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2019

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# **The Influences of Locus of Control, Debt, and Framing on Retirement Contributions**

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## **Abstract**

This study evaluates locus of control, debt, and framing effects as potential drivers of retirement savings decisions. We administer an online survey analyzing how much an individual will save for retirement upon graduating college. The study finds that individuals with an external locus of control contribute significantly less to their retirement savings than individuals with an internal locus of control. Interestingly, this study finds no significant relationship between debt overhang and initial contributions. To measure framing effects, participants were given the choice to change their initial contribution rate after seeing the estimated increased future amount of their account balance based on an annual contribution increase for each 1% of salary (percentage frame group) or \$500 (dollar frame group). The survey results show that individuals that were given the percentage frame increase their initial contribution to their retirement account significantly more than the group receiving the dollar frame.

**Keywords:** locus of control; retirement savings; framing; retirement contributions

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## **The Influences of Locus of Control, Debt, and Framing on Retirement Contributions**

### **1. Introduction**

In order to secure sufficient savings for retirement, careful planning is essential. However, planning for retirement is often overlooked by individuals and households. According to US News, the median 401(k) balance at the end of 2014 was a mere \$18,127, with 40% of the participants having less than \$10,000 (Brandon, 2016). With the concurrent shift in the United States from defined benefit plans to defined contributions, it appears that many Americans are woefully ill-prepared for their retirement stage of life.

Extensive research has been conducted in order to determine the factors influencing retirement savings decisions. One widely studied factor in this area is financial literacy. Mayer, Zick, and Glaittli (2011) found a general lack of knowledge about retirement planning among the public, which prove to be detrimental to an individual's retirement saving. Additionally, Kopusko, Hershey, Bojórquez, and Pérez (2016) found that an individual's financial knowledge has a significant positive effect on his/her expectations for their retirement plans.

While financial literacy has long been thought of as playing a significant role in the financial decisions made by individual's, recent studies are beginning to indicate otherwise. Moore (2003) reported that seminars intended to increase financial literacy were too general and emphasized a need to offer alternative, more personalized educational programs. Fernandes, Lynch, & Netemeyer (2014) examined over 200 other studies on financial literacy, and found that increased financial literacy had very little impact on future financial decisions. The researchers broke the studies they examined into two groups, manipulated financial literacy, which involved interventions for an individual, and measured financial literacy, which just measured the participants' financial literacy through a questionnaire. The study found that interventions only explained 0.1% of the variance in future financial decisions, and measured financial literacy only explained 2% of the variance in future financial decisions (Fernandes, Lynch, & Netemeyer, 2014). Thus, we believe that it is important to investigate other potential drivers and learning modules that significantly influence the retirement savings decision.

One potential driver that we examine in this paper is the locus of control: the extent of control an individual feels that he/she has over his/her life and the events that occur in his/her life. An individual with an internal locus (internals) of control believes he/she has control over their life, while an individual with an external locus of control (externals) believes that external forces have complete control over his/her life (Fournier, 2016).

Another potential driver that we analyze in this survey is the debt overhang of undergraduate college students as it pertains to retirement contributions. Debt overhang refers to the amount of debt, whether a mortgage, credit card debt, or student loan debt, that begins to play an increasing role in the financial decisions of individuals. One of the largest sources of debt, namely in the United States, is student loan debt. In 2018, the overall student loans outstanding in the U.S. surpassed \$1.5 trillion (Friedman, 2018). This factor has been shown by several studies to significantly influence individuals financial decisions (Zhang, 2013; Rothstein and Rouse, 2011; Minicozzi, 2005). This can create a dilemma for recent college graduates, who would greatly benefit from saving for retirement at an early age, but must also simultaneously pay off their student loans.

In addition to analyzing the drivers of retirement contributions, we are also interested in finding learning opportunities for individuals making their retirement decision. Employer-sponsored learning modules have been previously shown to improve financial decision-making (Dolvin and Templeton, 2006). Clark, Lusardi, and Mitchell (2016) found that participation in a learning module positively impacted participation, contributions, and asset allocation within a defined contribution plan. The term, "just-in-time" learning, was introduced by Fernandes, Lynch, and Netemeyer (2014), as a possible alternative to the traditional financial literacy learning intervention: Instead of providing training to prepare individuals to make infrequently made decisions in the future, teach them (who are likely not to retain their learning for very long) at the moment of their retirement savings decision. In our experimental design, we post this "learning" intervention immediately after an individual provided their initial retirement contribution amount. The survey posts an estimate of how much an increase of 1% (percentage frame group) or \$500 (dollar frame group) per year would increase their estimated portfolio amount at their age of retirement. Participants were then asked if they would like to change their contribution and, if they elected to change, allowed individuals to select a new contribution amount.

For this paper, we surveyed 103 undergraduate students in the U.S. at a small liberal arts University in the Midwest. Our results indicate that both locus of control and framing effects have a significant impact on the amount that an individual would save for retirement. More specifically, this study finds that individuals with an external locus of control would save less for retirement than individuals with an internal locus of control. Additionally, we find that

individuals that received a percentage frame would increase their retirement contribution significantly more than individuals who received a dollar frame. The results of this study show no significant relationship between debt overhang and the retirement contribution amount.

## 2. Literature Review and Hypotheses

### 2.1 Locus of Control

Locus of control refers to the extent of control an individual feels over his/her life, as well as the events that occur in his/her life. An individual with an internal locus (internals) of control believes he/she has control over their life, while an individual with an external locus of control (externals) believes that external forces have complete control over his/her life (Fournier, 2016). Previous studies have shown that locus of control affects saving behavior. Cobb-Clark, Kassenboehmer, and Sinning, (2016) found that households who had an internal reference person (head of household), saved substantially more than households with an external reference person. Perry and Morris (2005) found that externals were less likely to participate in responsible financial behavior, which includes saving money. Additionally, an individual's locus of control has an effect on his/her retirement planning anxiety. MacEwen et al (1995) found a negative relationship between retirement planning anxiety and internal locus of control, meaning that people with increased internal levels of locus of control have lower retirement anxiety. A study conducted by Kasilingam and Sudha (2010) found contradicting results showing that savings behavior depended solely on the level of external locus of control. Specifically, the study found that individuals with a higher external level of control were more likely to save a portion of their income, and individuals with higher levels of internal locus of control were only likely to save money when they received extra income (Kasilingam and Sudha, 2010).

Previous studies have also looked at the levels of locus of control by generation and gender. Twenge and Campbell (2008) found that external locus of control, amongst other psychological traits, is higher in Generation Y (millennials) than previous generations. Shaw and Waite (2015) conducted a similar generational study looking at only men, which supported these results. This study found that young men felt like they did not have much control over their lives, and as a result, were less likely to auto-enroll in a retirement plan (Shaw and Waite, 2015).

This study looks to expand upon the research previously done, and seeks to provide additional evidence in this area of literature. While much research has been done on how locus of control affects savings behavior, there is a lack of evidence on how locus of control affects retirement savings, namely contribution elections.

While there appears to be some conflicting evidence in previous research based on locus of control and savings, we believe that individuals who think that they have more control over their own lives will take more of an initiative in their financial future. As a result, the first hypothesis (H1) is that:

*H1: Individuals with an internal locus of control will save more for retirement than individuals with an external locus of control.*

### 2.2.A. - Debt Overhang

Debt overhang, has been shown to have a significant impact on the decisions of recent graduates, whether it's deciding to attend graduate school or accepting a job. When determining whether to go to graduate school, Zhang (2013) found that larger levels of debt decreased attendance. This study found that public school graduates who reached the average level of student debt were 11% less likely to go to graduate school than those students who did not reach this level of debt (Zhang, 2013). Rothstein and Rouse (2011) found that graduates with higher levels of debt were much less likely to take a job in a "low-income" sector, such as education, non-profits, and governmental jobs. Minicozzi (2005) found that for each thousand dollars of debt a student has, their beginning salary increases by 1%. To the best of our knowledge, one area that current studies have not focused on is how debt overhang impacts the retirement savings decisions of young adults. In our hypothesis testing, we predict that individuals with a higher debt overhang will forego retirement saving to pay off debt. As a result, Hypothesis 2, part one (H2a) is:

*H2a: Individuals with more debt will elect to save less for retirement than individuals with little to no debt.*

### 2.2.B. - Debt and Locus of Control

Previous studies have examined the relationship between debt and locus of control. Wang, Chen, and Wang (2008) found that individuals with an external locus of control were significantly less likely to use loans when buying a house than individuals with an internal locus of control. Other studies have linked locus of control with levels of credit card debt. Limerick and Peltier (2014) found that individuals with an external locus of control were more likely to have high levels of credit card debt. These findings are concurrent with previous studies (Caputo, 2012; Peltier, Pomirleanu, Endres, & Markos, 2013)

One of the key differences between mortgages and credit card debts are that mortgages are planned ahead of time, and credit card debt is more of a reactive, “in the moment” debt. Other studies have shown that individuals with an external locus of control lack self-confidence (Gürol, & Atsan, 2006), are less optimistic (Popper, Amit, Gal, Mishkal-Sinai, & Lisak, 2004) and have lower risk tolerance (Wong & Carducci, 2016). As a result, externals avoid large risky debts that require confidence that they will have the ability to pay off, such as home mortgages.

When comparing student loan debt with mortgage and credit card debt, one can see more similarities with mortgages. Mortgage loans are backed by an underlying asset that generally appreciates over time. Student loans are often intended to be an investment that yields larger career earnings. Carnevale, Cheah, and Hanson (2015) found that college graduates earn on average \$1 million more than non-graduates over the course of their working life. Both mortgages and student loans are large, pre-meditated loans that require extended time to pay off. As a result, this study expects higher levels of student debt to be representative of a population with higher levels of internal locus of control.

In this paper, we seek to extend the strand of literature by evaluating whether individuals with higher student loan debt provide significantly less initial retirement contributions than those who will not graduate with student loans. The second part of Hypothesis 2, (H2b) looks to further the knowledge of the relationship between locus of control and debt. Studies have shown that externals tend to take on more credit card debt, while internals are more likely to take on pre-planned, long-term debt, such as mortgages. Since student debt is more of a pre-planned, long-term debt, H2b is that:

*H2b: Individuals with a higher level of student loan debt will have a more internal locus of control than individuals with an external locus of control.*

### **2.3 - Framing Effects**

In addition to examining alternative potential drivers influencing retirement savings decisions, this paper seeks to examine “just-in-time” learning opportunities for individuals making their retirement decision. One way we address this issue is through the showing an individual how much their estimated future portfolio value will grow by increasing their annual contribution by 1% of their salary (percentage framing group) or \$500 (dollar frame group).

Framing refers to how a situation or problem is presented to an individual or group. Framing and its effects can have huge implications on any decision that is made, but can be especially impactful for financial decisions (Allais 1953, Tversky and Kahneman, 1981).

Previous studies have found that individuals favored a much more progressive tax system when the question was framed in an amount left over scenario versus an amount paid (Reimers, 2009). Other studies have focused on framing effects and planning for retirement. Card and Ransom (2011) found that additional savings behavior beyond a pension depended on how the contributions were named. This study found that additional savings were reduced by 10-30% more when framed as per dollar of employee contributions, rather than when labeled as employer contributions (Card, & Ransom, 2011). Another study by Brown, Kapteyn, and Mitchell (2011) looking at social security found that throughout ten scenarios, framing effects played a significant role in when an individual would claim social security benefits. The Common Cents Lab (2016) found that intended contributions increased 5% when salary was framed as an annual salary rather than an hourly wage. The salaries of the individuals in this study were the same, the only difference was how they were presented to the individuals in the study.

During the retirement contribution election process, individuals are confronted with weighing their perceived losses from today (a deduction in their paycheck) against the future gains of their retirement portfolio. For a recent college graduate making a salary of \$50,000 per year, an increase of 1% of their salary and \$500 is the same amount, yielding the same future portfolio amounts. We believe that the loss incurred by an additional contribution, when framed as a percentage (1%) increase of annual contribution will be perceived as a less painful loss compared to those who view the annual dollar (\$500) increase. As a result, our hypothesis for H3 is:

*H3: Individuals who are given a percentage frame will increase their retirement savings more than those who are given a dollar frame.*

### 3. Methodology

#### 3.1 Experimental Design and Variable Measures

Data was collected through a Qualtrics online survey. In the first section of the survey, we gathered demographic and educational data on the participants, including major, education level, and financial education experience. A copy of the survey can be provided by the corresponding author by request.

The second section of the survey measured locus of control by using the Rotter I-E scale (Rotter, 1966), involving 23 analyzed sets of two statements. Each individual must choose the statement that they most agree with. For each answer indicating an external locus of control selected, participants are given a point. In this study, total points were divided by 23 to take an average score. As a result, scores range from 0-1, with a 0.0 indicating an internal locus of control and a score of 1.0 indicating an external locus of control.

The third section of the survey inquired about the participants' level of debt. As the individuals in this survey are currently college students, they were asked what their current level of debt is as well as their approximate level of student loans they expect to have upon graduation. In addition to measuring student loan debt, the survey also measures the levels of all other debts that an individual may have (credit card, mortgage, auto loan, etc.).

The fourth part of the survey sought to measure how much a participant will save for retirement. Participants were given a scenario where they had recently accepted a job that would pay them \$50,000 upon graduation. The decision to use \$50,000 was based upon a recent survey by the National Association of Colleges and Employers (NACE). The survey found that the average expected salary for 2016 graduates was \$50,566 (Poppick, 2015). They were also given information about what a 401(k) is and the company's 401(k) match program, including a chart that detailed how much would be deposited into the account at various savings levels, up to the maximum contribution allowed. Survey participants were asked to determine how much they would save for retirement in this situation. Participants were asked to specify their initial contributions as a percent of the salary, but were also given a table indicating the equivalent dollar amount of their salary.

The final section of the survey included one of four follow up scenarios. To measure framing effects, participants were given information on how much the account value of their 401(k), based on historical returns, would increase with every additional 1% (percentage frame) or \$500 (dollar frame) saved. These values were based on one of two mock portfolios, either a 60/40 stock to bond split, or an 80/20 split. As a result, the 80/20 split portfolio shows increased returns for every \$500 or 1% saved compared to the 60/40 split. This allowed us to determine if in addition to framing, if the promise of increased returns would have any significant effect on an individual's choice to change his/her initial contribution. In addition, participants were either given that this increase was based on a 1% or a \$500 increase in their deduction. However, only one number was given, not both. Survey participants were then asked if they would like to change their contribution from what they had originally stated, and if so, what their new contribution would be. As a result, the participants of the survey were split into four groups, which are represented on the chart below:

<b>Group</b>	<b>Framing</b>	<b>Portfolio</b>
Group 1	Percentage	60/40
Group 2	Percentage	80/20
Group 3	Dollar	60/40
Group 4	Dollar	80/20

#### 3.2 Participants

The participants in this study are undergraduate college students, who attend a small, private liberal arts university in the Midwest United States. Survey participants were gathered in a variety of ways including various organizations on the school's campus. As a result, the survey participants have varied majors and are representative of the university as a whole. In total, the survey was completed by 103 undergraduate student with an average age of 20.53 years old. While this group of participants provide a number of limitations, discussed in section 5 of this paper, this sample allows for homogeneity of some critical control variables that could otherwise influence the retirement

contribution decision, for example, varying income levels, ages, and previous experience/retirement portfolio amounts. In our sample, all participants have the same education level, similar age group, and an unknown future income upon graduation, which allows for a much more straightforward evaluating method, particularly in our framing analysis.

## 4. Results

### 4.1 Descriptive Statistics

Of the 103 completed responses shown in Table 1, 64 participants identified themselves as females (62%), and 39 males (38%). This accurately depicts the overall student body of this private liberal arts, Midwest University. In terms of ethnicity, 95% of the participants identified themselves as white. Again, this represents the student body of this University. Of the 34 survey participants that have taken a finance course, 26 of them took the class as an undergraduate college student. While we refrain from using financial literacy as a variable in this analysis, we include a variable that includes previous experience taking a finance course. In a similar experimental setting eliciting retirement contribution amounts from current university students, Arling, Foltice, Kirby and Saajasto (2018) found that students who had previously taken a finance course provided significantly higher initial retirement contribution rates by 1.7%.

One of the variables tested in this study is anticipated student loan debt at graduation. Out of the 103 respondents, 54 had taken out student loans (52%).<sup>2</sup> For these 54 individuals, the average anticipated amount of their student loans at graduation was \$25,630, ranging from \$2,000 to \$100,000. From the scenario analysis, the average amount that an individual saved for retirement was approximately 11.46% of their salary, or approximately \$5,730 annually.

**Table 1. Descriptive Statistic Summary**

<i>Variable</i>	<i>Average</i>	<i>Min</i>	<i>Max</i>
N – Overall	103		
Female	62.1%	0	1
Age	20.53	18	28
Student Loans (in thousands) (N=54)	25.63	2	100
Other Loans (in thousands) (N=7)	17.86	1	50
Finance Course	33.0%	0	1
Initial Contribution	11.46%	2%	36%

Note: This table displays a summary of the descriptive statistics of the key variables used in this analysis.

A summary and description of the variables used in this analysis are provided below:

Variable: \_\_\_\_\_ Description: \_\_\_\_\_  
Dummy Variables: \_\_\_\_\_

<sup>2</sup> There were no participants in our survey with no current student loans but an anticipated student loan greater than \$0 at graduation.

Female	The gender of the participant (male=0 or female=1)
Finance Course	Whether or not the participant had taken a financial class

Tested Variables

Locus of Control	Internal or external, on a scale of 0-1
Student Debt	Expected level of student debt expected at graduation, in thousands
Other Loan	Other individual debt, excluding mortgage and student debts, in thousands
Initial Contribution	The amount the participant initially contributed to his/her 401(k)
Percentage Framing	Participants that received the final scenario as a percentage of salary.
Dollar Framing	Participants that received the final scenario as a dollar amount of salary.

**4.2 Results - Hypothesis 1 – Locus of Control**

Our first hypothesis focuses on the effect of locus of control on retirement saving decisions. Previous literature is contradictory on this topic: most studies find that internals save more (Perry, V.G., & Morris, M.D. 2005; Cobb-Clark, D. A., Kassenboehmer, S. C., & Sinning, M. G., 2016) while Kasilinghama and Sudha (2010) find that externals save more. In this paper, we believe that:

*H1: Individuals with an internal locus of control will save more for retirement than individuals with an external locus of control.*

This study uses two linear regression models to analyze hypothesis one, shown in Table 2. Regression 1 includes gender as a dummy variable. Regression 2 factors in previous experience taking a finance course.

In both regression models, we find support for hypothesis one as we cannot reject the null hypothesis. These models find that locus of control was the only significant driver of the savings decision. Here, we show that an individual who ranked as completely external (average of 1), would have an initial contribution, on average, approximately 11.4% less than an internal (with a p-value of .021). Taking a finance class had the least significance of any of the variables tested, supporting the findings of Fernandes, Lynch, and Netemeyer (2014) and are in conflict with the findings of Arling, Foltice, Kirby, and Saajasto (2018).

**Table 2. Regression Model Results – Impact on Initial Retirement Savings Allocation**

<i>Variable</i>	<i>Regression 1</i>	<i>Regression 2</i>
N	103	103
Constant	16.986***	16.947***
Female	0.652	0.663
Locus of Control	-11.403*	-11.378*
Finance Course		-0.059

Note: This table displays the results of a regression analysis on the key variables listed to determine the various drivers of the initial equity allocation.

\* significant at  $p < 0.05$ ; \*\* significant at  $p < 0.01$ ; \*\*\* significant at  $p < 0.001$

**4.3 Hypothesis 2 – Debt Overhang**

As previously discussed, debt overhang has large influences on post graduate decisions for many college students. For the most part, individuals with a larger debt overhang tend to forego graduate school (Zhang, 2013) and, instead, take high paying jobs in order to start paying off debt (Rothstein and Rouse, 2011). This study predicts that individuals with a higher debt overhang will also translate to foregoing retirement saving in order to pay off debt. As a result, Hypothesis 2, part one (H2a) is:

*H2a: Individuals with more debt will elect to save less for retirement than individuals with little to no debt.*



Again, multiple linear regression are used to analyze the data, which can be seen in Table 3. The first regression analyzes the effect that the two types of loans (student and other) would have on initial contributions. The second regression tests this again, but also includes the variable of financial education. In both models, we find no evidence to support this hypothesis. Regression 3 analyzes only the 54 individuals with student loans. The results show that, directionally, as the student loan amount increases, the elected initial retirement contribution amount also increases (significantly so in Regression 3). The regressions tests multiple variables, no other significant drivers to determine how much an individual's contribution would be. One possible explanation of this finding is that this survey was completed by current students who, most likely, haven't yet made a payment on their student loan and do not realize the impact it will have on their saving habits.

**Table 3. Regression Model Results – Impact of Debt on Initial Contributions**

<i>Variable</i>	<i>Regression 1</i>	<i>Regression 2</i>	<i>Regression 3</i>
N	103	103	54
Constant	10.516***	10.224***	6.781***
Gender	0.788	0.898	0.673
Student Loans (in thousands)	0.037	0.037	0.116**
Other Loans	-0.034	-0.028	-0.003
Finance Course		0.637	0.310

Note: This table displays the results of a regression analysis on the key variables listed to determine the various drivers of the initial equity allocation.

\* significant at  $p < 0.05$ ; \*\* significant at  $p < 0.01$ ; \*\*\* significant at  $p < 0.001$

The second part of Hypothesis 2, (H2b) looks to further the knowledge of the relationship between locus of control and debt. Studies have shown that externals tend to take on more credit card debt, while internals are more likely to take on pre-planned, long-term debt, such as mortgages. Since student debt is more of a pre-planned, long-term debt, H2b is that:

*H2b: Individuals with a higher level of student loan debt will have a more internal locus of control than individuals with an external locus of control.*

For H2B, shown in Table 4, a linear regression of the entire sample (Regression 1) and only students with student loans (Regression 2) find that this relationship does exist: student loans decrease as external locus of control increases. However, in our analysis, the driver of locus of control was not significant to a 95% confidence interval (p-value of .081 (0.71) for Regression 1 (2)).

**Table 4. Regression Model Results – Locus of Control and Student Debt**

<i>Variable</i>	<i>Regression 1</i>	<i>Regression 2</i>
N	103	54
Constant	23.670***	34.034**

Locus of Control	-23.506	-36.452
Female	4.580	16.119*
Other Loan	0.037	0.768
Finance Course	-2.693	-1.220

Note: This table displays the results of a regression analysis on the key variables listed to determine the various drivers of the initial equity allocation.

\* significant at  $p < 0.05$ ; \*\* significant at  $p < 0.01$ ; \*\*\* significant at  $p < 0.001$

In order to determine if there is a dominant driver of initial contributions, we run a regression that combines both locus of control and debt on the elected initial contribution amount. Overall, this regression tests student loans, other loans, finance course, gender, and locus of control against the initial contribution amount. Here, shown in Table 5, the only significant driver is locus of control, further adding support for Hypothesis 1.

**Table 5. Regression Model Results – Impact of Debt and Locus of Control on Initial Allocation**

<i>Variable</i>	<i>Regression 1</i>
N	103
Constant	16.483***
Gender	0.527
Finance Course	0.073
Locus of Control	-10.854*
Student Loan	0.023
Other Loan	-0.032

Note: This table displays the results of a regression analysis on the key variables listed to determine the various drivers of the initial equity allocation.

\* significant at  $p < 0.05$ ; \*\* significant at  $p < 0.01$ ; \*\*\* significant at  $p < 0.001$

#### 4.4 Hypothesis 3 - Framing Effects

The third and final question that this paper addresses is how framing effects will impact an individual's decision on how much to increase their retirement contribution. Once the individual posts their initial contribution amount, we show them how much their estimated future portfolio value will grow by increasing their annual contribution by 1% of their salary (percentage framing) or \$500 (dollar frame). In this scenario, an absolute dollar frame will appear to be a larger portion of the annual salary than the percentage frame. As a result, H3 is:

*H3: Individuals who are given a percentage frame will be more likely to increase their retirement savings than those given an absolute dollar frame.*

For each survey participant, one of four scenarios were given. The groups were either given a percentage frame or a dollar frame. Additionally, the increased account value was either based on a 60/40 stock to bond split, or an 80/20 stock to bond split. A breakdown of the groups can be seen in the chart below:

<b>Group</b>	<b>Framing</b>	<b>Portfolio</b>
Group 1	Percentage	60/40
Group 2	Percentage	80/20
Group 3	Dollar	60/40
Group 4	Dollar	80/20

Approximately half the people in each group elected to change their contribution rate, indicating that neither of the factors had any influence on whether an individual would change their initial contribution rate or not. However, one of the factors had a significant impact on how much the participant would change their initial contribution by. The average change and standard deviation for each group (including the percentage frame and stock splits groupings) can be seen in Table 6.

**Table 6 Average Change and T-Test Results**

<i>Group</i>	<i>N</i>	$\Delta$	Average $\Delta$	Min	Max
Group 1	26	12	3.833	1	7
Group 2	26	12	3.083	0	7
Group 3	28	12	-1.917	-18.7	2.6
Group 4	26	11	-1.154	-9.7	3
60/40 (Groups 1 & 3)	54	24	0.958	-18.7	7
80/20 (Groups 2 & 4)	52	23	1.057	-9.7	7
Percentage Frame (Groups 1 & 2)	52	24	3.458*		
Dollar Frame (Groups 3 & 4)	54	23	-1.552*		
<b>H3. Difference between Groups 1&amp;2 / 3&amp;4</b>			<b>5.011***</b>		

Note: This table displays the results of a T-Test analysis on the key variables listed to determine the various drivers of the initial equity allocation.

\* significant at  $p < 0.05$ ; \*\* significant at  $p < 0.01$ ; \*\*\* significant at  $p < 0.001$

For the participants in each group that elected to change their initial contribution, Group 1 increased their contribution by 3.83% on average. Group 2 increased their contribution by 3.08% on average. Group 3 decreased their contribution by about 1.92% on average, and Group 4 decreased their contribution by 1.15% on average. When we combine the groupings based on their framing (percentage versus dollar framing), a significant difference was found, with the group given the percentage frame increasing their initial contributions by 3.8% on average, and the group given the dollar frame decreased their portfolio by 1.55% on average. For H3, we test the difference between percent and dollar frames, and find that the percentage frame increased contributions by 5.01% compared to the dollar frame (significant at  $p < .001$ ). The implications of this finding is that one small alteration of framing during a short intervention can significantly influence the amount of an individual's contribution.

When ignoring the percentage and dollar framing, and looking at groups based on either a 60/40 split or an 80/20 split, there is no significant difference found in the change in contributions.

Finally, in Table 7, we run three regressions to determine the potential drivers of the change in contribution rates, our dependent variable. Potential drivers included in the model (our independent variables) were: gender, locus of control, financial education, the percentage vs. dollar framing, and the 60/40 vs. 80/20 split.

**Table 7. Regression Model Results – Impact of Percentage Framing**

<i>Variable</i>	<i>Regression 1</i>	<i>Regression 2</i>	<i>Regression 3</i>
N	47	47	47
Constant	-0.345	0.686	0.690
Gender	-1.392	-1.662	-1.664
Locus of Control	-0.827	-1.613	-1.588
Percentage Framing	4.951***	5.097***	5.097***
Finance Course		-1.868	-1.867
Portfolio Framing			-0.344

Note: This table displays the results of a regression analysis on the key variables listed to determine the various drivers of the initial equity allocation.

\* significant at  $p < 0.05$ ; \*\* significant at  $p < 0.01$ ; \*\*\* significant at  $p < 0.001$

Here, we find that the only driver that was found to be statistically significant was the percentage framing ( $P < 0.001$ ). As a result, this paper concludes that Hypothesis 3 is supported: Individuals given the percentage framing were more likely to increase their contributions than individuals given a dollar framing.

## 5. Limitations and Discussion

As previously mentioned, this survey entails a number of various limitations. First and foremost, the retirement contributions made were based on a hypothetical situation, rather than real life. As such, it is possible that participants may not have fully taken into account their student loans payments when making their decision on how much to save

for retirement, since to them, this was not a realistic depiction of their post-graduate life. We would like to see future research analyze the implications of retirement savings of individuals who are in the process of paying off student loans in order to more accurately determine if their debt impedes their ability to contribute to retirement more than our results suggest.

Another limitation may be the lack of diversity of the participants. As previously mentioned, the survey participants were predominantly white. In addition, there may also have been a lack of diversity in socioeconomic status. The participants were mainly gathered from a private school in the Midwest. While no socioeconomic data was gathered, the majority of students that go to this institution are from middle or upper class families. While we don't believe these factors to have a significant qualitative impact on our findings, we are cognizant that that survey sample is not consistent with a representative sample of individuals in the United States.

One potential limitation to our analysis of comparing contribution increases, based on percentage vs. dollar framing (H3), is the sample size. In this survey, only 47 out of 103 survey participants elected to change their contribution. As a result, when combining groups into frame type, each group had either 23 or 24 in its sample size. However, although the sample sizes are small, the relationship of higher contribution changes for the percentage frame group was found to be highly significant ( $p < 0.001$ ) in all analyses.

In our framing analysis, we found that individuals were not more or less likely to change their retirement elections. We would like to investigate, in future research, other alternative ways to provide "just-in-time" learning opportunities to not only increase the contribution amount, but also increase the likelihood of getting individuals to increase their retirement contributions.

## 6. Conclusion

The most notable trend in retirement savings in the US has been the switch from defined benefit plans to defined contribution plans, such as a 401(k). As a result, understanding the drivers on how much individuals save for retirement will help companies and other organizations create retirement plans that will encourage their employees to save more for retirement. For this paper, we surveyed 103 undergraduate students in the U.S. at a small liberal arts University in the Midwest. This study, consistent with the majority of previous studies, finds that individuals with an external locus of control save significantly less for retirement than those with an internal locus of control. One possible step for future research is to find quick and accurate ways to identify locus of control in order to target "externals" with more information on why they should save for retirement.

In this paper, we find that those with higher student loans have a more internal locus of control, though it is not statistically significant. While this result is consistent with other previous studies, our analysis suggests that student debt does not significantly decrease intended retirement contributions. In fact, our results show that those who have more student loans post higher contribution rates. When we combine the drivers of locus of control and debt to the initial retirement contributions, we find that locus of control is the dominate driver of the contribution decision.

In addition to analyzing the drivers of retirement contributions, we also analyzed a possible "just-in-time" learning opportunity for individuals while making their retirement contribution decision. In our experimental design, we post this "learning" intervention immediately after an individual provided their initial retirement contribution amount. The survey posted an estimate of how much an increase of 1% (percentage frame) or \$500 (dollar frame) per year would increase their estimated portfolio amount at their age of retirement. Here, we find that when framed as a percentage of salary, individuals increase their contributions significantly more than when framed as a dollar amount. We hope that our findings encourage retirement plan administrators to consider implementing short "just-in-time" learning opportunities for individuals to see the estimated long-term benefits of their retirement contributions based on each 1% annual increase before electing their final contribution amount.

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