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Internship Satisfaction and Educational Performance

By

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of the requirements for
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ABSTRACT

GIBSON, LAUREN Internship Satisfaction and Educational Performance.

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This paper investigates the impact of internship satisfaction on educational performance, in particular GPA, and subsequent educational impacts, including changing a major and adding a minor post-internship. I conduct a survey to collect data on undergraduate students of different class years and majors. The survey asks students questions on their demographic background, their internship experience, and their GPA by year. I collect data on several measures of satisfaction including colleagues, work environment, work load, substance of work, and pay.

Using the data I collect from the survey, I run cross-sectional regressions of demeaned GPA gap on satisfaction variables and control variables. The dependent variable being tested is the change in deviation from the mean before and after the internship. I also run logistic regressions to determine whether additional internship satisfaction leads to a change of major. Additionally, I run matched-pair regressions on GPA post-internship of one student, compared to the GPA of a student in the corresponding term that did not have an internship. Each pair is matched by gender, class year, major, and freshman GPA. Regression results suggest there is no concrete evidence that internship satisfaction affects change in grade point average, a change in major post internship, or an added minor post-

internship. There is little evidence to suggest a connection between internship satisfaction and GPA difference between matched pairs.

1 Introduction

Internships have become central to the college experience. Students are encouraged to gain real world experience before entering their chosen field. Because of this, most college career centers advocate heavily for student participation in internships. They have alumni and school specific databases to assist students in finding internships suited for them. However, it is unclear whether the satisfaction or dissatisfaction of a simulated working experience alters a student's motivation and knowledge, and subsequently their academic performance or not. This paper investigates the connection between internship satisfaction and student performance.

The results of this survey may be beneficial to Union College and the career center, as well as other colleges and universities. Internships are already considered very significant and advocated for heavily on campuses. If there appears to be a connection between satisfaction of internships and educational performance, career centers can work harder to not only advocate for internship participation but also work harder to place students in internships better suited to the individual and their academic goals. Thus, this may increase the chance that the student may gain both knowledge and motivation from a rewarding internship experience.

I collect data through a school-wide survey to collect information on a range of students of different class years and majors. The information collected from the survey includes demographic information, both overall and specific measures of

satisfaction, and educational performance, specifically grade point average. I code the results and run multiple regressions of the internship satisfaction variables on the change in deviation from the mean GPA before and after the internship, controlling for demographic information. I also run regressions of internship satisfaction on subsequent educational effects including changing major and adding a minor after participating in an internship.

This study can also be interpreted as an investment under uncertainty problem. It can be shown that, when uncertainty exists, rational investors maximize their welfare by delaying investments. This occurs because the option to invest has real value to the investor. That is, until the investor chooses to invest, they always have the option to invest or not invest. Once the investor chooses to invest, they lose the value of the option. Thus, investors take the option value into account when making their investment decisions. The more uncertain the success of the investment, the larger the value of the option, and thus the longer the agent or investor (in this case, a student) will wait to make a decision. This idea can be applied to my study in the sense that the time invested in one's schoolwork is an investment, and the knowledge gained from this work is human capital. If a student experiences an extremely satisfying internship, they may become more certain of the field they want to enter after graduation and choose to focus on work they know will help them get a job in this field, or "invest". Conversely, if a student gains less information into their future plans from a dissatisfying internship, the student might wait on investment, or not work as hard.

Through OLS regressions on demeaned differences, I find little evidence to suggest that there is a connection between internship satisfaction and educational performance. Through logistic regressions, I find no evidence to suggest a connection. Using a matched-pair technique, I find some evidence to support a connection between satisfaction of work environment and improved educational performance. Overall the results suggest no concrete evidence to show a relationship between internship satisfaction and educational performance.

2 Literature Review

2.1 Internships and grade performance

Based on previous literature, there is no definitive answer to whether or not internships affect educational performance. Knechel and Snowball (1987) study the impact of internships on academic performance, specifically accounting internships. The study looked at the post internship educational performance of students who took internships compared to a control group of non-interns with comparable GPA's and hours of coursework. Their results show that performance across all courses does not significantly differ between interns and non-interns. Further detailed analysis of specific coursework concluded that interns tend to work harder in courses directly related to the career field they plan to pursue, but performance in coursework that involves knowledge gained from the fundamental internship was the only dimension that interns significantly outperformed non-interns. Knechel and Snowball (1987) conclude that there is no significant difference between those who participated in internships versus those who had not on overall GPA in all

courses. The GPA of interns actually appeared to have declined post internship, which contradicted previous research. This result is attributed to a presumed decrease in motivation because knowledge-based benefits should not have led to a decrease in educational performance.

Koehler (1974) ran a similar study, which concluded that the academic performance of students following participation in an internship tended to improve. A clear benefit to participating in an internship found in this study was the substantive knowledge gained which resulted in higher performance in specific accounting courses. The study also found that internship participation motivated students to work hard to increase their opportunity of being offered an internship, as well as improved grades post internship.

Lowe (1965) also concluded that internships had educational benefits. The research found that internship participation further explained theories previously studied and increased importance of courses for students. The AAA Committee on Internship Programs (1952) found numerous educational benefits, including outside of classroom experiences not encountered in the classroom, exposure to the business world, and resulting improvement in evaluation and assimilation in the classroom environment.

Knechel and Snowball (1987) find that the results in Koehler (1974) came primarily from a lack of control group as well as a failure to test for statistical significance. Thus, Knechel and Snowball (1987) contradicted both acknowledged results from Koehler (1974) and Lowe (1965). Since the prior literature is conflicted,

there are no concrete findings on whether internships improve educational performance.

Prior research seems to only have focused on the connection between internship participation and educational effects. The effect of internship satisfaction on educational attainment has not yet been studied to my knowledge. Therefore, I wish to investigate this potential connection. Understanding the link between internship satisfaction and grades could inform colleges' and universities' efforts to help their students both have a more fulfilling educational experience, and a more suitable job market outcome.

2.2 Happiness, satisfaction, and other determinants of academic productivity

This research is directly related to satisfaction and productivity. Oswald, Proto, and SgROI (2015) provide evidence that happiness makes people more productive. Oswald, et al. (2015) set up four different types of experiments. The experiments ranged from showing subjects a comedy movie and then evaluating them on a standardized task both, to providing subjects with food and drinks and then evaluating productivity, to finally quizzing subjects on recent family tragedies and then evaluating their happiness and productivity. All experiments provided evidence to support that happier workers are more productive.

Research has also been done on many different demographic variables and their effects on grades, including income, ethnicity, and gender. Engle and Tinto (2008) research opportunity in higher using data from the U.S. Department of Education datasets. This study looks at the persistence and degree attainment rates

of low-income, first-generation students, as well as compares the participation of these students to students who have neither of these risk factors. They find that low-income, first generation students have higher dropout rates after the first year, and lower degree attainment rates than students who are neither low-income nor first-generation. The major barrier to the success of these students was found to be their choice of two-year college compared to a four-year institution. Based on these results, I will control for income and first-generation variables in my testing.

Cogner and Long (2010) shows that males earn lower GPAs and earn fewer credits than females both during their first semester of college and beyond. Males have also shown lower college completion rates than females.

Fischer (2007) examines the effect of ethnicity on college performance. Fisher finds that minority students have a harder time transitioning into college and colleges and universities don't account for this barrier. These barriers to a successful transition into college include the likelihood that minority students are first-generation and low-income, similar to Engle and Tinto (2008). Fischer (2007) also finds that minority college students also have a more difficult time acclimating to predominantly white campuses. Fisher found that these barriers to adjustment into college affect later success or failure.

Since there are numerous studies on demographic information and their effects on educational performance, I control for this in my study. In my survey I collect information on different demographic aspects in order to account for the effects that they may have on GPA.

3 Data

I collect data through a school-wide survey of Union College undergraduates. The survey was sent out via email to all current students of each class year. Students were incentivized with a chance to win one of three \$50 cash prizes. The survey collects demographic information on students including gender, family background, ethnicity/race, household income, class year, and major field of study. Based on prior literature, it is known that these demographic variables are correlated with grades so they must be controlled for during testing. In addition to demographic questions, the participants were asked if they have participated in an internship. Since many students have participated in multiple internships, students are given the opportunity to respond on a second internship later on in the survey. They are then asked to answer questions on overall internship satisfaction as well as other, more specific dimensions of satisfaction. Important questions pertaining to internship satisfaction are:

- **How satisfied were you with your internship experience?**
- **How satisfied were you with the work environment of your company?**
- **How satisfied were you with your workload?**
- **How satisfied were you with the substance of the work you did?**
- **Was it a paid internship?**
- **If yes, how satisfied were you with the pay?**
- **Did you receive a job offer after your internship?¹**

¹ I also collected results on colleague satisfaction but because of high correlation with work environment, so this variable was omitted for all regressions due to multicollinearity.

Following internship satisfaction questions, students are asked about their cumulative grade point average for each class year they have been in school for and their overall satisfaction of their educational experience.

Using the data collected from the survey results, I code the results and run cross-sectional regressions of the demeaned GPA difference on overall satisfaction, the more detailed measures of satisfaction, and the control variables. I also run logistic regressions to determine whether increased internship satisfaction leads students to changing their major or adding a minor.

Since there is a trend in GPA, I must remove the trend before proceeding with the analysis. The trend in GPA from the data appears below in Figure 1.

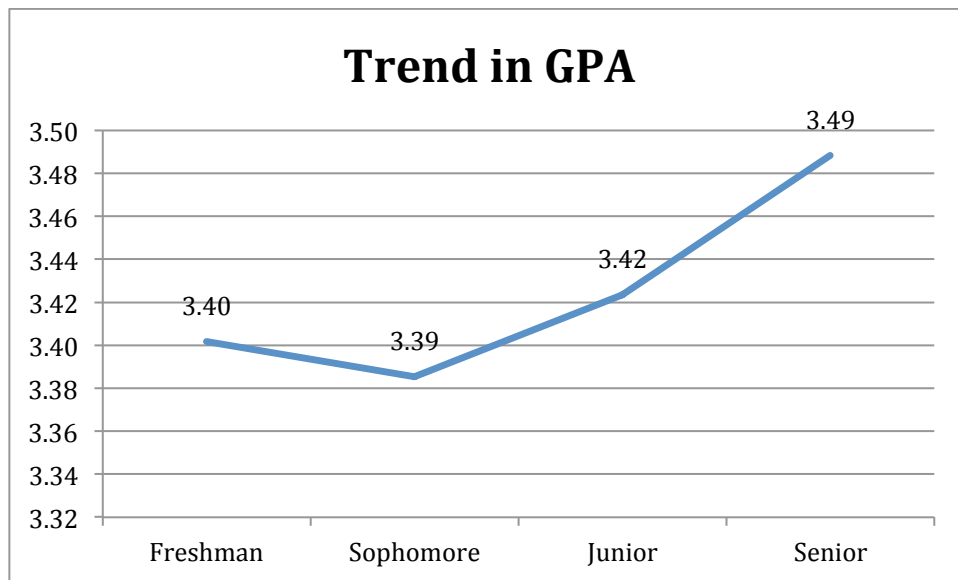


Figure 1: Trend in GPA for data sample.

I remove the trend from the GPA data by subtracting the average GPA in time t for every class year, denoted \bar{Y}_t , from the reported GPA for each student, i , at time t , denoted $Y_{i,t}$. Thus, the demeaned GPA variables are given as

$$DemeanedGPA_t = (Y_{i,t} - \bar{Y}_t) \quad (1)$$

This equation gives me each student's GPA deviation from the mean.

Next, I calculate the difference in the GPA deviations before and after an internship. Let k_i be the number of periods after taking an internship, which will vary by student, and let j_i be the number of periods before taking an internship, which will also vary by student. Then the difference in average GPA before and after the internship is given using equation (2) below

$$\Delta GPA_{dev} = \frac{1}{k_i} \sum_1^{k_i} (Y_{i,t} - \bar{Y}_t) - \frac{1}{j_i} \sum_1^{j_i} (Y_{i,t} - \bar{Y}_t) \quad (2)$$

Because I have the term of the internship taken by the student, but GPA data is annual, I assign the internship to each class year as follows:

- Freshman Internship: spring term Freshman year, summer after Freshman year, fall term Sophomore year, winter term Sophomore year
- Sophomore Internship: spring term Sophomore year, summer after Sophomore year, fall term Junior year, winter term Junior year
- Junior Internship: spring term Junior year, summer after Junior year, fall term Senior year, winter term Senior year

Suppose a student took an internship in the fall semester of their sophomore year. I count this as a freshman internship for the purposes of applying equation (2) above.

Thus, this student's sophomore GPA would be included in the post-internship average. Alternately, if the student took their internship in the spring or winter of their sophomore year, then the internship is counted as occurring during their sophomore year. Thus I include the freshman and sophomore GPA in the pre-internship average.

Summary statistics for the data are presented in Table 1. From the sample of Union College undergraduate students, the data includes 109 freshman, 91 sophomores, 95 juniors, and 138 seniors. Of the sample, about 65% are female and 35% were male. The data collected on race and ethnicity of the respondents are 3.89% Hispanic, 0.23% American Indian or Alaska Native, 8.68% Asian, 5.25% Black, 82.19% White, 0.23% Native Hawaiian or Other Pacific Islander, and 3.42% chose not to respond. Of the participating students, around 70% of students attended public school, while the remaining 30% attended private school. I also controlled for household income in this survey by asking the students to estimate their parents combined incomes. The rest of the important variables are summarized below in Table 1.

Table 1: Summary Statistics of Significant Variables

	Mean	Standard Deviation	Min	Max
Overall Satisfaction	2.88	0.95	0	4
Work Environment Satisfaction	2.91	1.03	0	4
Workload Satisfaction	2.59	1.04	0	4
Substance of Work Satisfaction	2.59	1.16	0	4
Pay Satisfaction	2.81	0.96	0	4
First Year GPA	3.40	0.41	1.5	4
Sophomore GPA	3.39	0.35	2.4	4
Junior GPA	3.42	0.32	2.5	4
Senior GPA	3.49	0.32	2.6	4
Overall Education Satisfaction	2.83	0.72	0	4

After discarding erroneous responses and data for which there was no GPA difference to be analyzed (i.e. they took an internship during the first two terms of their freshman year, or the final term of their senior year), there were 308 total responses to the survey. Of those, 205 of those students have not participated in an internship, while the other 103 students have had an internship experience.

4 Model Specification

4.1 Cross-sectional Regression Model for Change in GPA Deviation

To examine the relationship between internship satisfaction and educational performance, the following model is used:

$$\Delta GPA_{dev} = \beta_0 + \beta_1 Overall + \beta_2 Pay + \beta_3 PaySatisfaction + \beta_4 WorkEnviron + \beta_5 Workload + \beta_6 WorkSubstance + \beta_7 JobInField + \beta_8 JobOffer + \beta_9 OverallEduc + \beta_{10} AvgGPA + \delta_1 Class + \beta_X X_i$$

where *GPA* is the change in deviation from the mean before and after the internship, as calculated from Equation (2). *Overall* is the value of overall satisfaction of a student's internship experience. *Pay* is a dummy variable that controls whether or not the student received compensation for the work during their internship, and *PaySatisfaction* is the measure of satisfaction of the pay received, if any². The following measures are all subsequent measures of satisfaction for different aspects of an internship: *WorkEnviron* measures the satisfaction of one's work environment, *Workload* measures the satisfaction of how much work one did during an internship, and *WorkSubstance* measures the satisfaction of the work one did during an

² When I include *PaySatisfaction*, I exclude *Pay* because everyone in the sample who answered on pay satisfaction has been paid, so the variable is equal to one.

internship. *JobInField* is a dummy for whether a student plans to pursue a job in the field of their internship. *JobOffer* is a dummy pertaining to whether a student received a job offer from their internship.³ *OverallEduc* measures a student's current overall measure of satisfaction of their educational experience. *AvgGPA* is a measure of average cumulative GPA to control for student skill. *Class* is a dummy variable that represents the class year of the student, which accounts for any underlying variation in the student cohorts. Finally \mathbf{X}_i is a vector of demographic variables collected on the survey, such as gender, class year, major, race/ethnicity, mother's and father's education level, family income, whether they attended a private or public high school, and whether or not their parents were in the military.

4.2 Logistic Regressions Model for Major Change and Added Minor

To examine the relationship between internship satisfaction and a change in major, the following model is used:

$$\begin{aligned} MajorChange = & \beta_0 + \beta_1 Overall + \beta_2 Pay + \beta_3 PaySatisfaction + \\ & \beta_4 WorkEnviron + \beta_5 Workload + \beta_6 WorkSubstance + \\ & + \beta_7 OverallEduc + \beta_x \mathbf{X}_i \end{aligned}$$

where *MajorChange* is a binary variable for whether a student's major changed post-internship. All other variables are the same as specified in Section 4.1. However, the only difference is that \mathbf{X}_i is a vector only for student major. All other demographic variables are omitted.

³ This measure is included to account for a potential decrease in educational performance due to secured employment post-graduation.

I also use an identical model to test for the effect of internship satisfaction on adding a minor. The only change for this model is replacing the dependent variable with *AddedMinor*, where *AddedMinor* is a binary variable for whether a student added a minor post-internship.

4.3 Matched-Pair Regressions Model for GPA Difference

An alternate way to examine the relationship between internship satisfaction and educational performance is by using the following model:

$$GPADifference = \beta_0 + \beta_1 Overall + \beta_2 Pay + \beta_3 PaySatisfaction + \beta_4 WorkEnviron + \beta_5 Workload + \beta_6 WorkSubstance + \beta_7 OverallEduc + \beta_X X_i$$

where *GPADifference* is the difference in GPA between the reported GPA of a student post-internship, compared to the corresponding term of the student who did not participate in an internship. Students were matched by class year, major, gender and freshman GPA. The data yielded 61 matched pairs. X_i is a vector of demographic variables collected on the survey, such as race/ethnicity, mother's and father's education level, family income, whether they attended a private or public high school, and whether or not their parents were in the military. All other variables are specified in Section 4.1. If a satisfying internship leads to better GPA, then the GPA difference between the matched pairs should be positively correlated with the satisfaction measures.

5 Results

5.1 Cross-sectional Regression Results

I run regressions including the *PaySatisfaction* variable, and regressions omitting the *PaySatisfaction* variable in order to analyze paid and unpaid internships. The abbreviated results from the cross-sectional regressions run on the detrended GPA difference on satisfaction variables are shown in Table 2. Models (1) and (2) include control variables, and the other two models do not. Models (1) and (3) include the *PaySatisfaction* variable, and the other two models omit that variable. The full model results including the demographic variables are included in Appendix B.⁴

⁴ I also ran these cross-sectional regressions using disaggregated data, but the results did not yield any significance.

Table 2: Cross-sectional Regression Estimates for Demeaned GPA Difference

Variable	(1)	(2)	(3)	(4)
Overall	.098 (.100)	.069 (.042)	.037 (.057)	.039 (.040)
Pay		.113 (.116)		.049*** (.010)
PaySatisfaction	.047 (.073)		-.006 (.038)	
WorkEnviron	.0245 (.111)	-.036 (.057)	.009 (.063)	-.042 (.037)
Workload	-.016 (.092)	-.063 (.062)	-.052 (.079)	-.024 (.019)
WorkSubstance	.012 (.055)	-.017 (.025)	-.039 (.046)	-.037 (.032)
R²	0.788	0.601	0.032	0.059

The results from four cross-sectional regression estimations of change in GPA on satisfaction variables are shown. Columns (1) and (2) include control variables, (3) and (4) do not. Columns (1) and (3) include the *PaySatisfaction* variable, (2) and (4) omit this variable. The dependent variable in all regressions is the demeaned change in GPA.

* - Estimate is significant at the 10% level; ** - Estimate is significant at the 5% level; *** - Estimate is significant at the 1% level

The results show that pay is significant at the 1% level and leads to an increase in GPA. However, this result is not robust to the inclusion of control variables in column (2). Overall, the results suggest there is little or no connection between either overall internship satisfaction or individual measures of internship satisfaction and grade improvement. These results are consistent with previous literature done by Knechel and Snowball (1987), which found no concrete evidence on the connection between internships and educational performance.

The results may also lack statistical significance due to small sample size after eliminating participants with no internship experience and unusable data. These findings may also be a result of the cumulative data I use in my regressions.

5.2 Logistic Regressions Results

The results from the logistic regressions run on subsequent educational effects, including a change in major and an added minor, on satisfaction variables are shown in Tables 3 and 4, respectively. In models (1) and (2), I control for student's majors. Similar to the cross-sectional regressions, I run the regressions including *PaySatisfaction* and omitting this variable to look at both paid and unpaid internships. Models (1) and (3) include the *PaySatisfaction* variable, and the other models do not. The full model results including the demographic variables are included in Appendix C.

Table 3: Logistic Regression Estimates for Major Change

Variable	(1)	(2)	(3)	(4)
Overall	-0.856 (.863)	-0.581 (.541)	-0.704 (.754)	-0.496 (.482)
Pay		-0.770 (.658)		-0.701 (.621)
PaySatisfaction	.514 (.690)		.542 (.594)	
WorkEnviron	.685 (.941)	.322 (.371)	.568 (.704)	.373 (.375)
Workload	-.133 (.818)	-.341 (.418)	-.083 (.574)	-.321 (.358)
WorkSubstance	-.153 (.639)	-.366 (.346)	-.160 (.565)	-.329 (.339)
Pseudo R²	0.191	0.148	0.073	0.102

The results from four logistic regression estimations of *MajorChange* on satisfaction variables are shown. Columns (1) and (2) include controls for major and overall education satisfaction, (3) and (4) do not. Columns (1) and (3) include the *PaySatisfaction* variable, (2) and (4) omit this variable. The dependent variable in all regressions is whether or not the student changed their major after participating in an internship.

*- Estimate is significant at the 10% level; ** - Estimate is significant at the 5% level; *** - Estimate is significant at the 1% level

When looking at the data from a different point of view, the results of logistic regressions run on internship satisfaction and *MajorChange* yield no significance.

The results suggest that how much a student enjoys their internship experience does not affect their decision to change their major post-internship.

Table 4: Logistic Regression Estimates for Adding a minor

Variable	(1)	(2)	(3)	(4)
Overall	.484 (.613)	.644 (.481)	.325 (.554)	.570 (.443)
Pay		.729 (.586)		.795 (.553)
PaySatisfaction	.575 (.414)		.478 (.376)	
WorkEnviron	-.687 (.552)	-.814 (.376)	-.528 (.499)	-.725 (.349)
Workload	.368 (.478)	.419 (.380)	.272 (.435)	.368 (.348)
WorkSubstance	.022 (.415)	.101 (.301)	.069 (.397)	.110 (.302)
Pseudo R²	0.099	0.105	0.046	0.062

The results from four logistic regression estimations of *AddedMinor* on satisfaction variables are shown. Columns (1) and (2) include controls for major and overall education satisfaction, (3) and (4) do not. Columns (1) and (3) include the *PaySatisfaction* variable, (2) and (4) omit this variable. The dependent variable in all regressions is whether or not the student added a minor after participating in an internship.

* - Estimate is significant at the 10% level; ** - Estimate is significant at the 5% level;

*** - Estimate is significant at the 1% level

Similarly, the logistic regressions run on internship satisfaction and *AddedMinor* yield insignificant results. Thus, the findings suggest that internship satisfaction does not effect a student's decision to add a minor post internship.

5.3 Matched-Pair Regressions Results

The results from the matched-pairs regressions run on the GPA difference on satisfaction variables are shown in Table 5. Models (1) and (2) include control

variables, and the other two models do not. Models (1) and (3) include the *PaySatisfaction* variable, and the other two models omit that variable.

Table 5: Matched-Pair Regression Estimates for GPA Difference

Variable	(1)	(2)	(3)	(4)
Overall	.067 (.167)	.030 (.069)	.002 (.085)	.035 (.059)
Pay		.080 (.079)		.026 (.068)
PaySatisfaction	-.056 (.076)		.055 (.039)	
WorkEnviron	.154** (.083)	.101** (.054)	.069 (.064)	.037 (.049)
Workload	-.130 (.153)	-.050 (.078)	.046 (.091)	.037 (.063)
WorkSubstance	-.082 (.069)	-.026 (.048)	-.080 (.055)	-.064 (.042)
R²	0.736	0.627	0.138	0.070

The results from four matched-pair regression estimations of GPA difference on satisfaction variables are shown. Columns (1) and (2) include control variables, (3) and (4) do not. Columns (1) and (3) include the *PaySatisfaction* variable, (2) and (4) omit this variable. The dependent variable in all regressions is GPA difference of the student post-internship, with the corresponding term of the student who did not participate in an internship.

* - Estimate is significant at the 10% level; ** - Estimate is significant at the 5% level; *** - Estimate is significant at the 1% level

The matched-pair regression estimates yields two significant results. The estimations suggest that satisfaction of work environment leads to an improvement in GPA for a student who participates in an internship, compared to a student who does not have an internship. These results slightly disagree with my previous results, which suggested there was no connection between internship satisfaction

and educational performance or decisions regarding majors and minors. This may be due to the fact that the matched-pair technique is detecting additional variation by including the direct difference in educational performance between a student who had an internship and was satisfied versus a student who had no internship experience at all.

6 Conclusion

Internships have become a core part of the college experience. Students are exposed to the real world work experience and are able to learn about potential fields they may enter after college. Although many undergraduate college students participate in internships during their time in college, my findings suggest that there is no evidence to support that internship satisfaction affects educational performance, more specifically, change in grade point average before and after internship participation. My results on cross-sectional and logistic regressions run on internship satisfaction and a student's decision to either change major or add a minor, post internship, also proved to be insignificant. However the results for the matched-pair regressions suggested that satisfaction of the work environment led to an increase in educational performance for the student who participated in an internship when directly compared to the performance of the student who did not have an internship. Thus, I have little evidence that internship satisfaction affects either of these educational decisions. Some of my results are consistent with the research done by Knechel and Snowball (1987), who concluded that there is no significant difference in educational performance between students who

participated in an internship and students who had not. Some of my additional results are consistent with other research suggesting that internships do in fact have educational benefits.

In future research, I hope to try alternate methodologies in order to further analyze the data. I hope to try a regression discontinuity technique with the potential to find more significant results on internship satisfaction and educational performance. For these further tests, I plan to use disaggregated data due to the fact that my current data tests cumulative GPA, which contains a lot of information from previous GPA results. Thus using year-to-year GPA data will likely provide us with a better change at finding an effect of internship satisfaction on educational performance. I also suggest to further researchers that an appropriate measure of the true effect of internship satisfaction on educational performance could be more accurately studied using a longitudinal study. Studying specific students year over year would eliminate low response rate and flawed survey data.

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Appendix A: Survey Questions

1. What is your gender?

- a. Male
- b. Female

2. What class year are you?

- a. Freshman
- b. Sophomore
- c. Junior
- d. Senior
- e. Graduated

3. What is your major? (If double major, select all that apply)

- a. Sciences
- b. Engineering
- c. Languages and Literature
- d. Economics
- e. Political Science
- f. Humanities

4. What is your mother's highest level of educational attainment?

- a. Less than High School
- b. High School graduate
- c. Some College or 2 year degree
- d. 4 year degree
- e. Graduate/Professional degree or higher

5. What is your father's highest level of educational attainment?

- a. Less than High School
- b. High School graduate
- c. Some College or 2 year degree
- d. 4 year degree
- e. Graduate/Professional degree or higher

6. Please specify your ethnicity.

- a. Hispanic or Latino
- b. Non-Hispanic or Latino

- 7. Please specify your race.**
- a. American Indian or Alaska Native
 - b. Asian
 - c. Black or African American
 - d. White
 - e. Native Hawaiian or Other Pacific Islander

- 8. Estimate your household income.**
- a. \$19,999 or less
 - b. \$20,000- \$39,999
 - c. \$40,000- \$59,999
 - d. \$60,000- \$79,999
 - e. \$80,000- \$99,999
 - f. \$100,000- \$149,999
 - g. \$150,000 or more

- 9. Did you attend public or private high school?**
- a. Public
 - b. Private

- 10. Was your mother or father ever in the military?**
- a. Military family
 - b. Non-military family

- 11. Did you have an internship? (If you've had more than one, please answer the following questions on your most recent internship)**
- a. Yes
 - b. No

- 12. Was the internship directly related to your major?**
- a. Yes
 - b. No

- 13. When was your internship? (Please only select one)**
- a. Fall term freshman year
 - b. Winter term freshman year
 - c. Spring term freshman year
 - d. Summer after freshman year
 - e. Fall term sophomore year
 - f. Winter term sophomore year
 - g. Spring term sophomore year

- h. Summer after sophomore year
- i. Fall term junior year
- j. Winter term junior year
- k. Spring term junior year
- l. Summer after junior year
- m. Fall term senior year
- n. Winter term senior year
- o. Spring term senior year
- p. Summer after senior year
- q. N/A

14. How satisfied were you with your internship experience?

- a. Not at all satisfied
- b. Slightly satisfied
- c. Somewhat satisfied
- d. Very satisfied
- e. Completely satisfied
- f. N/A

15. How satisfied were you with the work environment of your company?

- a. Not at all satisfied
- b. Slightly satisfied
- c. Somewhat satisfied
- d. Very satisfied
- e. Completely satisfied
- f. N/A

16. How satisfied were you with your colleagues?

- a. Not at all satisfied
- b. Slightly satisfied
- c. Somewhat satisfied
- d. Very satisfied
- e. Completely satisfied
- f. N/A

17. How satisfied were you with your workload?

- a. Not at all satisfied
- b. Slightly satisfied
- c. Somewhat satisfied
- d. Very satisfied
- e. Completely satisfied
- f. N/A

18. How satisfied were you with the substance of the work you did?

- a. Not at all satisfied
- b. Slightly satisfied
- c. Somewhat satisfied
- d. Very satisfied
- e. Completely satisfied
- f. N/A

19. Was it a paid internship?

- a. Yes
- b. No
- c. N/A

20. If yes, how satisfied were you with the pay?

- a. Not at all satisfied
- b. Slightly satisfied
- c. Somewhat satisfied
- d. Very satisfied
- e. Completely satisfied
- f. Not applicable
- g. N/A

21. Did you receive a job offer after your internship? (Not necessarily from the company that you interned for)

- a. Yes
- b. No
- c. N/A

22. Did your major change after your internship?

- a. Yes
- b. No, but added a minor
- c. No

23. Estimate your cumulative GPA freshman year.

- a. 2.0
- b. 2.1
- c. 2.2
- d. 2.3
- e. 2.4
- f. 2.5

- g. 2.6
- h. 2.7
- i. 2.8
- j. 2.9
- k. 3.0
- l. 3.1
- m. 3.2
- n. 3.3
- o. 3.4
- p. 3.5
- q. 3.6
- r. 3.7
- s. 3.8
- t. 3.9
- u. 4.0

24. Estimate your cumulative GPA sophomore year.

- a. 2.0
- b. 2.1
- c. 2.2
- d. 2.3
- e. 2.4
- f. 2.5
- g. 2.6
- h. 2.7
- i. 2.8
- j. 2.9
- k. 3.0
- l. 3.1
- m. 3.2
- n. 3.3
- o. 3.4
- p. 3.5
- q. 3.6
- r. 3.7
- s. 3.8
- t. 3.9
- u. 4.0
- v. Not applicable

25. Estimate your cumulative GPA junior year.

- a. 2.0
- b. 2.1
- c. 2.2
- d. 2.3
- e. 2.4

- f. 2.5
- g. 2.6
- h. 2.7
- i. 2.8
- j. 2.9
- k. 3.0
- l. 3.1
- m. 3.2
- n. 3.3
- o. 3.4
- p. 3.5
- q. 3.6
- r. 3.7
- s. 3.8
- t. 3.9
- u. 4.0
- v. Not applicable

26. Estimate your cumulative GPA senior year.

- a. 2.0
- b. 2.1
- c. 2.2
- d. 2.3
- e. 2.4
- f. 2.5
- g. 2.6
- h. 2.7
- i. 2.8
- j. 2.9
- k. 3.0
- l. 3.1
- m. 3.2
- n. 3.3
- o. 3.4
- p. 3.5
- q. 3.6
- r. 3.7
- s. 3.8
- t. 3.9
- u. 4.0
- v. Not applicable

27. Do you plan to pursue a job in this field?

- a. Yes
- b. No
- c. N/A

28. Rate your current satisfaction of your educational experience.

- a. Not at all satisfied
- b. Slightly satisfied
- c. Somewhat satisfied
- d. Very satisfied
- e. Completely satisfied

Appendix B: Cross-Sectional Regression Estimates

Table 2: Cross-sectional Regression Estimates for Demeaned GPA Difference

Variable	(1)	(2)	(3)	(4)
Overall	.098 (.100)	.069 (.042)	.037 (.057)	.039 (.040)
Pay		.113 (.116)		.049 (.010)
PaySatisfaction	.047 (.073)		-.006 (.038)	
WorkEnviron	.0245 (.111)	-.036 (.057)	.009 (.063)	-.042 (.037)
Workload	-.016 (.092)	-.063 (.062)	-.052 (.079)	-.024 (.019)
WorkSubstance	.012 (.055)	-.017 (.025)	-.039 (.046)	-.037 (.032)
OverallEduc	-.050 (.065)	.027 (.033)		
JobInField	.416 (.285)	.180 (.133)		
JobOffer	.081 (.191)	.143 (.151)		
Female	.038 (.122)	.011 (.068)		
Junior	.271 (.314)	.010 (.087)		
Senior	.250 (.250)	.024 (.117)		
Engineering	-.113 (.129)	-.012 (.073)		
LanguagesandLiterature	-.092 (.112)	.062 (.055)		
Economics	-.184 (.167)	-.103 (.098)		
PoliticalScience	.023 (.164)	.074 (.028)		
Humanities	.046 (.091)	-.002 (.042)		
Other	.202 (.107)	.171 (.052)		
MotherHighschool	2.147 (.772)	.796 (.208)		
MotherSomeCollege	1.201 (.584)	.484 (.124)		

MotherCollege	1.039 (.613)	.383 (.238)		
MotherGrad	1.074 (.598)	.373 (.158)		
FatherHighschool	.812 (.744)	.349 (.281)		
FatherSomeCollege	1.103 (.768)	.546 (.283)		
FatherCollege	.957 (.727)	.497 (.217)		
FatherGrad	.721 (.753)	.336 (.165)		
AmericanIndianorAlaskaNative				
Asian	-.011 (.687)	-.121 (.090)		
Black	2.206 (1.598)	.710 (.327)		
White	.454 (.670)	.402 (.117)		
NativeHawaiianorOtherPacific				
RaceNone				
Inc2	-.612 (.425)	.420 (.197)		
Inc3		.547 (.163)		
Inc4	-.157 (.683)	.594 (.269)		
Inc5	-.203 (.6611)	.541 (.292)		
Inc6	-.080 (.537)	.540 (.261)		
Inc7	.066 (.630)	.607 (.238)		
PublicHS	-.121 (.219)	-.018 (.046)		
Military	-.318 (.185)	-.186 (.136)		
AvgGPA	-.121 (.342)	-.247 (.099)		
R²	0.788	0.601	0.032	0.059

The results from four cross-sectional regression estimations of change in GPA on satisfaction variables are shown. Columns (1) and (2) include control variables, (3)

and (4) do not. Columns (1) and (3) include the *PaySatisfaction* variable, (2) and (4) omit this variable. The dependent variable in all regressions is the demeaned change in GPA.

*- Estimate is significant at the 10% level; ** - Estimate is significant at the 5% level;

*** - Estimate is significant at the 1% level

Appendix C: Logistic Regression Estimates

Table 3: Logistic Regression Estimates for Changing Major

Variable	(1)	(2)	(3)	(4)
Overall	-0.856 (.863)	-0.581 .541	-0.704 (.754)	-0.496 (.482)
Pay		-0.770 (.658)		-0.701 (.621)
PaySatisfaction	.514 (.690)		.542 (.594)	
WorkEnviron	.685 (.941)	.322 (.371)	.568 (.704)	.373 (.375)
Colleagues	-.133 (.818)	-.341 (.418)	-.083 (.574)	-.321 (.358)
Workload	-.153 (.639)	-.366 (.346)	-.160 (.565)	-.329 (.339)
WorkSubstance	-0.856 (.863)	-0.581 .541	-0.704 (.754)	-0.496 (.482)
Sciences	.758 (2.015)	.093 (1.332)		
Engineering		-0.656 (1.562)		
LanguagesandLiterature				
Economics				
PoliticalScience	2.168 (2.098)	-0.013 (1.491)		
Humanities	.449 (1.387)	-1.499 (1.351)		
Other	-.183 (1.981)	-.325 (1.377)		
OverallEduc	-.848 (1.034)	-.418 (.468)		
Pseudo R²	0.191	0.148	0.073	0.102

The results from four logistic regression estimations of *MajorChange* on satisfaction variables are shown. Columns (1) and (2) include controls for major and overall education satisfaction, (3) and (4) do not. Columns (1) and (3) include the *PaySatisfaction* variable, (2) and (4) omit this variable. The dependent variable in all regressions is whether or not the student changed their major after participating in an internship.

* - Estimate is significant at the 10% level; ** - Estimate is significant at the 5% level; *** - Estimate is significant at the 1% level

Table 4: Logistic Regression Estimates for Adding a Minor

Variable	(1)	(2)	(3)	(4)
Overall	.484 (.613)	.644 (.481)	.325 (.554)	.570 (.443)
Pay		.729 (.586)		.795 (.553)
PaySatisfaction	.575 (.414)		.478 (.376)	
WorkEnviron	-.687 (.552)	-.814 (.376)	-.528 (.499)	-.725 (.349)
Colleagues	.368 (.478)	.419 (.380)	.272 (.435)	.368 (.348)
Workload	.022 (.415)	.101 (.301)	.069 (.397)	.110 (.302)
WorkSubstance	.484 (.613)	.644 (.481)	.325 (.554)	.570 (.443)
Sciences	-1.294 (1.283)	-.453 (.919)		
Engineering	-.755 (1.581)	-.890 (1.23)		
LanguagesandLiterature				
Economics	-.094 (1.267)	-.045 (.9701)		
PoliticalScience		-1.19 (1.35)		
Humanities	-.907 (1.479)	-.662 (.989)		
Other	-1.336 (1.414)	-1.378 (1.102)		
OverallEduc	-.368 (.533)	-.408 (.396)		
Pseudo R²	0.099	0.105	0.046	0.062

The results from four logistic regression estimations of *AddedMinor* on satisfaction variables are shown. Columns (1) and (2) include controls for major and overall education satisfaction, (3) and (4) do not. Columns (1) and (3) include the *PaySatisfaction* variable, (2) and (4) omit this variable. The dependent variable in all regressions is whether or not the student added a minor after participating in an internship.

* - Estimate is significant at the 10% level; ** - Estimate is significant at the 5% level; *** - Estimate is significant at the 1% level