financing a graduate education are [4]. The current study aims to verify whether exposure to financial literacy education impacts financial outcomes. First, we hypothesize that:

- H1.* There are positive causal treatment effects on individuals' attitudes toward debt-financed graduate education.

---

In particular, we want to assess experimentally the effectiveness of the financial education intervention aimed at college seniors for reducing their stress and worries about taking out graduate student loans (affective attitudes to debt). Indeed, an important question for policymakers is whether financial education programs can influence financial attitudes. Although some studies have provided experimental evidence indicating that financial education can improve financial attitudes, such evidence, however, is limited mostly to the elementary and high school levels (e.g. [Batty et al., 2015](#); [Bhattacharya and Gill, 2020](#)). Truly, financial education experiments targeting undergraduate students to help them make investment and funding decisions for a graduate degree are virtually nonexistent. Second, attitudes to student debt are examined using Likert scales to establish if there are gender-based differences in attitudes to student debt. We hypothesize that:

*H2.* Female students are more fearful of graduate loan debt than their male peers.

In addition, as attitudes are theorized to shape intentions and affect behavior (e.g. [Ajzen, 1991](#)), in this study, we also want to test whether *more favorable attitudes toward graduate loan debt foster individuals' intentions to apply for a student loan to pursue a master's degree* (*H3*).

The rest of the paper is organized as follows. Section 2 briefly reviews key published works on the topic addressed in this article. Section 3 summarizes the experimental design. In Section 4, we test whether financial education interventions improved undergraduate students' attitudes toward obtaining a student loan to finance a graduate degree program. In Section 5, we look into how gender affects attitudes toward debt when deciding how to pay for graduate school. In Section 6, we explore relationships between attitudes toward debt and behavioral intentions. Section 7 concludes.

## 2. Background

A growing body of literature examines individuals' attitudes toward debt (e.g. [Loibl et al., 2021](#)). Yet, studies on debt attitudes with special emphasis on student loan stress and student loan worries, which are the main focus of this article, are limited. We begin by reviewing the literature that has attempted to directly associate student loan debt with financial wellness and psychological and health outcomes. Among these studies, we found the work of [Tay et al. \(2017\)](#). The authors assessed the association between debt and subjective well-being (SWB). In particular, using a large-scale representative sample of college graduates from the USA (Gallup-Purdue Index data), they found that the amount of student loan debt increased financial worry, and then financial worry lowered life satisfaction. That is, student loan debt influences satisfaction with life indirectly, mediated by financial worry ([Tay et al., 2017](#)). Research has also reported a positive association between the amount of student loan debt one has and the amount of stress one feels toward this debt (e.g. [Chisholm-Burns et al., 2017](#); [Walsemann et al., 2015](#)). For instance, in a study aimed at dental students at the University of Birmingham (UK), participants circled the response that best fit their situation regarding statements such as "My total amount of student loan(s) causes me stress" and "My total student loan(s) does not cause me to worry". In the former, 39% of males and 44% of females agreed/strongly agreed with the statement; in the latter, 40% of males and 51% of females disagreed/strongly disagreed with the statement ([Boyles and Ahmed, 2017](#)). More recently, [Xiao and Kim \(2022\)](#), with data from the 2018 US National Financial Capability Study, showed that payment delinquencies of student loans (being late in debt repayment) are positively associated with financial stress. Another important factor linked to student loan stress is financial self-efficacy (FSE). For example, [Shim et al. \(2019\)](#) conducted a study among university students to investigate the association between FSE and student loan repayment stress. It was found that students with

---

a greater FSE perceived less difficulty in paying off their loans and indulged in less loan repayment-related stress.

Some studies have also suggested that students' debts and associated financial concerns might have important implications for their mental and physical health (e.g. [Jessop et al., 2005](#); [Robb et al., 2012](#); [Sweet et al., 2013](#)). [Zhang and Kim \(2019\)](#), targeting American young adults aged 18–28, examined the impact of student loans on psychological distress. Using five biannual waves (2005, 2007, 2009, 2011 and 2013) from the transition into adulthood study (TA) and fixed-effects models, [Zhang and Kim \(2019\)](#) found that increases of \$1000 in student loan debt resulted in 6% higher odds of distress [5]. Likewise, [Sato et al. \(2020\)](#) found significant associations between the total amount of student loan debt and psychological distress among university graduates and dropouts in Japan. The psychological distress was measured using the Kessler Psychological Distress Scale (K6) score. Research has also reported that the appraisal of debt as being stressful was associated with poor health and symptoms of depression among black, Hispanic and white students ([Tran et al., 2018](#)).

In addition to the reviewed works, the present study fits into the related literature that has examined attitudes toward educational loans and student debt.

Interest in the causes and effects of debt acquisition by students has been a recurrent source of research in economic psychology, and a good part of this research has concerned students' attitude to debt ([Haultain et al., 2010](#), p. 323).

Research has mainly tried to determine whether attitudes toward debt influence borrowing behavior. Positive attitudes toward debt have been directly associated with intentions to take on debt and have higher amounts of debt ([Loibl et al., 2021](#)). An influential article by [Davies and Lea \(1995\)](#) have been at the forefront of the dialogue on students' attitudes and student debt. [Davies and Lea \(1995\)](#), who developed a unidimensional attitude to debt scale, is the first notable attempt to investigate the psychological structure of students' debt attitudes. They argued that there may be two types of student debtors, those who borrow because a lack of family resources, and those who borrow to meet their lifestyle expectations. Later, in a study of how student-loan borrowers perceive their loans, [Baum and O'Malley \(2003\)](#) found that students in repayment feel burdened by their loans and would have borrowed less if they could do it over again. More recently, [Norvilitis and Batt \(2016\)](#) examined student loan attitudes among US college students. Their results indicated that loan attitudes were associated with higher levels of debt; in particular, loan initiative and loan resignation attitudes predicted the level of student loan debt. Loan initiative items reflected a proactive attitude toward loans, suggesting that students believe that they can pay their loans off if they work hard, whereas loan resignation items indicated that students feel that loans are inevitable if one wants a college education. Although attitudes influence behavior ([Ajzen, 1991](#)), social psychologists who have studied this relationship are still refining our understanding of the circumstances under which attitude and behavior are most closely linked (e.g. [Mortenson, 1989](#)).

Although there is some work on student loan debt in general, there is still limited research related to women. The literature has traditionally found that female students are more afraid of debt than male students (e.g. [Haultain et al., 2010](#)). One early study was conducted by [Mortenson \(1989\)](#), who examined the attitudes of Americans toward borrowing to finance educational expenses over the period from 1959 to 1983. The author found that women were less likely than men to hold a favorable view of educational loans. Later, [Ratcliffe and McKernan \(2013\)](#) observed that more than half of Americans who had student loan debt were worried that they would be unable to repay their debt; those who were women were more likely to have student loan stress. [Fan and Chatterjee \(2019\)](#) also

---

showed that women are more likely to be worried about student loans than men. [Beale and Cude \(2017\)](#) used survey data to examine the influence of psychological factors on college student attitudes toward debt. They found that female college students are more likely to have a negative attitude toward debt than males. Given that females on average earn less than males, sociological theories would suggest that females may value the future worth of tertiary education lower than males, and thus influence their willingness to incur debt to earn a tertiary qualification ([Agnew and Harrison, 2015](#)).

Another area of concern is that many students do not have a strong understanding of loans, which may lead to unwise choices about debt assumption or issues with repayment in the future ([Norvilitis and Batt, 2016](#)). According to [Sullivan and Towell \(2017\)](#), many borrowers lack a clear understanding of the loan terms, ultimately affecting their ability to adhere to the repayment terms of their loans, which leads to many defaults. The level to which financial education programs enhance financial knowledge and financial behavior is a crucial concern for policymakers and higher education institutions ([Salas-Velasco, 2022](#)). So, it could be safely concluded that it is necessary to provide financial counseling to the students as soon as they plan to join the college or university. For example, from the analysis run by [Fan and Chatterjee \(2019\)](#) using the 2015 National Financial Capability Study data set, we know that individuals who receive financial education in an academic or professional setting are less likely to be worried about their student loan debt.

### 3. Experimental design

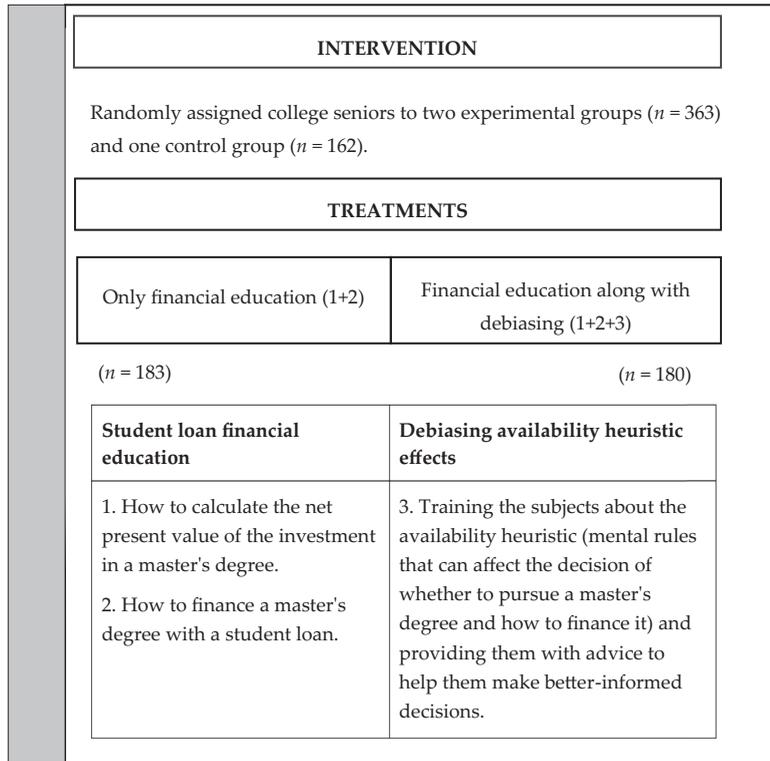
The main objective of this study was to experimentally assess the impact of financial education programs on college seniors' financial attitudes toward graduate student loan debt. As we have anticipated, student attitudes toward debt have been analyzed in the context of higher education (e.g. [Callender and Mason, 2017](#)), but only a few researchers internationally have used an experimental design to study personal financial decision-making ([Cho et al., 2016](#)). In particular, at the beginning of the 2019/2020 academic year, around 70% of final-year undergraduate students from a Spanish public university enrolled at the business school participated voluntarily in the experiment, although there were economic rewards assigned by lottery based on the correct answers to certain questions. The computer labs of the business school were used for the implementation of the experiment. The data were collected during the experiment through an online questionnaire designed in Qualtrics® software [6].

Before starting the experiment, participants were randomly assigned to two treatment groups and one control group ([Figure 1](#)). Then, as can be seen in [Figure 1](#), subjects in experimental group 1 received financial education: a short online course on the economic viability of getting a master's degree and how to finance it with a graduate student loan (see [Figure 2](#) for further details), whereas subjects in experimental group 2 received financial education along with information on the availability bias. In particular, based on the literature (e.g. [Fischhoff, 1982](#); [Tversky and Kahneman, 1974](#)), the debiasing mechanism manipulated in the experiment was to prompt the subjects with a warning message about the possibility of decision bias, in particular, the so-called availability heuristic or availability bias ([Figure 1](#)). Control group participants did not receive any treatment. [Table A1](#) in the [Appendix](#) includes more information about the sample. A balance table was also added to show that the randomization was successful.

### 4. College seniors' attitudes toward graduate student loan debt

#### 4.1 Measuring attitude toward indebtedness

After the intervention [7], all participants were instructed to assume that:



**Figure 1.**  
Experimental design

**Source:** FUNCAS project and author's elaboration

- they had been admitted to a graduate school of business to pursue a master's degree that was viable from an economic point of view and whose total cost was €30,000 (tuition and cost of living for the year of completion of the master's degree); and
- they had funds available for an amount equivalent to 50% of the total cost, but they were able to get financial aid (a graduate student loan according to the bank's financing conditions that were shown in the experiment to all subjects) [8].

Since students' perceived risk of failing to graduate discourages them from borrowing money (e.g. Furuta, 2023), participants were told that they will have no difficulty in completing the master's degree, and they also were provided with data on potential earnings after graduating [9]. Then, and within the conceptual framework of the theory of planned behavior (Ajzen, 1991), all subjects had to rate several items related to variables that precede the decision to request a graduate student loan to pursue a master's degree (dependent variables, DVs); among these DVs were the attitudes toward debt-financed graduate studies. In particular, debt attitudes were measured using a six-item attitude scale that was created for the experiment. All debt attitude statements had to be scored

<p><b>MODULE 1</b></p> <p><b>Module objectives</b></p> <ul style="list-style-type: none"><li>• Why good decision-making begins with accurately understanding costs and benefits.</li><li>• The decision to invest in a master's degree.</li></ul> <p><b>Module outline</b></p> <ul style="list-style-type: none"><li>• Direct and opportunity costs to estimate the total cost of a graduate degree.</li><li>• Estimating the economic benefits of a master's degree.</li><li>• The time value of money.</li><li>• Calculation of the net present value of the investment.</li></ul> <p><b>MODULE 2</b></p> <p><b>Module objectives</b></p> <ul style="list-style-type: none"><li>• To assist the student in developing better control over his/her finances.</li><li>• Given the potential salary, figure out how much money should be going towards a graduate student loan.</li><li>• How much prospective student-loan payments will be and how much interest an individual will pay.</li></ul> <p><b>Module outline</b></p> <ul style="list-style-type: none"><li>• Borrowing capacity calculation. The 40 percent rule.</li><li>• Student-loan payment amount estimation.</li><li>• Personal financial scheduling.</li></ul>
--

**Source:** FUNCAS project and author's elaboration

**Figure 2.**  
Financial education  
for decision-making  
in graduate studies

on a seven-point Likert scale (Table 1) [10]. Higher scores indicated more positive attitudes toward debt.

Although the debt was for educational purposes, a factor analysis suggested that a two-factor might best represent attitudes that affect the acquisition of student loans (Table 1). Both uncorrelated factors are behaviorally important [11]. Factor 1 would capture the attitude toward debt in its affective dimension; it appears to measure the extent to which students are fearful of debt [12]. Factor 2 would capture the attitude toward debt in its instrumental (or cognitive) dimension; it measures the extent to which students regard debt as useful. As can be seen in the bottom rows of Table 1, the mean score obtained in the first three items is below the midpoint of the scale [13], which means greater stress, discomfort and concern with the possibility of getting into debt with a student loan: *an antidebt attitude*. Earning a graduate education will surely provide long-term financial wellness by expecting higher salaries than with a bachelor's degree. However, having to take out a student loan to finance a master's

Loaded debt attitude items <sup>b</sup>	Factor 1	Factor 2
<i>Getting into debt with the student loan to pursue the master's degree would be for me:</i>		
Stressful 1 - 2 - 3 - 4 - 5 - 6 - 7 Relaxing	0.5106	-0.2253
Uncomfortable 1 - 2 - 3 - 4 - 5 - 6 - 7 Comfortable	0.3823	-0.0675
Worrying 1 - 2 - 3 - 4 - 5 - 6 - 7 Rewarding	0.3768	-0.0593
Harmful 1 - 2 - 3 - 4 - 5 - 6 - 7 Beneficial	-0.0625	0.3809
Useless 1 - 2 - 3 - 4 - 5 - 6 - 7 Useful	-0.2325	0.5189
Inadvisable 1 - 2 - 3 - 4 - 5 - 6 - 7 Advisable	-0.0513	0.3701
Cronbach's alpha ( $n = 525$ )	0.837	0.840
Mean (S.D.) of the attitude scale (affective dimension); $n = 525$	3.204 (1.274)	
Mean (S.D.) of the attitude scale (cognitive dimension); $n = 525$		4.721 (1.285)

**Table 1.**  
Borrowing attitudes  
toward graduate  
loans: rotated  
component matrix<sup>a</sup>

**Notes:** <sup>a</sup>Extraction method = principal component analysis. Rotation method = varimax with Kaiser normalization; <sup>b</sup>Attitudes toward graduate student loans scale (created for the present study). Adapted from Ajzen (1991, 2019), Conner and Sparks (2005), and Sotiropoulos and d'Astous (2013), mainly; The analysis was performed using Stata® 17 statistical software  
**Source:** Author's elaboration

degree program can generate financial discomfort in the short term because the uncertainty of not knowing if a good job will be found that allows one to repay the loan regularly. This situation can overwhelm an undergraduate who ultimately decides not to get an advanced degree for fear of debt, which will cause financial stress and worry. Our results somehow suggest that being uncomfortable with debt acts as a self-imposed borrowing constraint. In this regard, using a representative sample of the Swedish adult population, Almenberg *et al.* (2021) introduced a survey measure of debt attitude, asking respondents if they were uncomfortable with debt. Those who reported being uncomfortable with debt had considerably lower debt levels, even when controlling for relevant socioeconomic variables. Nonetheless, at the same time, taking out a student loan to get a master's degree after college graduation is perceived as something useful, beneficial and advisable, which might more appropriately be described as the perceived utility of debt. The mean score of the last three items of the attitude scale (i.e. cognitive dimension) is above the central point of the scale: a *pro-debt attitude* [14].

Our results are in line with applied works that have provided evidence that attitudes toward acquiring debt are not well described by a single dimension (e.g. Haultain *et al.*, 2010; Harrison *et al.*, 2015; Scott and Lewis, 2001). For example, Haultain *et al.* (2010) used factor analysis to investigate the structure of attitudes toward debt among current and prospective New Zealand tertiary students. Attitudes were better described by two uncorrelated dimensions: fear of debt and debt utility. Similarly, a previous study with UK students by Scott and Lewis (2001) found that 11 of the 14 items on the attitudes to debt scale loaded onto one of two factors: seven anti-debt statements loading onto Factor 1 and four pro-debt statements loading onto Factor 2.

#### 4.2 Impact of the financial education intervention on college seniors' attitudes toward debt

This section aimed to verify whether or not there were positive causal treatment effects on individuals' attitudes toward financing a graduate degree with a student loan; that is, whether the intervention fostered participants' debt attitudes. Regression methods are one of the more popular approaches used in various academic fields to estimate

causal effects using experimental data (Imbens and Rubin, 2015; Imbens and Wooldridge, 2009). Researchers frequently specify a regression equation in terms of realized outcomes ( $Y$ ) as:

$$Y_i = \alpha + \theta T_i + X_i\beta + error_i \quad (1)$$

Equation (1) includes the dependent variable ( $Y$ ), the independent variable for the receipt of treatment ( $T$ ), and additional pretreatment covariates ( $X$ ) [15]. The parameters of equation (1) are estimated by least squares.

To study how college seniors' borrowing attitudes differ across the treated and untreated subjects, ordinary least squares (OLS) estimations were carried out in which mean values of the attitude scale (affective dimension) and mean values of the attitude scale (cognitive dimension), the outcomes (dependent variables), were separately regressed on the independent variable (or experimental factor) and pretreatment covariates of gender, academic ability and majors. In Table 2, we evaluated the effectiveness of the financial education intervention [16]. As seen in Table 2, the experimental factor was entered into the econometric estimation as dummy variables for the experimental groups, with the control group being the reference category. In the first regression (Model I), the estimated coefficients associated with the variables of the experimental groups are positive and statistically significant, although the coefficients are not statistically different between them (test shown at the bottom of Table 2). The intervention increased the self-assessment of students' debt attitudes by almost 0.4 points. In other words, the results show that borrowing money through a student loan to pursue a master's degree is perceived as more stressful and worrying among individuals who did not receive any financial training. In

	Model I (debt attitude: affective dimension)		Model II (debt attitude: cognitive dimension)	
	Coef.	Robust Std. Err.	Coef.	Robust Std. Err.
Control group	Ref. cat.		Ref. cat.	
Experimental group 1	0.357**	0.133	0.165	0.139
Experimental group 2	0.393**	0.136	0.264	0.138
Gender (= 1 female)	-0.399***	0.109	-0.193	0.112
Academic ability	-0.011	0.073	-0.083	0.081
Majors (= 1 finance and Accounting)	0.347*	0.167	0.415**	0.143
Constant	3.194***	0.498	5.192***	0.543
Number of obs.	525		525	
F(5, 519)	4.84***		3.20**	
R-squared	0.047		0.025	
Dependent variable	Mean scores of each subject on the attitude scale (first three items of Table 1)		Mean scores of each subject on the attitude scale (last three items of Table 1)	
Testing the equality of two coefficients				
$H_0: \beta_1$ and $\beta_2$ are not statistically different				
F(1, 519)	0.07			
Prob. > F	0.792			
	0.357 and 0.393 are not statistically different			

**Table 2.** College seniors' attitudes toward borrowing for graduate education: assessing the intervention effectiveness

**Notes:** \*\*\* $p < 0.001$ ; \*\* $p < 0.01$ ; \* $p < 0.05$

**Source** Author's elaboration

particular, compared to the control group, whose rating on the scale was around 3.0 on average, the experimental subjects in groups 1 and 2 rated an extra value of 0.36 and 0.39, respectively. Hence, the treated individuals showed a more favorable personal judgment to take out a student loan – the affective dimension of the perceived attitude toward debt. “By “affective”, we mean a response to an object (debt) that reflects how the respondents feel about that object” (Almenberg *et al.*, 2021, p. 781). Among the covariates, gender was significantly related; women showed a more negative attitude toward debt than men. The college major was also significantly related to student attitudes toward debt. In the second regression (Model II), on the contrary, the estimation results revealed that the treatments did not impact subjects’ attitudes toward graduate school loans – the cognitive or instrumental dimension of attitude.

Our results are essential for educators and counselors to prevent students from stopping investing in further education by perceiving educational loan debt as something stressful or worrying. The fact of having to finance a degree with a student loan can curb investments in human capital because of a fear of debt (Cunningham and Santiago, 2008). These debt-averse attitudes not only predict lower intentions to pursue higher education but are also potentially exacerbating existing inequalities in access (Boatman *et al.*, 2022).

## 5. Predicting borrowing attitudes: gender differences

This section questions if there is a different attitude to student debt between males and females. As we anticipated in the second section, the literature has traditionally found that female students are more likely to have student loan stress than male students (e.g. Ratcliffe and McKernan, 2013), and also that women are more likely to be worried about student loans than men (e.g. Fan and Chatterjee, 2019). We wanted to verify these results within the framework of our experimental design. To do this, we focused on the two items of the attitude scale that assess stress and worry. As we saw in Table 1, all participants rated on a seven-point Likert-type scale the following statement:

*Getting into debt with the student loan to pursue the master’s degree would be for me*  
 Stressful 1 - 2 - 3 - 4 - 5 - 6 - 7 Relaxing  
 Worrying 1 - 2 - 3 - 4 - 5 - 6 - 7 Rewarding

We treat the *attitude toward student loan debt for graduate education* (perceived financial strain) as a qualitative (polytomous) dependent variable. When the outcome variable is ordinal (i.e. the relative ordering of response values is known but the exact distance between them is not) [17], an ordered logit model is the most recommended one (McKelvey and Zavoina, 1975) [18]. Presumably, there are more than seven possible values for debt attitude, but respondents must decide which option best reflects the range that their feelings fall into. For such variables, also known as limited dependent variables, we know the interval that the underlying  $Y^*$  falls in, but not its exact value. Ordinal regression techniques allow us to estimate the effects of  $X$  on the underlying  $Y^*$  in such a way that the model to estimate is Greene (2003):

$$Y^* = \beta'X + \epsilon$$

where  $\epsilon$  is the disturbance that follows a logistic distribution,  $X$  is the vector of explanatory variables and  $\beta$  is the vector of coefficients to be estimated. Specifically,  $X$  contains the independent variable (training content) and observable characteristics of the subjects (pre-treatment covariates such as gender, academic ability and majors).

The results of the ordered logistic regression analysis are presented in Table 3. The Stata® code “ologit” was used to run Model I (student loan stress) and Model II (student loan worries). The cutpoints shown in the middle of Table 3 indicate where the latent variable is cut to make the seven groups that we observe in our data. Note that this latent variable is continuous. In general, these are not used in the interpretation of the results [19]. First, in relation to gender, negative and statistically significant coefficients for female students are associated with a reduction in the likelihood of perceiving borrowing for graduate studies as relaxing and rewarding compared to men (Model I and Model II, respectively); or, if we want, compared to men, women are more likely to perceive borrowing for graduate studies as something stressful and worrisome. Thus, our results are consistent with studies that have shown that women are more stressed and worried about student loan debt than men (e.g. Ratcliffe and McKernan, 2013; Fan and Chatterjee, 2019). Second, individuals who received both a financial education treatment and a debiasing treatment (i.e. experimental group 2) increased the probability of perceiving borrowing money to pursue a master’s degree as relaxing and rewarding in comparison to the control group (Model I and Model II); or if we want, they reduced the likelihood of perceiving borrowing for graduate studies as something stressful and worrying compared to the control group. Finally, participants who received only financial education (i.e. experimental group 1) increased the probability of perceiving as rewarding borrowing money to pursue a master’s degree compared to the control group (Model II), but the coefficient is not statistically significant in Model I. Therefore, these results show that financial education alone may not be enough to change undergraduate students’ financial attitudes, but it must be accompanied by information on heuristics that affect financial decision-making as well. Removing or at least mitigating these biases would appear to be an important goal [20].

	Model I (student loan stress)			Model II (student loan worries)		
	Coef.	Robust Std. Err.	Odds ratio	Coef.	Robust Std. Err.	Odds ratio
Control group	Ref. cat.			Ref. cat.		
Experimental group 1	0.283	0.196	1.33	0.372*	0.187	1.45
Experimental group 2	0.429*	0.189	1.54	0.471*	0.196	1.60
Gender (= 1 female)	-0.588***	0.159	0.56	-0.599***	0.157	0.55
Academic ability	0.000	0.105	1.00	-0.056	0.106	0.95
Majors (= 1 finance and Accounting)	0.194	0.258	1.21	0.594*	0.254	1.81
/cut1	-1.724	0.723	-1.72	-2.198	0.731	-2.20
/cut2	-0.454	0.715	-0.45	-1.116	0.727	-1.12
/cut3	0.837	0.712	0.84	0.032	0.726	0.03
/cut4	1.847	0.721	1.85	1.136	0.729	1.14
/cut5	2.996	0.736	3.00	1.956	0.733	1.96
/cut6	4.469	0.832	4.47	3.495	0.823	3.50
Number of obs.	525			525		
Wald $\chi^2(5)$	19.66**			24.00***		
Pseudo $R^2$	0.011			0.014		
Log pseudolikelihood	-871.685			-919.218		

Notes: \*\*\* $p < 0.001$ ; \*\* $p < 0.01$ ; \* $p < 0.05$

Source: Author’s elaboration

**Table 3.**  
Borrower’s attitude  
to educational loans:  
gender differences

**6. Predicting intentions to take out student loans: the role of affective attitudes toward debt**

Attitudes have long been linked to behaviors (Ajzen, 1991). According to Ajzen (1991, 2020), a person’s behavior can be predicted by behavioral intention, which in turn is predicted by the person’s attitude toward the behavior, subjective norms and perceived behavioral control. The more favorable attitudes, subjective norms and perceived behavioral control held by someone, the greater the intention to perform the behavior in question (Ajzen, 1991, 2020). In the context of educational loans, taking out a student loan (behavior) would be expected to be preceded by an intention to apply for a loan (behavioral intention), which in turn was influenced by a favorable attitude toward borrowing [21]. In our study, which is experimental in nature, the students have not yet carried out any financial behavior. However, information was available in the experiment about the intention of the subjects to request a loan to pursue a master’s degree in the same hypothetical scenario described at the beginning of Section 4 [22]. In particular, in the postintervention questionnaire, all participants (including the control group) were asked to rate on a seven-point Likert scale their intention to borrow to complete the financially viable master’s program (Table 4) [23].

As we have anticipated, attitudes are theorized to shape intentions and affect behavior (Ajzen, 1991). Thus, we wanted to test whether more favorable attitudes toward graduate loan debt changed (fostered) individuals’ intentions to apply for a student loan to pursue a master’s degree. In short, we wanted to study how the affective dimension of the perceived attitude toward debt is associated with the intention to take a loan. However, as an affective attitude to debt is influenced by the treatment, as we have seen before, this study opts for structural equation modeling to examine the pathways that link financial education, debt attitudes and planned borrowing (Figure 3).

Table 5 presents the results of the structural equation model estimation [24]. Behavioral intention, which is explained by debt attitude (affective dimension), are both observed endogenous variables [25]. In the estimation, for each participant, we took the mean value of both self-reported measures. The financial education provided to the experimental subjects is an observed exogenous variable. As no statistically significant differences were observed between the two experimental groups (see Table 2), for analysis purposes, we consider a treatment dichotomous variable to have values equal

**Table 4.**  
The intention to apply for a student loan to pursue a master’s degree: means and standard deviations for each item

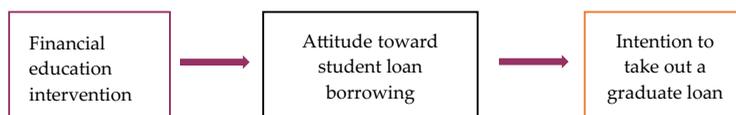
	Obs.	Mean	S.D.	Range
Behavioral intention (BI). Cronbach’s alpha = 0.9118	525	3.437	1.507	1—7
1. I would intend to apply for the student loan to pursue the master’s degree: <i>Strongly disagree</i> 1 - 2 - 3 - 4 - 5 - 6 - 7 <i>strongly agree</i>	525	3.457	1.736	1—7
2. For me to apply for the student loan to pursue the master’s degree would be: <i>Extremely unlikely</i> 1 - 2 - 3 - 4 - 5 - 6 - 7 <i>Extremely likely</i>	525	3.396	1.560	1—7
3. I would try to get the student loan to pursue the master’s degree: <i>Strongly disagree</i> 1 - 2 - 3 - 4 - 5 - 6 - 7 <i>Strongly agree</i>	525	3.457	1.603	1—7

**Notes:** The three-item behavioral intention scale was adapted from Ajzen (1991, 2019), Conner and Sparks (2005), Koropp *et al.* (2014) and Sotiropoulos and d’Astous (2013), mainly. Cronbach’s alpha assesses the internal consistency of the scale items. The scale has an adequate internal consistency as a Cronbach’s alpha coefficient of 0.70 or higher is considered “acceptable” in most social science research situations (Hair *et al.*, 2013). In italics is the mean value of the scale

**Source:** Author’s elaboration

to 1 for treated individuals and 0 for control group participants [26]. The model estimations show that the treatment influenced (fostered) debt attitudes, and, as the TPB predicts, the model estimations further show that attitude toward the behavior is a significant predictor of borrowing intentions. Thus, our study offers some evidence that financial education interventions aimed at college seniors improve the affective dimension of debt, which in turn changes (fosters) the intention to take a graduate loan. In addition, although an impact of the financial education intervention on borrowing intentions was not observed [27], an indirect effect of the financial education intervention on behavioral intention was indeed observed. The latter is estimated in Table 6 using the estimated coefficients from Table 5. A test of joint significance is also shown in Table 6. In sum, the financial education intervention indirectly impacted borrowing intentions through the improvement of debt attitudes.

We think that our results are of great value to policy decision-makers in the sense that financial aid programs aimed at higher education students should include financial training to foster attitudes toward debt (“good debt”) that ultimately will translate into the intention of applying for a student loan (without student loans, university education would be out of reach for many students). We are also aware of the limitations of this experimental study, since only in a real-life scenario can the actual behavior be studied, that is, the amount of money that students ultimately borrow. In an ideal experimental design, researchers would follow experiment participants to study whether and how much they ultimately borrowed and whether exposure to financial education led to



Source: Authors’ elaboration

Figure 3. Changing debt attitudes and predicting borrowing intentions

	Coef.	Robust std. Err.
D.V. (debt attitude: affective dimension)		
Treatment (= 1 treated subjects)	0.375**	0.116
Gender (= 1 female)	-0.399***	0.109
Academic ability	-0.010	0.073
Majors (= 1 finance and Accounting)	0.351*	0.166
Constant	3.185***	0.497
D.V. (borrowing intention)		
Debt attitude: affective dimension	0.497***	0.049
Gender (= 1 female)	0.214	0.121
Academic ability	-0.057	0.086
Majors (= 1 finance and Accounting)	-0.044	0.206
Constant	2.121***	0.589
Number of obs.	525	
Log pseudolikelihood	-3,190.992	
Standardized root mean squared residual (SRMR)	0.011	

Notes: Estimation method = ML; D.V. stands for the dependent variable; \*\*\* $p < 0.001$ , \*\* $p < 0.01$ , \* $p < 0.05$

Source: Author’s elaboration

Table 5. Results of the structural equation model estimation

better financial decision-making; for example, whether they borrowed a prudent amount of money to avoid situations of over-borrowing (effects on long-term behaviors). In any case, and as we anticipated in the introduction, financial education experiments aimed at college seniors on investment and financing decisions in a master’s degree are practically nonexistent internationally. Our study, even with its limitations, contributes to recent literature on the importance of experiments in behavioral economics and behavioral finance, which can inform our understanding of how real people think, choose and decide (e.g. [Baddeley, 2019](#)).

### 7. Conclusion

The link between financial attitudes and consumer financial behavior is well documented. However, little is known about the role of financial education in shaping debt attitudes. In an experimental setting, this study shows that college students’ attitudes toward graduate loan debt can be changed (encouraged) by financial education programs. Debt aversion, sometimes called loan aversion, is a reluctance to incur debt. The stress and worry that can cause graduate student loan debt may foster an anti-debt attitude among college seniors and discourage investments in advanced degrees that would be beneficial to individuals and society. However, we find that student loan debt-related stress and worry may be relieved if college students are properly informed about the financial aspects of graduate loans and also about the possible heuristics or biases that may affect their decision not to borrow. Heuristics often arise in the context of insufficient information. So, although an important question for policymakers and counselors alike is whether financial education can influence financial attitudes, removing or at least mitigating these biases would appear to be an important goal as well. Further analysis reveals that compared to male students, female students are more likely to experience stress related to getting student loans and worry about them. Our experimental evaluation also reveals that more favorable attitudes toward graduate loan debt foster individuals’ intentions to apply for a student loan to pursue a master’s degree.

This study has important educational policy implications to prevent students from stopping investing in human capital by perceiving educational loan debt as something stressful or worrying. Because the highest debt in terms of student loans typically comes from graduate students, the training aimed at helping undergraduate students make informed graduate loan decisions is vital. Our results can help potential (and current) grad students develop a feasible financial plan for graduate school by encouraging higher education institutions to implement educational loan information and financial education into university seminar courses for better graduate student loan decision-making.

**Table 6.**  
The impact of the educational intervention on borrowing intentions: significance test of the indirect effect

Estimated coefficient, $\hat{a}$ Exposure to financial education → debt attitude	Estimated coefficient, $\hat{b}$ Debt attitude → behavioral intention	Indirect effect, $\hat{a} \times \hat{b}$		
		Observed coef.	Bootstrap std. Err.	[95% conf. interval]
0.375	0.497	0.186	0.060	0.069 0.304

**Notes:** There is a statistically significant indirect effect because zero is not in the 95% confidence interval. Bootstrap results for indirect effect: reps = 2,000 ( $n = 525$ ). The analysis was performed using Stata® 17 statistical software

**Source:** Author’s elaboration

---

Notes

1. Data from 2015 to 2016: <https://nces.ed.gov/surveys/npsas/>. Only graduate PLUS loans are included; parent loans are excluded. Direct PLUS loans are federal loans that students can use to help pay for higher education. A direct PLUS loan is commonly referred to as a Grad PLUS loan when made to a graduate or professional student. For further details, visit <https://studentaid.gov/understand-aid/types/loans/plus/grad>
2. More recently, De Gayardon *et al.*'s research (2022) examines the relationship between student loans – having borrowed for higher education and attitudes toward debt – and housing tenure at age 25 in England. They found that young graduates who did not borrow for higher education are more likely to own their home and less likely to rent or live with their parents than graduates who borrowed for their studies or young people who never attended higher education.
3. FUNCAS is an acronym that stands for *Fundación de las Cajas de Ahorros* (Foundation of Savings Banks). It was the institution that financed the project, hence the name.
4. Readers interested in getting more details about the experiment can contact the corresponding author.
5. TA used the six-item Kessler scale (shortened as K6) as the measure of psychological distress. The amount of debt was measured using the outstanding balance at the time when the respondent answered the survey (all values adjusted to 2013 dollars).
6. A paper-based original questionnaire was piloted in May 2019 and a few refinements were made as a result. The final questionnaire also contained demographic questions.
7. Indeed, from the beginning of the experiment for the control group.
8. The student loan mechanism was based on the lending of funds to students to cover up to 100% of the direct cost of education and living expenses until they complete their studies.
9. In the standard life-cycle model, young people make optimal educational investment decisions if they can finance these investments by borrowing against future earnings (Rothstein and Rouse, 2011). Thus, expectations for future earnings may affect students' choices in whether to borrow and how much.
10. Although various kinds of rating scales have been developed to measure attitudes directly, the most widely used is the Likert scale.
11. The complexity of conceptualizations of debt attitudes existing in the literature results in a need for a classification of attitudes (Białowolski *et al.*, 2020).
12. The “anxiety factor” in Harrison *et al.* (2015) and the “fear of debt factor” in Haultain *et al.* (2010) are analogous, suggesting that an affective component is crucial to understanding students' responses to debt.
13. The mean value obtained in the affective dimension of attitude was significantly ( $p < 0.01$ ) below the midpoint of the scale.
14. The mean value obtained in the cognitive dimension of attitude was significantly ( $p < 0.01$ ) above the central point of the scale.
15. It is important to highlight that it is appropriate to control only for pre-treatment predictors when estimating causal effects in experiments (Gelman and Hill, 2006).
16. The analysis was performed using Stata® 17 statistical software. Descriptive statistics can be found in Table A2 in the Appendix.
17. The response categories in the Likert scales have a rank order, but the intervals between values cannot be presumed equal.

18. When outcome variables are ordinal rather than continuous, the ordered logit model, a.k.a. the proportional odds model (ologit/po), is a popular analytical method (Williams, 2016).
19. There is no constant term reported in “ologit” (the intercept (constant) is  $-\text{cut1} = 1.724; 2.198$ ).
20. See Salas-Velasco (2024) for a recent article on this topic.
21. Ajzen (1991, 2020) defined attitude as the extent to which a person has a favorable or unfavorable evaluation or appraisal of a specific behavior.
22. The theory of planned behavior (TPB) assumes that behavioral intentions capture the motivational influences on behavior (Ajzen, 1991). Thus, intention is seen as the most proximal predictor of behavior.
23. Items were evaluated for inclusion in the final scale based on several statistical and theoretical considerations. As part of the validation process, factor analysis was used. The factor analysis used principal component analysis with varimax rotation. As can be seen in Table 4, the mean value given by the participants on the intention scale was below the midpoint of the scale ( $p < 0.01$ ).
24. The analysis was performed using Stata® 17 statistical software. With the maximum likelihood (ML) method, researchers recommend the use of the standardized root mean squared residual (SRMR) for evaluating model fit (e.g. Hu and Bentler, 1998). A perfect fit corresponds to an SRMR of 0. A good fit is a small value, considered by some to SRMR be limited to 0.08 (e.g. Hu and Bentler, 1998). In our analysis (Table 5),  $\text{SRMR} = 0.011 (<0.08)$ .
25. These variables were measured in that order in the experiment.
26. In the estimation, we also control for gender, academic ability and majors.
27. We run an OLS regression of the mean values given by each subject on the intention scale (dependent variable) on the treatment (independent variable), controlling for gender, majors and academic ability. The estimated coefficient associated with the treatment did not show statistical significance. Results are not shown, but they can be requested from the corresponding author.
28. One of the assumptions of ANOVA is that the variances are the same across groups. Before running a one-way ANOVA, we used Levene’s test to check the assumption of equal variances. Levene’s test confirmed that this assumption was not violated.

## References

- Agnew, S. and Harrison, N. (2015), “Financial literacy and student attitudes to debt: a cross national study examining the influence of gender on personal finance concepts”, *Journal of Retailing and Consumer Services*, Vol. 25, pp. 122-129.
- Ajzen, I. (1991), “The theory of planned behavior”, *Organizational Behavior and Human Decision Processes*, Vol. 50 No. 2, pp. 179-211.
- Ajzen, I. (2019), “Constructing a theory of planned behavior questionnaire”, available at: [www.people.umass.edu/ajzen/pdf/tpb.measurement.pdf](http://www.people.umass.edu/ajzen/pdf/tpb.measurement.pdf)
- Ajzen, I. (2020), “The theory of planned behavior: frequently asked questions”, *Human Behavior and Emerging Technologies*, Vol. 2 No. 4, pp. 314-324.
- Akers, B. (2014), *Reconsidering the Conventional Wisdom on Student Loan Debt and Home Ownership*, Brown Center on Education Policy, Washington DC, pp. 1-5.
- Almenberg, J., Lusardi, A., Säve-Söderbergh, J. and Vestman, R. (2021), “Attitudes towards debt and debt behavior”, *The Scandinavian Journal of Economics*, Vol. 123 No. 3, pp. 780-809.
- Baddeley, M. (2019), *Behavioural Economics and Finance*, 2nd ed., Routledge, New York, NY.

- Batty, M., Collins, J.M. and Odders-White, E. (2015), "Experimental evidence on the effects of financial education on elementary school students' knowledge, behavior, and attitudes", *Journal of Consumer Affairs*, Vol. 49 No. 1, pp. 69-96.
- Baum, S. and O'Malley, M. (2003), "College on credit: how borrowers perceive their education debt", *Journal of Student Financial Aid*, Vol. 33 No. 3, pp. 7-19.
- Beale, E.M. and Cude, B.J. (2017), "College students' attitudes toward debt", *International Journal of Undergraduate Research and Creative Activities*, Vol. 9, p. 5.
- Bhattacharya, R. and Gill, A. (2020), "Financial education and financial attitudes: evidence from a high school experiment", *Journal of Financial Counseling and Planning*, Vol. 31 No. 2, pp. 251-266.
- Białowolski, P., Cwynar, A., Cwynar, W. and Węziak-Białowolska, D. (2020), "Consumer debt attitudes: the role of gender, debt knowledge and skills", *International Journal of Consumer Studies*, Vol. 44 No. 3, pp. 191-205.
- Boatman, A., Callender, C. and Evans, B. (2022), "Comparing high school students' attitudes towards borrowing for higher education in England and the United States: who are the most loan averse?", *European Journal of Education*, Vol. 57 No. 2, pp. 199-217.
- Boyles, J.D. and Ahmed, B. (2017), "Does student debt affect dental students' and dentists' stress levels?", *British Dental Journal*, Vol. 223 No. 8, pp. 601-606.
- Callender, C. and Mason, G. (2017), "Does student loan debt deter higher education participation? New evidence from England", *The ANNALS of the American Academy of Political and Social Science*, Vol. 671 No. 1, pp. 20-48.
- Chisholm-Burns, M.A., Spivey, C.A., Jaeger, M.C. and Williams, J. (2017), "Associations between pharmacy students' attitudes toward debt, stress, and student loans", *American Journal of Pharmaceutical Education*, Vol. 81 No. 7, p. 5918.
- Cho, S.H., Mountain, T.P., Porto, N., Kiss, D.E., Gutter, M.S. and Griesdorn, T. (2016), "Experimental design to understand the student loan decision: a methodological note", *Family and Consumer Sciences Research Journal*, Vol. 45 No. 1, pp. 65-76.
- Conner, M. and Sparks, P. (2005), "Theory of planned behaviour and health behavior", in Conner, M. and Norman, P. (Eds), *Predicting Health Behaviour: Research and Practice with Social Cognition Models*, 2nd ed., Open University Press, Berkshire., pp. 170-222.
- Cunningham, A.F. and Santiago, D.A. (2008), "Student aversion to borrowing: who borrows and who doesn't", Institute for Higher Education Policy and Excelencia in Education, available at: <https://eric.ed.gov/?id=ED503684>
- Davies, E. and Lea, S.E. (1995), "Student attitudes to student debt", *Journal of Economic Psychology*, Vol. 16 No. 4, pp. 663-679.
- De Gayardon, A., Callender, C., Deane, K.C. and DesJardins, S. (2018), "Graduate indebtedness: its perceived effects on behaviour and life choices—a literature review", (Centre for Global Higher Education Working Paper No. 38), UCL Institute of Education, available at: <https://ris.utwente.nl/ws/files/250008480/wp38.pdf>
- Debande, O. (2004), "A review of instruments for student loans in tertiary education", *European Journal of Education*, Vol. 39 No. 2, pp. 161-190.
- Fan, L. and Chatterjee, S. (2019), "Financial socialization, financial education, and student loan debt", *Journal of Family and Economic Issues*, Vol. 40 No. 1, pp. 74-85.
- Fischhoff, B. (1982), "Debiasing", in Kahneman, D., Slovic, P. and Tversky, A. (Eds), *Judgment under Uncertainty: Heuristics and Biases*, Cambridge University Press, Cambridge, pp. 422-444.
- Furuta, K. (2023), "The burden of student loan debt: differences in socioeconomic background and attitudes towards higher education", *British Journal of Sociology of Education*, doi: [10.1080/01425692.2023.2267771](https://doi.org/10.1080/01425692.2023.2267771).

- 
- Gelman, A. and Hill, J. (2006), "Causal inference using regression on the treatment variable", *Data Analysis Using Regression and Multilevel/Hierarchical Models*, Cambridge University Press, Cambridge, pp. 167-198, doi: [10.1017/CBO9780511790942.012](https://doi.org/10.1017/CBO9780511790942.012).
- Greene, W. (2003), *Econometric Analysis*, 5th ed., Prentice Hall, NJ.
- Hair, J.F., Black, W.C., Babin, B.J. and Anderson, R.E. (2013), *Multivariate Data Analysis*, (international edition), Pearson, NJ.
- Harrison, N., Agnew, S. and Serido, J. (2015), "Attitudes to debt among indebted undergraduates: a cross-national exploratory factor analysis", *Journal of Economic Psychology*, Vol. 46, pp. 62-73.
- Hastings, J.S., Madrian, B.C. and Skimmyhorn, W.L. (2012), "Financial literacy, financial education and economic growth", NBER Working Paper Series No. 18412, National Bureau of Economic Research.
- Haultain, S., Kemp, S. and Chernyshenko, O.S. (2010), "The structure of attitudes to student debt", *Journal of Economic Psychology*, Vol. 31 No. 3, pp. 322-330.
- Hu, L.T. and Bentler, P.M. (1998), "Fit indices in covariance structure modeling: sensitivity to underparameterized model misspecification", *Psychological Methods*, Vol. 3 No. 4, p. 424.
- Imbens, G.W. and Rubin, D.B. (2015), "Regression methods for completely randomized experiments", *Causal Inference for Statistics, Social, and Biomedical Sciences: An Introduction*, Cambridge University Press, Cambridge, pp. 113-140, doi: [10.1017/CBO9781139025751.008](https://doi.org/10.1017/CBO9781139025751.008).
- Imbens, G.W. and Wooldridge, J.M. (2009), "Recent developments in the econometrics of program evaluation", *Journal of Economic Literature*, Vol. 47 No. 1, pp. 5-86.
- Jessop, D.C., Herberts, C. and Solomon, L. (2005), "The impact of financial circumstances on student health", *British Journal of Health Psychology*, Vol. 10 No. 3, pp. 421-439.
- Kodde, D.A. and Ritzen, J.M. (1985), "The demand for education under capital market imperfections", *European Economic Review*, Vol. 28 No. 3, pp. 347-362.
- Koropp, C., Kellermanns, F.W., Grichnik, D. and Stanley, L. (2014), "Financial decision making in family firms: an adaptation of the theory of planned behavior", *Family Business Review*, Vol. 27 No. 4, pp. 307-327.
- Loibl, C., Letkiewicz, J., McNair, S., Summers, B. and Bruine de Bruin, W. (2021), "On the association of debt attitudes with socioeconomic characteristics and financial behaviors", *Journal of Consumer Affairs*, Vol. 55 No. 3, pp. 939-966.
- Lusardi, A. and Mitchell, O.S. (2014), "The economic importance of financial literacy: theory and evidence", *Journal of Economic Literature*, Vol. 52 No. 1, pp. 5-44.
- McKelvey, R.D. and Zavoina, W. (1975), "A statistical model for the analysis of ordinal level dependent variables", *The Journal of Mathematical Sociology*, Vol. 4 No. 1, pp. 103-120.
- Montalto, C.P., Phillips, E.L., McDaniel, A. and Baker, A.R. (2019), "College student financial wellness: student loans and beyond", *Journal of Family and Economic Issues*, Vol. 40 No. 1, pp. 3-21.
- Mortenson, T.G. (1989), "Attitudes toward educational loans", *Journal of Student Financial Aid*, Vol. 19 No. 3, pp. 38-51.
- Norvilitis, J.M. and Batt, M.J. (2016), "Beyond financial need: predictors of student loans and student loan attitudes", *Journal of Student Financial Aid*, Vol. 46 No. 3, pp. 55-65.
- Organisation for Economic Co-operation and Development (2016), "Skills matter: further results from the survey of adult skills", doi: [10.1787/9789264258051-en](https://doi.org/10.1787/9789264258051-en)
- Park, H.M. (2009), "Comparing group means: T-tests and one-way ANOVA using STATA, SAS, R, and SPSS", The University Information Technology Services (UITS) Center for Statistical and Mathematical Computing Working Paper, Indiana University, available at: <https://scholarworks.iu.edu/dspace/handle/2022/19735>
- Ratcliffe, C. and McKernan, S.M. (2013), "Forever in your debt: who has student loan debt, and who's worried", Urban Institute.

- Ratcliffe, C. and McKernan, S.M. (2015), "Who is most worried about student-loan debt?", *Communities and Banking*, Vol. 26 No. 1, pp. 29-31.
- Robb, C.A., Moody, B. and Abdel-Ghany, M. (2012), "College student persistence to degree: the burden of debt", *Journal of College Student Retention*, Vol. 13 No. 4, pp. 431-456.
- Rothstein, J. and Rouse, C.E. (2011), "Constrained after college: student loans and early-career occupational choices", *Journal of Public Economics*, Vol. 95 Nos 1/2, pp. 149-163.
- Salas-Velasco, M. (2022), "Causal effects of financial education intervention aimed at University students on financial knowledge and financial self-efficacy", *Journal of Risk and Financial Management*, Vol. 15 No. 7, p. 284.
- Sato, Y., Watt, R.G., Saijo, Y., Yoshioka, E. and Osaka, K. (2020), "Student loans and psychological distress: a cross-sectional study of young adults in Japan", *Journal of Epidemiology*, Vol. 30 No. 10, pp. 436-441.
- Scott, A.J. and Lewis, A. (2001), "Student loans: the development of a new dependency culture?", In Scott, A.J., Lewis, A. and Lea, S.E.G. (Eds), *Student Debt: The Causes and Consequences of Undergraduate Borrowing in the UK*, The Policy Press, Bristol.
- Shim, S., Serido, J. and Lee, S.K. (2019), "Problem-solving orientations, financial self-efficacy, and student-loan repayment stress", *Journal of Consumer Affairs*, Vol. 53 No. 3, pp. 1273-1296.
- Sotiropoulos, V. and d'Astous, A. (2013), "Attitudinal, self-efficacy, and social norms determinants of young consumers' propensity to overspend on credit cards", *Journal of Consumer Policy*, Vol. 36 No. 2, pp. 179-196.
- Sullivan, J. and Towell, M. (2017), "Student loans: What you need to know before signing", *Journal of Accountancy*, Vol. 223 No. 1, pp. 49-52.
- Sweet, E., Nandi, A., Adam, E.K. and McDade, T.W. (2013), "The high price of debt: household financial debt and its impact on mental and physical health", *Social Science and Medicine*, Vol. 91, pp. 94-100.
- Tay, L., Batz, C., Parrigon, S. and Kuykendall, L. (2017), "Debt and subjective well-being: the other side of the income-happiness coin", *Journal of Happiness Studies*, Vol. 18 No. 3, pp. 903-937.
- Tran, A.G., Mintert, J.S., Llamas, J.D. and Lam, C.K. (2018), "At what costs? Student loan debt, debt stress, and racially/ethnically diverse college students' perceived health", *Cultural Diversity and Ethnic Minority Psychology*, Vol. 24 No. 4, p. 459.
- Tversky, A. and Kahneman, D. (1974), "Judgment under uncertainty: heuristics and biases", *Science*, Vol. 185 No. 4157, pp. 1124-1131.
- Walsemann, K.M., Gee, G.C. and Gentile, D. (2015), "Sick of our loans: student borrowing and the mental health of young adults in the United States", *Social Science and Medicine*, Vol. 124, pp. 85-93.
- Williams, R. (2016), "Understanding and interpreting generalized ordered logit models", *The Journal of Mathematical Sociology*, Vol. 40 No. 1, pp. 7-20.
- Xiao, J.J. and Kim, K.T. (2022), "The able worry more? Debt delinquency, financial capability, and financial stress", *Journal of Family and Economic Issues*, Vol. 43 No. 1, pp. 138-152.
- Zhang, Q. and Kim, H. (2019), "American young adults' debt and psychological distress", *Journal of Family and Economic Issues*, Vol. 40 No. 1, pp. 22-35.

### Further reading

- Boatman, A., Evans, B. and Soliz, A. (2016), "Understanding loan aversion in education: evidence from high school seniors, community college students, and adults", (CEPA Working Paper No. 16-15), Stanford Center for Education Policy Analysis, available at: <http://cepa.stanford.edu/wp16-15>
- De Gayardon, A., Callender, C. and DesJardins, S.L. (2022), "Does student loan debt structure young people's housing tenure? Evidence from England", *Journal of Social Policy*, Vol. 51 No. 2, pp. 221-241.
- Salas-Velasco, M. (2024), "Debiasing the availability heuristic in student loan decision-making", *Empirica*, Vol. 51, pp. 501-528, doi: [10.1007/s10663-024-09609-z](https://doi.org/10.1007/s10663-024-09609-z).

	Frequency	%	One-way ANOVA		
			<i>Gender</i> (= 1 female) Mean	<i>Academic ability</i> Mean	<i>Majors</i> (= 1 finance and Accounting) Mean
Control group	162	30.86	0.48	6.71	0.12
Experimental group 1	183	34.86	0.54	6.77	0.07
Experimental group 2	180	34.29	0.57	6.86	0.13
Total experiment participants	525	100.00			
Analysis of variance					
<i>F</i>			1.29	1.88	2.09
Prob. > <i>F</i>			0.275	0.153	0.125

**Notes:** (1) For the binary variables of gender and majors, the mean represents the proportion of experiment participants in the category equal to 1. [In relation to undergraduate majors, in the category = 0 were included: Business, Business and Law, Economics, Marketing, and Tourism]. For large samples ( $n > 30$ ), Park (2009) showed that the difference between comparing means and proportions becomes negligible. (2) Academic ability is the self-reported average mark of the academic transcript up to the time of the experiment. Grading in the Spanish system ranges from 0 (minimum) to 10 (maximum). (3) The one-way ANOVA uses the F-statistic to test if all groups have the same mean (null hypothesis). For participants' sociodemographic characteristics considered in the table, the  $p$ -value is greater than 0.05, so we fail to reject the null hypothesis

**source:** Author's elaboration

**Table A1.**  
Distribution of  
experiment  
participants

Table A1 included the analysis of variance (ANOVA) to validate that the means of covariates used in the analysis (relevant sociodemographic characteristics) do not differ significantly across groups. The analysis was performed using Stata@ 17 statistical software [28]

	Mean	SD	Role of financial education
Control group	0.31		
Experimental group 1	0.35		
Experimental group 2	0.34		
Gender (= 1 female)	0.53		
Academic ability (grade point average)	6.78	0.73	
Majors (= 1 finance and Accounting)	0.11		
Observations	525		

**Notes:** (1) Academic ability is the average mark of the academic transcript up to the time of the experiment. This information was self-reported by the participants. In the Spanish system, grades fluctuate from 0 to 10, requiring a 5 to pass. (2) In relation to undergraduate majors, in the category = 0 were included: Business, Business and Law, Economics, Marketing, and Tourism. (3) For binary or dichotomous variables such as gender and undergraduate majors, and also for a set of dummy variables such as treatment-control groups, the mean represents the percentage of experiment participants in each category

**Table A2.**  
Descriptive statistics of the independent variable and covariates

**Corresponding author**

Manuel Salas-Velasco can be contacted at: [msalas@ugr.es](mailto:msalas@ugr.es)

For instructions on how to order reprints of this article, please visit our website:

[www.emeraldgroupublishing.com/licensing/reprints.htm](http://www.emeraldgroupublishing.com/licensing/reprints.htm)

Or contact us for further details: [permissions@emeraldinsight.com](mailto:permissions@emeraldinsight.com)