Investing in Education: Impact of Student Financial Stress on Self-Reported Health

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By Stephen Poplaski, Randy Kemnitz, and Cliff A. Robb

Through the lens of Human Capital theory, the role of financial aid (both amount and type) is explored in the context of student financial stress, and ultimately general student health. Data are taken from a sample of 232 students from a major Midwestern university who were surveyed about their financial attitudes, behavior and knowledge. The presence and amount of federal loans was associated with self-reported financial stress, and the validated stress measure was further associated with students' self-reported health. A number of personal life events (i.e. job loss) were also associated with higher stress levels. Implications are discussed.

Keywords: *financial stress, self-reported health, college students, student loans*

Many households find it difficult to cover college expenses, particularly given long standings trends in tuition costs. Higher education has long been recognized as an area where costs are on the rise with the Consumer Price Index for published college tuition and fees increasing by 63% from 2006 to 2016 (Bureau of Labor Statistics, 2016). Around this same time frame, household incomes were relatively stagnant with the exception of the highest earning quintile (Baum, Elliott, & Ma, 2014). However, recent data on college prices indicate a general slow-down in this trend, as published tuition and fees for public, four-year institutions increased by about 2.5% between the 2017-18 and 2018-19 college years (compared to an increase of 8.5% between 2010-11 and 2011-12 or 13.4% between 2002-03 and 2003-04) (College Board, 2018). With each passing year, students are more reliant on assistance programs or borrowing to cover the high costs of their education (Berman, 2015; Dai, 2013; Haughwout et al., 2015). In 2016-17, average cumulative debt for degree recipients was $28,500, and about 59% of students reportedly graduated with some debt (Baum et al., 2018). Between 2002 and 2012, federal financial aid increased 1,000% to over $23 billion (Baum & Payea, 2013). The growth in aid is the result of both more aid per student and more students using financial aid (Dynarski & Scott-Clayton, 2013). Though the use of financial aid has grown, available financial support has failed to keep pace with tuition increases (Aud et al., 2011). In addition, aid available to students can take on many forms including grants, scholarships, work programs, and loans. In an environment where financing one's education is increasingly through loans, both public and private, the forms and types of financial assistance or grant aid available take on a more critical role. Financial aid influences where students enroll, and once enrolled, their ability to stay at an institution and complete their degree (Dynarski & Scott-Clayton, 2013).

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Individuals and families are often faced with complex decisions regarding how much to borrow and from what sources. This process is further complicated by inconsistencies in how different institutions define and calculate student "need" figures. Loan decisions are often made on an annual basis, and students may not be aware of overall loan balances nor do they have a clear understanding of what total monthly payment obligation to expect (Andruska, Hogarth, Fletcher, Forbes, & Wohlgemuth, 2014). This process can result in a wide variety of outcomes and scenarios, as students themselves ultimately determine how much aid to take out. In addition, there is variation among federal student aid available in the form of subsidized and unsubsidized loans. Whereas subsidized loans do not accrue interest while a student is in school or in deferment after graduation (limited to $23,000), unsubsidized loans do not provide this benefit. Interest that may go unpaid while a student is enrolled on unsubsidized loans is rolled into the loan balance, thus increasing the amount owed.

Looking at a sample of 156 undergraduates, Lee and Mueller (2014) compared loan debt decisions for first generation and continuing-generation students. Whereas the findings noted an increased reliance on student loans among the first-generation group, all of the students were generally found to be ill-equipped to incur education-related debt in a responsible manner (Lee & Mueller, 2014). This uncertainty has the potential to increase student stress as they draw nearer to degree completion and pending payments are soon to be realized (Monat, Averill, & Lazarus, 1972).

Financial aid decisions, as a sub-dimension of general education decisions, can be viewed as investment decisions as articulated by Becker's (1962) Theory of Human Capital. Under this framework, individuals are assumed to assess all relevant costs and benefits in making investment decisions. This theory is explained in more detail in the theoretical framework below. For the present study, we consider that an additional implicit cost of obtaining a degree might be the psychological and physical impacts associated with the debt accrued by many individuals to finance their education, as increased costs are making students rely more on loan funds to finance an education. It is important to note that there are a variety of models and structures for institutions of higher education in the United States, including but not restricted to public, private, not-for-profit, for-profit, and technical schools.

Previous studies of student loan debt have highlighted that increased default rates associated with student loans is tied to growth in the number of students seeking degrees from for-profit or non-selective schools (Looney & Yannelis, 2015). For the present study, we emphasize a sample of students within a traditional, public, not-for-profit university setting. University administrators, educators and researchers need to be aware of the financial circumstances of their students, as these factors may play an increasing role in student well-being. The present study explores the impact of student loan debt on students' self-reported financial stress levels, and financial stress is subsequently analyzed in relation to self-reported physical health. In this fashion, both physical and psychological impacts are considered.

Theoretical Framework and Literature Review

According to Human Capital Theory (HCT), individuals invest in themselves (and this investment may take many forms, including education) with the intention of improving future welfare, based on consideration of the costs and benefits (Becker, 1962). Investments in education are viewed as a means of improving the stock of human capital for an individual, and this greater human capital is associated with greater productivity. The market, in turn, values this greater productivity and rewards those who have invested in their human capital with higher wages. Earnings from employment are considered to be the dominant measure when studies test for the optimal educational investment, and research has generally demonstrated a positive connection between increased education and income (Baum & Schwartz, 2006). However, earnings are rarely assessed in combination with the various risks or costs of these borrowing decisions

(Heckman, Lochner, & Todd, 2008). Several relevant costs are far easier to assess (such as direct costs of obtaining an education like tuition and supplies) whereas others require that decision-makers effectively incorporate opportunity costs. Opportunity costs may best be defined as the value of some alternative action once a decision has been made (i.e. a student who chooses to go to school full time must forgo the opportunity to work in the market earning income full time. These forgone wages are essentially another cost of the education process). In an environment that requires heavy borrowing one must also consider the impact of this borrowing on present and future consumption decisions. Borrowing may effectively create a higher present income for students, which in turn allows them to purchase necessities and finance their education. However, the fact that these dollars must be paid back at some future date means that future spending (or consumption) may be limited for a time. Borrowing decisions may be further complicated by the fact that students are often provided with a range of options, with some students selecting the maximum amount allowable and others taking only the minimum amount based on their planned budget.

The present higher education environment often requires individuals to rely on at least some debt financing (given that 70% report carrying some debt), further complicating the decision process. Financing terms vary not only in terms of the interest rates applied, but also in the repayment structure and timing. Some private loans may require repayment of costs while the student is in attendance, whereas others may be deferred until the student completes their program. Regardless of these differences typical loan terms will require extended payments for years after one's education is completed. Borrowers need to consider terms such as the source of the loans, available government subsidies, repayment time frames, interest rates by type and amount, and most importantly the amount of the loan payments in the context of future income.

Baum and Schwartz (2006) attempted to outline standards for defining controllable student debt, framing their study within the context of the Life-Cycle Income (LCI) Model (Ando & Modigliani, 1964). LCI posits that individuals make decisions about how much to consume in each individual period based on the goal of consuming their total resources evenly over their remaining lifetime. Younger individuals, and college students in particular, often have limited current income since a majority of their hours are dedicated to education and human capital development. Because education is presumed to improve their productivity, there is a general expectation that graduates will face significantly higher expected future earnings. As a result of these income assumptions, borrowing is often justified as a reasonable means of income smoothing. Income from higher earning periods later in life may be used to pay off debts from earlier consumption periods. This model rationally explains a student's willingness to borrow for the educational investment because of the expected future earnings from employment.

Whereas student loan debt may be well-justified theoretically, it is important that all factors of the decision be considered in determining what level of debt might be reasonable. Research on student persistence behavior indicates that high levels of debt or financial stressors in general may adversely impact students' degree completion (Robb, Moody, & Abdel-Ghany, 2011). Aside from degree completion, evidence indicates that student loan debt may impact many post-graduation decisions, including marital timing, employment choices and other household decisions (Brown, Haughwout, Lee, Scally, & van der Klaauw, 2014; Gicheva, 2011; Rothstein & Rouse, 2011).

In many cases, student loan debt does not impose an immediate repayment burden on individuals (as payments may be deferred for some period, though this varies by type of loan and lender). Even when there are not immediate repayment obligations, there is potential for this debt to impose a psychological burden on individuals, as the future potential costs may influence current health and well-being through stress (Robb et al., 2011). Research has indicated a negative relationship between stress and health, in both physical and psychological domains (Cohen, Janicki-Deverts, & Miller, 2007; Cooke, Barkham, Audin, Bradley, & Davy, 2004; Delongis, Folkman, & Lazarus, 1998; Marin et al., 2011; Pearlin, Schieman, Fazio, & Meersman, 2005). Financial factors, including education costs and borrowing decisions, have been linked to

stress in college students (Aselton, 2012; Trombitas, 2012), and stress has been further linked with poor academic performance (Ross, McCleland, & Macleod, 2006). Jessop, Herberts, and Solomon (2005) reported associations between student financial support and mental and physical health outcomes. This is consistent with earlier findings that students who reported difficulty paying bills or considering withdrawal from school for financial reasons generally displayed poorer mental and physical health (Roberts, Golding, Towell, & Weinreb, 1999).

According to HCT, a larger investment in education is expected to improve most facets of an individual's life. Because educational investment does entail costs, it is important to understand those costs in detail, including the possible impacts on health and the value of human capital created. This research sought to further understand the impact of financial aid on student stress, with an ultimate interest in how this financial stress might impact overall health. For the purpose of analysis, it was hypothesized that:

H1: Students receiving aid in the form of loans will report higher levels of financial stress relative to other forms of support, all else equal.

H2: Financial stress level will be positively associated with reported student loan balance, all else equal.

H3: Financial stress will be inversely associated with self-reported health, all else equal.

Method

Data and Sampling

The Institutional Review Board (IRB) approved the proposed student survey in September of 2013. Data were collected from a sample of students at a major Midwestern university during the fall 2013 semester (October-December). The undergraduate course catalogue for the university was screened to extract those courses at the 200, 300, 400 and 500 levels (with the intention of oversampling from slightly older student cohorts that would have had time to accumulate some student loan debt). From the available course listings a sample of 10 courses was randomly selected from each level (all spring courses for the 200-500 level were eligible for inclusion). Through coordinated efforts with the university registrar, class rosters were obtained for those randomly selected courses. Student enrolled in each of the selected courses were invited via email to participate in a brief online survey dealing with financial well-being and money management issues. The email invitation as well as the opening page of the online survey presented students with an informed consent statement approved by the university IRB. A total of 2,654 students were invited to participate in the survey, and full survey responses were received for 324 of those invited (a response rate of roughly 12%).

For this analysis, the student sample was censored to include only students who reported receiving some financial aid (n = 232). Sixty-five percent of the sample was female, and another 86% identified as white (both figures were higher than university figures of 51% and 77%, respectively). Roughly 30% of the respondents were seniors, 36% were juniors, 24% sophomores, and 10% freshmen. Eighty-six percent of the sample reported working at least part-time, and 67% indicated having a GPA > 3.0. The employment statistics are higher than national averages that indicate closer to 70% of undergraduates do some work while enrolled (Deruy, 2015).

Measures

Financial stress. The dependent variable for the first part of the analysis was the Financial Stress Scale – College Version (FSS-CV) (Northern, O'Brien, & Goetz, 2010). The FSS-CV consists of various financial aspects that are considered related to a student's financial standing and stress level. Northern et al. (2010) performed an item analysis on the original 22-item scale, and removed 9 of the items deemed to be less relevant to the college student population tested. The full scale was utilized for the present survey, though

like Northern et al. (2010) the present analysis retains only those behaviors identified as relevant to the student population based on analysis of sensitivity (for example, very few students reported any issues related to child care expenses for the present sample, thus the distribution for this item was highly skewed and it was dropped from consideration). Each of the items requires students to rate their personal experience on a 4-point scale. The final scale used for analysis consisted of 13

Figure 1

Financial Stress Scale – College Version

Consider the past six months. Please first rate how often you've thought about the following financial events using the following scale: (1) Never, (2) Sometimes, (3) Often, or (4) All of the time. (**Place an X in the appropriate box**)

	Never	Sometimes	Often	All of the time
1. Being behind on payments				
2. Having a low credit score				
3. Not having any emergency money (e.g. savings accounts, investments)				
4. Living paycheck to paycheck				
5. Being in a job where your work isn't steady/predictable				
6. Barely making enough money to cover expenses				
7. Not making enough money to be able to cover unexpected expenses				
8. Worrying about having enough money to retire				
9. Knowing you make less money than most of your peers				
10. Having large debt				
11. Having loans with high interest rates				
12. Christmas/holiday expenses				
13. Having to borrow money from family/friends				

financial stress items (these items are detailed in Figure 1). Responses to each scale item were summed to provide a financial stress score, with a possible range of 13 (very low financial stress) to 52 (extremely high financial stress). The scale items demonstrated good internal consistency, measured here by Cronbach's alpha (Cronbach's alpha = .897). Cronbach's alpha is a test that can be applied to scale items to determine

the degree to which each of the items relates to one another, or hold together as a related scale.

Self-reported health. The second analysis focused on self-reported health in relation to reported financial stress. Self-reported health was measured by a single question asking students to rate their overall health on a scale from 1 (very poor) to 5 (very good). Self-reported measures of health (often measured as responses to a single item) are frequently employed, and evidence suggests that these measures generally provide good insight into real health conditions and outcomes (Miilunpalo, Vuori, Oja, Pasanen, & Urponen, 1997; Mossey & Shapiro, 1982). This measure may be somewhat limiting however, as it leaves the interpretation of what health is up to the respondent (i.e. whether individuals think about health in terms of physical ailments only or whether they think about health more holistically is unknown).

Relative health. A measure of self-reported health relative to others was included in the first analysis. Similar to the self-reported health measure described previously, the relative health measure consisted of a single-item on a scale of 1 (very poor) to 5 (very good).

Subjective well-being. Five statements comprise the Satisfaction with Life Scale (Pavot & Diener, 1993), and were included as a measure of subjective well-being (SWB) (See Figure 2). Each statement was scored on a 5-point Likert-type scale, with 1 indicating, "Strongly Disagree" and 5 indicating, "Strongly Agree". The SWB statements were structured such that higher scores indicated greater levels of subjective well-being. The SWB scale demonstrated good internal consistency (Cronbach's alpha = .875).

Figure 2

Satisfaction with Life Scale

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
In most ways my life is close to my ideal					
The conditions of my life are excellent					
I am satisfied with my life					
So far I have gotten the important things that I want in life					
If I could live my life over, I would change almost nothing					

Financial aid. Questions related to type and amount of financial aid were included in the survey. For loan type, emphasis was placed on whether students received supports such as need-based grants, tuition waivers or scholarships versus student loans that would need to be repaid at some future date. Further, students who reported receiving student loans were asked for total amounts owed in student loan debt. Data on debt levels were categorical, and for the final analysis, subjects were divided into one of two categories based on whether they held more than $20,000 in student loan debt or not.

Hardship. Students were asked about any experienced physical or financial hardship from the prior twelve months. Potential hardship variables included experiencing the loss of a job, personal disability, the development of a health condition, a decrease in income, or loss associated with a natural disaster. Any of these events could serve as a reasonable stressor on personal finances, making this an important aspect to

control for. Hardship responses were individually coded in binary form, with a "1" indicating that individuals had experienced the listed outcome, and "0" otherwise.

Sociodemographics. A number of other personal demographic variables were included as controls for the present analyses, including gender, ethnicity, class rank, grade point average, employment, dependent status, and parental education. All data were self-reported.

Analysis and Findings

All data were analyzed using SAS 9.3 statistical software. Two separate empirical models were explored in the present study. Significance was examined using $p \leq .05$. First, a predictive model of student financial stress was developed, with an emphasis on student financial aid as a critical factor. Ordinary Least Squares (OLS) regression was utilized based on the continuous nature of the student financial stress variable. In general, OLS regression is most appropriate for data that are normally distributed (i.e. data follow a bell curve), as the procedure assumes that data are structured in this manner. We can test for these assumptions by exploring the degree to which the distribution violates this assumption (i.e. whether data are bunched more to the right or left of the mean value (skewness) or whether there are abnormally long tales (kurtosis). Testing indicated that FSS-CV scores were normally distributed (skewness = 0.593, kurtosis = -0.392). For the OLS analysis, variables were entered in three stages, beginning with basic demographic controls, followed by subjective well-being and hardship factors, and ending with variables related to financial aid.

Self-assessed health was explored in a second model, with an emphasis on student financial stress as a key predictor variable. For this analysis, two separate analysis techniques were employed, cumulative logit and OLS regression. Due to the condensed nature of the personal health scale (responses must fall between 1 and 5), the strict assumptions of OLS may not be met (Gameroff, N. D.), and the cumulative logit provides a robustness check of these results. In effect, the cumulative logit model provides information on the probability that someone will have a higher, rather than lower, self-reported health score. A major advantage of this approach is that subjective distances between score values need not be perfectly equivalent (i.e. a movement from 2 to 3 need not be assumed to be the same as 1 to 2). OLS analysis was conducted for ease of interpretation, as specific changes in the dependent variable can be more effectively understood.

Sample Characteristics

Once survey responses were cleaned for complete responses to variables of interest, a sample size of 232 remained which represents those respondents who reported receiving some type of financial aid. Descriptive statistics are outlined in Table 1. A strong majority of respondents were female (65%) and white (86%), which exceeded the population values for these characteristics (51% and 77% respectively). Oversampling of upperclassmen resulted in larger percentages of seniors (30%) and juniors (36%) relative to sophomores (23%) and freshmen (10%). A majority of the sample indicated being employed (82%), whereas national statistics indicate that roughly 70% of undergraduates work while they are in school. A majority of the sample reported having a GPA in excess of 3.0 (67%).

Self-reported health was high overall, with a mean score of 4 (out of 5), with a slightly lower average for health relative to peers (average = 3.8 out of 5). Looking at hardship experiences, the greatest number of students experienced income declines (19%) followed by job loss (11%). Less than 5% of the population experienced serious personal health issues (4%), a disability (1%), or loss due to a negative weather event (2%). A majority of the sample owed less than $20,000 in student loans at the time of the survey, with 28% indicating loan amounts in excess of $20,000. Federal loans were by far the most common form of financial aid reported (84%), followed by scholarships (55%), and need-based grants (43%). The average score on the FSS-CV was relatively modest at 27.5 out of a possible 56. Interestingly, testing of the 92 respondents who

did not report receiving any financial aid yielded an average FSS-CV score of 20.7 with an observed maximum of 44.

Table 1

Descriptive Statistics

	%	Mean	SD	Range
Male	35.5			0 - 1
Female	64.5			0 - 1
White	86.1			0 - 1
Non-White	13.9			0 - 1
Freshmen	10.4			0 - 1
Sophomore	23.0			0 - 1
Junior	36.3			0 - 1
Senior	30.3			0 - 1
GPA LE 3.0	32.3			0 - 1
GPA>3.0	67.7			0 - 1
Are you				
Currently Employed	82.1			0 - 1
Not Currently Employed	17.9			0 - 1
Financially Independent	31.9			0 - 1
Financially Dependent	68.1			0 - 1
Parents Education Level				
Parents did not attend college	14.7			0 - 1
Parents have some college	18.7			0 - 1
Parents are college graduates	66.5			0 - 1
In the past twelve months have you				
Been disabled	1.6			0 - 1
Lost a job	11.6			0 - 1
Had a loss due to a tornado	2.0			0 - 1
Had a loss of income	19.1			0 - 1
Dealt with a health issue	4.8			0 - 1
What is your total amount of student loans?				
$0	9.2			0 - 1
$1-$20,000	62.5			0 - 1
Over $20,000	28.3			0 - 1
What type of financial aid do you receive?				
Federal Work study	11.6			0 - 1
Federal Loans	84.1			0 - 1
Need Based Grants	43.1			0 - 1
Scholarships	55.6			0 - 1
Tuition Waivers	3.4			0 - 1
Other Financial Aid	8.2			0 - 1
Self-reported Health		4.036	0.807	1 - 5

Relative Health	3.825	0.984	1 - 5
Subjective Well Being	16.753	4.303	5 - 25
Financial Stress Scale – CV	27.532	8.381	13 - 56

n = 232

Multivariate Analyses

The impact of financial aid on perceived financial stress was explored through a series of hierarchical models, wherein additional variables of interest are added to a base model. OLS was used to predict student scores on the FSS-CV, and Table 2 outlines the results of the first three hierarchical models with perceived financial stress as the dependent variable. Model 1 consisted of basic demographic and academic variables. The model is significant (F = 5.02, p<.0001), explaining roughly 15% of the variance in students' FSS-CV score. In this model, males and those with a GPA over 3.0 reported experiencing significantly less stress. Seniors and those who considered themselves financially independent reported higher levels of stress. In model 2, variables were expanded to include hardship factors that students may have encountered in the past 12 months such as income loss, as well as a measure of subjective well-being. The addition of these variables to the predictive model improved the predictive power of the model, as roughly 31% of the variance in FSS-CV scores was accounted for by model 2. Students who reported experiencing a job loss or a loss of income over the past year displayed higher scores on the FSS-CV. Measures of gender, financial independence and GPA were consistent with the first model. Individuals' SWB was inversely associated with the stress score for this stage of the analysis, as was self-reported health relative to peers.

For the final model (model 3) accumulated loan balance data and type of financial aid received were included. Addition of these factors improved the model, and the final model was significant (F = 6.77, p <.0001) explaining 38.5% of the variance in student stress score, representing a 7-percentage point improvement over Model 2. Students reporting over $20,000 in student loan debt scored notably higher on the FSS-CV, with a similar effect noted for those receiving Federal student loans. Relative health (self-assessed based on peers) was negatively associated with stress score, as those with greater relative health scored notably higher on the FSS-CV. The hardship variables from model 2 remained significant, though GPA, dependent status, and SWB were not found to be significant in the final model[1].

Table 2

OLS Regression with the FSS-CV as Dependent Variable (n=232)

	Model 1		Model 2		Model 3	
	Est.	SE	Est.	SE	Est.	SE
Male	-3.670**	1.125	-2.860**	1.019	-2.958*	0.991
White	-0.461	1.548	0.887	1.419	0.321	1.384
Class in School (Freshmen)						
Sophomore	1.569	1.898	0.375	1.720	-1.499	1.699
Junior	2.612	1.811	1.302	1.640	-1.105	1.269

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[1] It should be noted that multiple model adjustments were made to explore these data. One analysis explored a predictive model of stress score among all respondents (n = 324) though the model was necessarily restricted to predictors not related to financial aid. In terms of the predictors applied, general effects and significance mirror those presented in Table 2, Model 2. An additional set of analyses was run on a restricted sample of underclassmen (freshmen and sophomore respondents only, n = 77). This restricted sample analysis was also consistent with the findings from the full sample.

Senior	3.896*	1.844	2.459	1.672	-1.035	1.134
GPA>3.0	-4.324***	1.171	-2.757*	1.131	-1.133	1.163
Employed	0.219	1.374	0.455	1.202	-0.659	1.262
Financially Independent	3.802***	1.129	2.572**	1.276	1.689	1.057
Parents Education (HS or less)						
Parents had Some College	-1.813	1.763	-2.163	1.589	-1.933	1.535
Parents are college grads.	-2.330	1.489	-2.159	1.353	-1.413	1.297
In the past 12 months, have you suffered a						
Disability	--	--	-5.941	4.424	-7.331	4.291
Job loss	--	--	5.912***	1.529	4.949***	1.475
Loss due to tornado	--	--	-2.164	3.363	-0.604	3.280
Loss of Income	--	--	4.097**	1.28	3.545**	1.235
Health Issue	--	--	3.059	2.314	3.358	2.324
Relative Health	--	--	-1.209*	0.516	-1.223*	0.495
Subjective Well Being	--	--	-0.398**	0.121	-0.398	0.116
Accumulated Loan Balance						
$1k to $20k	--	--	--	--	2.129	1.612
Over $20k	--	--	--	--	4.194*	1.699
Type of Financial Aid						
Federal Work-study	--	--	--	--	0.466	1.484
Federal Loans	--	--	--	--	5.045***	1.328
Need Based Grant	--	--	--	--	0.671	0.990
Scholarships	--	--	--	--	-1.452	1.025
Tuition Waiver	--	--	--	--	-1.938	2.515
Other Financial Aid	--	--	--	--	-1.522	1.673
Intercept	28.44***		37.21***		31.88***	
Adjusted R^2	.148		.316		.385	

*p<.050, **p<.010, ***p<.0001*

With this association of financial aid and stress in mind, the link between stress and health was explored with both OLS and cumulative logit. The cumulative logit was applied as a check on the robustness of the OLS (as there were concerns over the effectiveness of OLS for a short scale such as health) and results from the two analyses were consistent, suggesting that the observed relationships are robust across the different model assumptions. Results for both models are outlined in Table 3. For ease of interpretation, OLS results

are discussed. The predictive model of student self-reported health was significant (F = 4.41, p <.0001), explaining roughly 20% of the variance in health score. Overall, self-reported health was positively associated with subjective well-being, and negatively associated with having experienced a health issue within the past 12 months. Reporting higher scores on the FSS-CV was associated with lower self-reported health, all else equal.

Table 3

OLS Regression and Cumulative Logit Analyses with Overall Health as Dependent Variable

	OLS		Cumulative Logit	
	Parameter Est.	SE	Est.	SE
Male	-0.045	0.108	-0.210	0.2728
White	0.134	0.149	0.320	0.3688
Class in School				
Sophomore	-0.004	0.180	-0.088	0.4715
Junior	-0.013	0.172	-0.104	0.4486
Senior	0.149	0.176	0.108	0.4577
GPA>3.0	0.183	0.119	0.472	0.3002
Employed	-0.090	0.134	-0.116	0.3404
Financially Independent	0.114	0.111	0.285	0.2812
Parents had Some College	-0.146	0.167	-0.364	0.4386
Parents are college grads.	-0.025	0.142	-0.066	0.3719
In the past 12 months, suffered a				
Disability	0.370	0.459	0.876	1.0852
Job loss	0.087	0.165	0.386	0.4108
Loss due to tornado	-0.373	0.352	-1.047	0.9077
Loss of Income	-0.018	0.137	-0.122	0.3372
Health Issue	-0.813***	0.235	-2.036**	0.6171
Stress Scale	-0.019***	0.007	-0.047*	0.0184
Subjective Well Being	0.052***	0.013	0.132***	0.0335
Intercept	3.529***	0.415	--	--
Intercept 2	--	--	2.042	1.13
Intercept 3	--	--	-0.009	1.09
Intercept 4	--	--	-2.600	1.11*
Score test for the proportional odds assumption	--		39.32	
Adjusted R²	.20		--	

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

Discussion

This study applies a unique approach to human capital investment decisions by considering the effect of student loan debt accumulation on financial stress, with consideration for how that stress might subsequently impact personal health for a sample of college students at a major university. Other studies have provided increasing evidence of financial stress as an issue for college students, though the focus is often on academic success or degree persistence rather than personal health and well-being (Heckman, Lim, & Montalto, 2014; Letkiewicz et al., 2014; Robb et al., 2011; Trombitas, 2012). There are many causes of stress for college students, though prior research provides evidence that financial factors are among the most stressful (Trombitas, 2012). Specifically, Trombitas (2012) highlighted that (a) the need to repay loans, (b) the cost of education, (c) borrowing money for college, and (d) the need to find a job after graduation comprised four of the top five stressors for college students.

As hypothesized, the current study identified relationships between financial stress and the types of financial aid as well as the amount of financial aid received. Notably, those individuals who received federal student loans reported higher levels of stress. Possession of other loan types was not effective in differentiating individuals based on FSS-CV scores. Loan amount was also informative, as individuals reporting loan balances in excess of $20,000 scored notably higher on the stress measure. Ultimately, inclusion of loan specific measures improved the predictive power of the model by 7%.

In the latter analysis, student stress was inversely associated with self-reported health as hypothesized. These data were consistent with previous findings regarding the adverse impact of general stress on physical and psychological health (Cohen, Janicki-Deverts, & Miller, 2007; Cooke et al., 2004; Delongis, Folkman, & Lazarus, 1998; Jessop et al., 2005; Marin et al., 2011; Pearlin et al., 2005; Ross et al., 2006). Utilizing a sample of students from Great Britain, Cooke et al. (2004) identified associations between student perceptions of their financial situation and attitudes toward debt and health; specifically, students with high financial concerns showed greater amounts of feeling tense, anxious, or nervous. Along the same lines, Jessop, Herberts and Solomon (2005) compared significantly different groups of British and Finnish students with regard to their debt levels and financial concerns with their mental and physical health. Finnish students continued receiving state support for higher education compared to the British students who lost state funding for education. Findings supported the authors' expectations that Finnish students would experience better mental and physical health than their British equivalents and that financial hardship and concern predicted mental and physical health. Other research has highlighted the effects of stress and its contribution to the progression of various diseases, including depression, cardiovascular disease, HIV/AIDS, and cancer (Cohen et al., 2007; Ross et al., 2006). Chronic stress in particular can have detrimental impacts on cognitive functioning and mental health (DeLongis et al., 1998; Marin et al., 2011; Pearlin et al., 2005).

From the perspective of HCT, Washer & Nippani (2004) proposed viewing individuals as assets complete with a life valuation on their personal balance sheets. In theory, this valuation should increase as that person's skills and abilities improve through college (Becker, 1962). Estimates of returns on education investments can be complex (Card, 1999). A proper valuation process must accurately reflect the full cost of these improvements, including the potential impacts on ones' health that may come through added stress. Increasing college costs have forced many students to borrow greater and greater amounts of money, and the degree to which this greater borrowing might impact personal health must be considered as an implicit cost of the investment process. Based on the available information, it does not appear that current trends in education costs or existing supports for students will change anytime soon. In all likelihood, college students and their families may continue to face a series of complex borrowing decisions with serious long-term implications at all levels of the economy (Brown et al., 2014; Gicheva, 2011; Robb et al., 2011; Rothstein & Rouse, 2011).

Implications

The present data raise questions regarding the extent to which increasing debt levels might have a downward influence on investment decisions, though the data are not sufficient to explore this question more thoroughly. Previous studies have drawn empirical connections between financial stress and student degree completion processes (Letkiewicz et al., 2014; Robb et al., 2011). Conceptually, human capital decisions can be impacted in a number of ways. The addition of student loans to the investment decision requires that any anticipated future costs be incorporated (this may be conceptualized as a decrease in the anticipated future income during the anticipated payoff period). Investment decisions may be further impacted by the implicit cost of the stress experienced related to the student loan debt burden. This stress could conceptually impact current decisions of students (persistence) as well as later life decisions (future borrowing), while also having a more universal impact on personal health. The present results are suggestive of potential problematic health effects given the association between loan debt and stress and between stress and self-reported health.

This study adds to the literature by further exploring the relationships between the costs of human capital improvements and the subsequent gains in productivity attributed to said investments. Much has been written on the increased earning potential created by a college education, not as much has been analyzed about the potential costs to the individual of that increased earning potential. These data raise questions as to how the financial stress associated with the student loan debt burden might influence overall health, future earnings, and ultimately life satisfaction.

As colleges and universities consider the issue of student health, programs and approaches should be comprehensive in nature to ensure that factors such as psychological stress associated with college costs can be accounted for and addressed. Programs may be considered that assist in alleviating the stress associated with student loan debt, either through making the processes more transparent, or helping students outline reasonable plans for timely repayment post-graduation. Further this study may assist policy makers in assessing a more complete picture of costs and benefits as they work on the significant, pervasive financial aid issue in the United States, as some relevant costs may be unclear at the present time.

Limitations

It is important to consider the limitations of the present research. Although the sampling design was intended to yield a random selection of undergraduate students from the university where the survey was conducted, clear response biases existed. This bias is most evident in the disproportionate number of female (64.5% compared to 51% of the student population) and white (86% compared to 78% of the student population) students among respondents. The intentional oversampling of upperclassmen could provide an additional bias whereby students who are highly concerned with student loan debt decisions might fail to persist past the first or second year. As a result, generalizability back to the university population would be somewhat questionable, and there is further concern regarding how well these data might be generalized to the larger population of undergraduate students at a national level. If there are sub-samples of students who seek alternative paths earlier due to the high financial costs of an education, those individuals may not be represented in our sample, and results might under-represent how stressful these financial factors may be in the decision to attend a college or continue another semester.

The present analysis addresses only one sector of higher education, that of a public, not-for-profit institution. Future research should consider differences in stress experienced by students based on institution type. In addition, student choices in the context of borrowing are a complex factor that is not deeply explored in the present survey. The present survey lacks details on how much debt was actually taken out relative to how much debt a student had available to them.

Survey data analyzed were cross-sectional in nature, and reliance on data from a single point in time ultimately makes it impossible to establish clear, causal arguments with regard to student loans, stress, and self-reported health. A more effective design would employ multi-phase testing of student stress, debt, and health statistics so that associations could be explored longitudinally. Additionally, the present study was reliant on self-report data for all of the critical variables of interest. Ideally, objective loan data would be accessed along with medical records and physical tests of stress when considering financial issues. A lack of more comprehensive measures beyond financial factors was a further limitation as the model of self-reported health would likely have been stronger with a variety of factors from other life domains such as diet, exercise, smoking behavior and temporal orientation.

Conclusion

The existing evidence supports the argument that financial stress can have an adverse impact on student health and outcomes, and that student loans can be a significant contributor to perceived financial stress. These findings are particularly salient for college student affairs offices and administrators who are focused on developing and maintaining supportive, healthy campus environments. These offices would do well to consider overall student well-being in the course of advising students, as our findings indicate that perceived debt burden can adversely impact students' reported stress levels, which may in turn have a negative influence on their self-reported health. Students face a variety of stressors to their physical and mental health, and it should be acknowledged that providing sufficient aid may not in and of itself ensure that students are not facing significant financial strain. In addition to health impacts, university officials must consider the potential impacts on persistence to degree, as some students may find themselves with large amounts of debt and no diploma to show for it. Such students are far more likely to default on their debt since the lack of a degree decreases the likelihood of securing competitive employment.

In addition to demonstrating more awareness of issues related to financial stress, offices could be proactive in helping students anticipate and plan for debt impacts over the long term. Campus agents could help students establish a concept of "reasonable" debt for their situation and circumstances, and this could go a long way to assist in reducing debt-related anxiety and stress. In many cases, students may lack clear expectations regarding future income or living expenses, thus limiting their ability to borrow effectively. In many cases debt is an appropriate, reasonable means for financing a college education, but all students should be able to make borrowing decisions based on good information about the potential costs and options available to them. Further research should consider more comprehensive, longitudinal approaches to exploring the impact of student financial aid on college students and recent graduates, as cross-sectional data leave many unanswered questions and cannot illuminate causal effects at work.

Nexus

- Campus financial aid should consider student well-being holistically, incorporating social, academic, and financial factors in programming and outreach policies. Our results indicate that greater amounts of student loan debt are associated with greater financial strain in the present, which is associated lower self-reported health.
- Programs can be proactive in helping students understand the implications of borrowing decisions, by generating projections of future monthly payments and putting the borrowing in perspective relative to other options. This would serve to remove much of the guesswork involved in determining how much to borrow in a given semester.

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