Senior Honors Thesis

LEVERAGING THE EFFECTS OF LOSS FRAMING TO NUDGE LOW-INCOME, HIGH-ACHIEVING STUDENTS IN CHICAGO TOWARDS HIGHER EDUCATION

Benjamin H. Feis

Submitted to the Philosophy, Politics and Economics Program at the University of Pennsylvania in Partial Fulfillment of the Requirement for Honors

Advisor: Professor Laura Perna

Date of Submission: May 11, 2016

Acknowledgments

During my sophomore year, I used to keep a piece of paper on the bulletin board above my desk. On the paper was a Venn diagram with three circles. The words inside read, “Economic Inequality,” “Higher Education,” and “Behavioral Economics.” For some reason, I always found myself captivated by these topics. Inequality because it’s the greatest challenge facing our nation, education because it’s far and away the most effective way of improving people’s life chances, and behavioral economics because it’s powerful yet elegant. In many ways, this project lies at the intersection of these three topics and represents everything I have loved learning about most over the past four years.

While this thesis is near and dear to my heart, it would not have been possible without the immense support and love of a number of people in my life. First, I want to express my sincerest gratitude to my advisor Laura, who has been a constant source of guidance and encouragement during this process. I am extremely appreciative of the time she has spent working through these ideas with me and for her willingness to always push me to think more critically. I also certainly would not have been able to carry out the primary research component of this project without her help, and I am very thankful that she pushed me in this direction.

I also want to thank my parents for being my biggest fans and role models in life. Their love and faith in me, not just during this project but throughout my entire time at Penn, means more to me than they know. As a side note, I have so enjoyed and appreciated every conversation we have had over the past year about this project and what I have learned along the way. Their thoughts and feedback have been hugely helpful in allowing me to formulate my ideas. I also want to thank my brother Andy for always supporting me and for agreeing to explain statistics concepts to me, albeit a bit begrudgingly at times. Finally, thank you to my best friend, L, for always being by my side and believing in me.

Abstract

The vast majority of low-income, high-achieving high school students in the U.S. either do not apply to college or undermatch by attending less selective institutions than those they are qualified to attend. Previous research has demonstrated that behavioral "nudges" can be an effective and low-cost method of influencing students' application behavior and encouraging them to enroll in selective institutions. This study contributes to this existing body of literature by examining whether framing college earnings premium information as a loss causes low-income high school students in Chicago to report greater likelihood of applying to college than when the same information is framed as a gain. I find that there are no significant differences between the gain and loss conditions, but that students in both conditions report greater likelihood of applying to a highly selective college as compared to students in the control, where no earnings premium information was provided.

Table of Contents

INTRODUCTION

Inequality in Educational Attainment and Income in the U.S.

Inequality in educational attainment between the rich and poor is at an all-time high in the United States. As Putnam (2015) observes, "In the twenty-first century, socioeconomic status has become even more important than test scores in predicting whether a student will graduate from college." For the first time in U.S. history, high-scoring low-income students are now slightly less likely (29 percent) to get a college degree than low-scoring high-income students (30 percent). Furthermore, Bailey and Dynarski (2011) find that the college attainment gap has been widening rapidly since the 1980s. Whereas 58 percent of students from the most affluent quintile and 19 percent from the poorest quintile entered college in 1980, 80 percent of high-income students now enter as opposed to only 29 percent of low-income students.

Just as inequality in educational attainment has risen during this period, so too has income inequality in the U.S. (Piketty, 2014). Goldin and Katz (2010) argue that this is not a coincidence. During the first eight decades of the twentieth century, the supply of educated workers was higher than the demand for them. This led to higher incomes for most people and lower inequality. Since about 1980, however, the rate of technological change has increased, demand for educated workers has outpaced the supply, and the result has been rising income inequality. While this paints a bleak picture, there is perhaps a silver lining. If educational attainment and income inequality are truly as interrelated as Goldin and Katz claim, then improving opportunities for low-income students to access education may, in turn, reduce income inequality. Before discussing strategies to improve access, though, it is worth briefly explaining some of the private returns to higher education.

Returns to Higher Education

Perhaps the most salient benefit of having a college degree is an increase in earnings. Median annual earnings of bachelor's degree recipients are approximately $21,100 higher than those of high school graduates. Median lifetime earnings of those who attend college are 65 percent higher than those of their counterparts who only attend high school (Baum, Ma & Payea, 2013). The earnings premium associated with going to college has been increasing over time, too. Between 1980 and 2008, the earnings differential between college and high school graduates increased dramatically from 50 percent to 95 percent (Autor, 2010). In general, ample evidence points to the fact that college is a worthwhile investment in one's future. Leslie and Brinkman (1988) further calculate that the private rate of return on an undergraduate degree is between 11.8 and 13.4 percent, and that even this estimate is understated because many students receive financial aid and/or grants that offset the cost of college.

While the earnings differential between high school and college graduates is large, the gap is significantly larger for those who attend selective institutions. Even after controlling for selection effects, there is strong evidence that attending an elite private institution provides a significant earnings premium over attending a less selective institution (Brewer, Eide & Ehrenberg, 1999; Hoxby, 2001). This effect is most pronounced for students who come from low-income backgrounds (Dale & Krueger, 1999).

In light of this, combined with the evidence presented in the previous section, it seems apparent that policymakers should pay particular attention to ensuring that low-income, high-achieving students have equal opportunities to access higher education as compared with their higher-income peers. This not only aligns with our belief in America as a land of opportunity

where meritocracy prevails; it also has the potential to reduce income inequality, arguably the nation's most critical domestic concern.

Low-Income, High-Achieving Students

Hoxby and Avery (2013) show that the vast majority of low-income, high-achieving students in the U.S. do not apply to selective colleges, despite the fact that selective institutions typically cost less and have higher institutional graduation rates than less selective colleges. This application behavior may subsequently lead to academic undermatch, which occurs when a student enrolls in a less selective institution than one which he is qualified to attend.

While students across the socioeconomic status (SES) spectrum are susceptible to undermatch, low-income students are especially vulnerable. Students below the median SES level in the U.S. undermatch 49.6 percent of the time, whereas those above the median SES undermatch only 34 percent of the time. The degree of undermatching is also quite large; 22.7 percent of lower-SES students enroll in a college that is two selectivity levels below what they could have attended (Smith, Pender & Howell, 2012).

Solving the problem of undermatch is an important goal for policymakers, and for good reason. Every year, there are roughly 30,000 low-income, high-achieving students (where "high-achieving" includes those who score in the top 10 percent nationally on the SAT or ACT), which means that highly selective colleges could theoretically increase the proportion of low-income students on their campuses by 30 percent without lowering admissions standards (Giancola & Kahlenberg, 2016). The goal of this paper is to examine the ways that the field of behavioral economics can be used to solve the problem of undermatch, as well as to improve college access for low-income students more generally.

Why Nudge?

A nudge, as Sunstein and Thaler (2009) define it, is "any aspect of choice architecture that alters people's behavior in a predictable way without forbidding any options or significantly changing their economic incentives." Two aspects of nudging are intuitively appealing from a policymaking perspective. First, nudges are typically cheap to implement. Unlike programs like QuestBridge or Posse, which spend lots of money and resources to help low-income students apply to college, nudges operate through simple reminders and reframing of information, among countless other ways. Second, nudges embrace the concept of libertarian paternalism. They are libertarian in the sense that they preserve people's freedom to choose. They are simultaneously paternalistic in the sense that they enable policymakers (or high schools, or colleges, or any other choice architect) to make decisions about what they think will make the chooser's life better (Sunstein & Thaler, 2009).

The next section provides a review of just some of the ways that nudges have been implemented in the world of education and college access.

LITERATURE REVIEW

Review of Information- and Assistance-Based Interventions

Information-Based Interventions

Expanding College Opportunities Project

Hoxby and Avery (2013) show that the vast majority of low-income, high-achieving students do not apply to any selective colleges despite being qualified for admission and success at these institutions. In a landmark study, Hoxby and Turner (2013) build on this research by designing a set of interventions known as the Expanding College Opportunities (ECO) Project. Roughly 40,000 low-income, high-achieving students across the U.S. were randomly assigned to receive different types of information. The most comprehensive form of the intervention, called the Expanding College Opportunities-Comprehensive (ECO-C) Intervention, provided students with application guidance, semi-customized information about the net cost of attending different colleges, and no-paperwork application fee waivers, all for only $6 per student contacted.

Hoxby and Turner found that the ECO-C Intervention had a large effect on these students' college application and enrollment behavior. Students in this condition submitted 48 percent more applications, were 78 percent more likely to be admitted to a peer college, and were 46 more likely to enroll in a peer college. To date, the ECO Project is the most important study showing that the provision of high quality and relevant information about college options to low-income, high-achieving students can have a significant impact on their behavior.

Effects of Test Score Information

There is ample evidence to support the conclusion that low-income, high-achieving students underestimate their competitiveness in the pool of college applicants due to a lack of information about their qualifications. Sitting for a college entrance exam, for example, is an important step in the application process and poses a nontrivial barrier for many students.

Goodman (2012) shows that, in Colorado and Illinois, selective college enrollment increased by about 20 percent after statewide test-taking mandates were implemented. A plausible explanation for this is that students may be pleasantly surprised by their scores, which, in turn, may convince them to apply to and enroll in college. This finding points towards the fact that simply providing students with more information about their academic qualifications can potentially increase their likelihood of applying to selective institutions.

Similarly, Bulman (2012) analyzes data from every SAT and ACT testing facility across the U.S. and finds that students are more likely to attend college if they attend a high school that hosts a test center. The explanation for this is twofold. First, students who attend high schools that double as testing facilities likely have increased awareness about exam dates and receive implicit recommendations from faculty and administrators to take the exam. Second, as in Goodman (2012), taking the test may reveal surprisingly encouraging information to students about their qualifications and may subsequently lead them to apply to college.

Effects of Applying on Enrollment Behavior

In addition to these encouraging findings about the provision of information related to academic qualifications, Smith (2013) finds that the act of applying to colleges in and of itself increases students' likelihood of enrollment. This effect, however, is most pronounced for students applying to very few colleges. Moving from one to two applications and two to three applications increases students' odds of enrolling by 40 percent and 10 percent, respectively (with additionally diminishing probabilities as the number of applications increases). This finding is partly explained by the fact that students who apply to more colleges are likely to be accepted to more, but it is also explained by the mindset that applying to college creates.

At San Marcos High School in Texas, administrators started requiring that students complete an application to nearby Austin Community College in order to graduate. Because all it takes to be admitted to the community college is a completed application and a record of having taken the SAT or ACT, filling out the application was equivalent to being accepted. The requirement of completing an application, combined with a few other nudges, increased the number of San Marcos High students enrolling in Texas colleges by 11 percent (Sunstein & Thaler, 2009). This result corroborates the findings of Smith (2013), namely that the mere act of applying and being accepted to college may change the way students perceive their qualifications as well as the value of higher education.

Finally, Pallais (2015) shows that when the ACT increased the number of free score reports that students could send from three to four, more college applications were completed and low-income ACT-takers in particular attended more selective colleges as a result. As in the previous studies mentioned, this finding shows that the provision of test score information may be especially worthwhile for low-income students. Additionally, the fact that the marginal cost of sending a fourth score report was just $6 before the policy was changed also highlights the possibility that students rely heavily on simple heuristics (i.e., the number of free score reports) when making college application decisions. While this is concerning in some sense, it is also encouraging in the sense that it shows that the college application process is littered with various cognitive biases that are relatively easy to overcome through the use of nudging.

Assistance-Based Interventions

Simplifying the Financial Aid Process

A substantial body of research shows that the application process for federal financial aid is highly complex, and that students and families especially from low-income backgrounds have difficulty navigating it (Dynarski & Scott-Clayton, 2006). The authors write, "The federal system for distributing financial aid rivals the tax code in its complexity." In order to complete the Free Application for Federal Student Aid (FAFSA), one must answer more than a hundred detailed financial questions that require tax forms and other sources. The negative consequences of this complexity are significant. Low-income students may fall behind on application deadlines as a result or even be deterred from matriculating into college altogether (Avery & Kane, 2004).

Several efforts have been made to simplify the process of applying for financial aid. While some of these efforts focus on reducing the complexity of forms themselves (e.g., Dynarski & Wiederspan, 2012), the most noteworthy study involves providing direct personal assistance to low-income families completing the FAFSA (Bettinger, Long, Oreopoulos & Sanbonmatsu, 2012). Working with H&R Block, the researchers provided parents with personal assistance in filling out the forms, as well as information about estimated financial aid packages. Students whose parents received the treatment were more likely to apply for financial aid, receive larger aid packages, and enroll in college. Furthermore, families who received aid information but no assistance with the FAFSA did not experience improved outcomes.

These findings suggest that, while the provision of information may reduce barriers to college access for low-income students in some cases, information alone is not enough. In many cases, individual-specific support and assistance is likely to produce the largest effects.

Using Text Messages as Prompts

In recent years, increased attention has been paid to the effectiveness of text messages as a means of communicating information to high school and college students. In one study, Castleman and Page (2014) sent text reminders to college freshmen with information on how to renew their FAFSA, an important step that students must take in order to retain their financial aid. The authors found that the prompts greatly improved the odds of freshmen at community colleges persisting into their sophomore year. By contrast, the texts did not improve persistence among freshmen at four-year colleges, where the rate of persistence was already high.

In a related study, Castleman and Page (2013) attempt to mitigate the effects of "summer melt," whereby high school graduates who intend to go to college ultimately do not matriculate anywhere after high school. Over the summer, they sent personalized text messages to students with reminders about important tasks to complete. They found that these substantially increased college enrollment, especially among students with less access to quality college counseling.

Text messages are not just effective when communicating with students, either. Kraft and Rogers (2015) demonstrate that they can also be used as a method for teachers to communicate with parents. In fact, when parents of high school students received weekly, individualized text messages about their child's academic performance, the proportion of students failing to receive course credit fell by 41 percent. In other words, the text messages enabled parents to keep better track of their child's weekly progress and, as a result, students' academic success increased.

While text messages are likely not the only answer to the question of how to provide students with personalized assistance, they are nonetheless an effective tool because of the ubiquity of cellphones, especially among young people, and the low cost of intervention.

Individualized College Coaching

The clearest and most traditional example of an assistance-based intervention is college coaching. Barr and Castleman (2016) conducted a long-term randomized controlled evaluation of Bottom Line, an intensive college advising program in Massachusetts, New York, and Illinois, and found that the program had a significant impact on the way that students approached the college application process. Students receiving Bottom Line coaching applied to substantially more colleges and were approximately 30 percent more likely to have reviewed their financial aid options with a professional. Most importantly, students in the Bottom Line program were 14 percent more likely to enroll in a four-year college. They also attended more selective colleges with higher institutional graduation rates.

Similarly, Carrell and Sacerdote (2012) test whether college counseling combined with cash incentives provided to high school students late in their senior year can improve college going and persistence. They find mixed results. First, offering cash incentives alone without coaching has no effect on the college going rate. Second, the program had pronounced effects for women and immigrant students, but smaller effects for non-immigrant men. The most important contribution of the study to the existing body of literature is that college coaching can have a positive impact on high school students who, late in their senior year, are "at the margin" of whether to enroll in college.

While most college coaching programs are focused on the application process, coaching can also be an effective tool to improve college persistence. Bettinger and Baker (2014) test the effectiveness of InsideTrack, a student coaching service that checks in regularly with non-traditional college students to ensure that they are following through on their goals and building practical skills. They find that students who were randomly assigned to receive coaching from

InsideTrack were more likely to persist in college during the treatment period, and most encouragingly, more likely to still be enrolled one year after the coaching program ended.

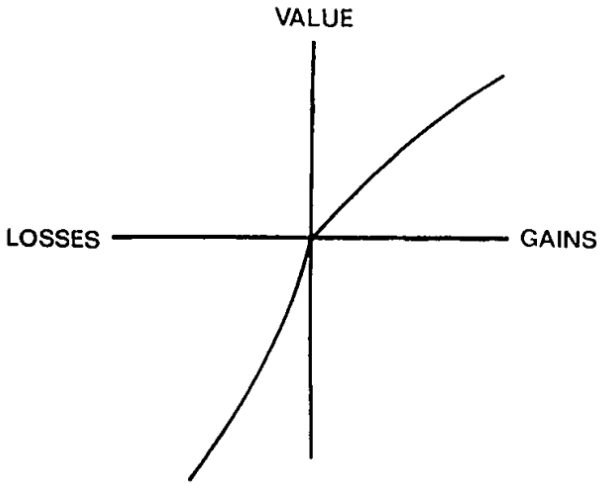
Research findings on the effects of college coaching programs are important, yet this cannot be the only answer. Providing direct coaching is, among other things, more expensive on a per-student basis and less scalable due to a scarcity of qualified college counselors. Moreover, it is also not clear that college coaching qualifies as a "nudge" per se according to the definition given by Sunstein and Thaler (2009). Whereas a nudge operates purely on the psychological level by altering the choice architecture governing certain decision making processes, college coaching resembles more of a "push" towards higher education.

Loss Aversion and Loss Framing

Prospect Theory

Kahneman and Tversky (1979) present an alternative model to expected utility theory as a descriptive model of decision making under uncertainty, known as prospect theory. According to this theory of choice, value is assigned to gains and losses relative to a neutral reference point rather than to absolute utility levels. Kahneman and Tversky demonstrate using empirical evidence that the value function is typically concave for gains, convex for losses, and is generally steeper for losses than for gains (see Figure 1 below).

Figure 1: Prospect Theory Value Function



Loss Aversion

Prospect theory as described above suggests an additional concept known as loss aversion (Tversky & Kahneman, 1991). The central assumption of this theory is that, because the value function is steeper in the negative than in the positive domain, losses and disadvantages have greater impact on preferences than gains and advantages. In other words, losses loom larger than

corresponding gains. The difference is not insignificant, either. Thaler (2015) estimates that losses hurt roughly twice as much as equivalent gains feel good.

This finding is corroborated by evidence in neuroscience and psychology. Kahneman (2011) shows that the amygdala, the area of the brain responsible for threat detection and which is commonly associated with emotional arousal, is strongly activated when subjects are confronted with losses. In an influential paper titled "Bad Is Stronger Than Good," Baumeister, Bratslavsky, Finkenauer, and Vohs (2001) write, "Bad emotions and bad feedback have more impact than good ones, and bad information is processed more thoroughly than the good."

The general conclusion here is that loss aversion is a highly powerful and motivating force in decision making. Dozens of studies have demonstrated its effects, typically by way of two phenomena known as the endowment effect and loss framing.

Endowment Effect

Thaler (1980) explains the endowment effect as the following: "The loss of utility associated with giving up a valued good is greater than the utility gain associated with receiving it." In one experiment, coffee mugs are randomly given to half the subjects in an experiment. A market is then created in which subjects with mugs are told to assign an ask price, and subjects without mugs are told to assign a bid price. Whereas subjects who were not initially given a mug valued it at a median price of $3.12, those who were given a mug (i.e., endowment) valued it at $7.12. This discrepancy confirms the theory of loss aversion insofar as a perceived loss "hurt" the subjects with a mug more than an equivalent perceived gain "felt good" for the subjects without one. Subjects with a mug feared that giving it up would hurt a lot, while subjects without a mug felt that receiving one would feel only pretty good (Kahneman, Knetsch & Thaler, 1991).

Several studies have shown similar effects in natural field experiments. In one study, Houssain and List (2012) show that bonuses framed as losses improved worker productivity at a Chinese factory as compared to bonuses framed as gains. In the positively-framed bonus ("reward") condition, workers were told that if the week's per-hour production reached a certain threshold, a bonus would be paid at the end of the pay period. In the negatively-framed bonus ("punishment") treatment, workers were provisionally given the bonus before the work week began, but were told that if the week's per-hour production did not reach a certain threshold, the bonus would be retracted at the end of the pay period. While the value of the bonus issued was equivalent in both groups, the endowment effect was significant. Worker productivity increased by a statistically significant amount when moving from the reward to the punishment treatment.

Fryer, Levitt, List, and Sadoff (2012) likewise show that teacher bonuses framed as losses are linked to stronger student outcomes than bonuses framed as gains. When teachers were paid in advance and asked to give back the money if their students did not improve sufficiently, math test scores increased by approximately one-third of a standard deviation. As Fryer et al. note, this is equivalent to increasing teacher quality by more than one standard deviation.

Similar findings are observed when loss-framed financial incentives are used to encourage academic performance among high school students in several Chicago schools (Levitt, List, Neckermann & Sadoff, 2012). In this study, students either received $20 cash after a standardized testing session if they improved (gain frame), or received $20 before the testing session and were told that they would keep the reward if they improved and lose it if they did not improve (loss frame). The researchers found that the loss-framed incentives were more likely to produce testing improvements than the gain-framed incentives.

Loss Framing

Loss aversion, however, does not only manifest itself in the form of the endowment effect. A sizable literature (e.g., Bertrand et al., 2010; Tversky & Kahneman, 1981) highlights the powerful effects of a strongly related concept known as loss framing. Whereas the endowment effect is concerned with material gains and losses (i.e., payment is actually given or taken away), loss framing uses the power of language alone to influence decision processes.

Ganzach and Karsahi (1995) demonstrate that loss framing in the context of consumer advertising is much more likely to increase consumer purchases than gain framing. Customers of a credit card company who rarely used their cards received a message explaining the benefits of the card. These benefits were explained either in terms of gains the customers could realize from using the card or in terms of losses they could suffer from not using it (see Figure 2 below).

Figure 2: Credit Card Gain vs. Loss Framing (Ganzach & Karsahi, 1995)

Gain Frame

1. In using ZionCard you can only gain in comparison to using cash!
2. There is no commission on using ZionCard!
3. Using ZionCard does provide you with protection against theft or loss!

Loss Frame

1. In using cash you can only lose in comparison to using ZionCard!
2. There is no commission on using ZionCard!
3. Using cash does not provide you with protection against theft or loss!

Card usage was then monitored for two months after the message. Results showed that the percentage of customers in the loss condition who started to use the card was more than double the percentage observed in the gain condition. The framing effect was not ephemeral, either. In a follow up questionnaire distributed six months later, 66 percent of respondents in the

loss condition could recall the message, as compared to only 43 percent in the gain condition. This suggests that loss framing may have durable, lasting effects as a cognitive nudge.

This literature serves as the basic premise for leveraging the effects of loss framing to encourage more students to apply to college. To date, the financial benefits of attending college are almost exclusively communicated to high school students using gain framing (e.g., "College students earn more, on average, than those who do not attend college"). But the benefits of going to college can just as easily be framed as losses associated with not going to college. As far as we know, no studies have tested the effects of loss framing in this context. This concept forms the basis of the research study's primary question as explained in the "Objectives and Methodology" section.

Perceptions of College Costs and Returns

Present Bias

Contrary to what standard models of time discounting predict, human beings have a tendency to overweight costs and benefits in the present relative to those in the future. This phenomenon is known as quasi-hyperbolic discounting, or more simply, present bias (Thaler, 2015). Using their "beta-delta" model of intertemporal choice, O'Donoghue and Rabin (1999) show that decision makers who are susceptible to their present bias are more likely to procrastinate immediate-cost activities and preproperate (i.e., do to soon) immediate-reward activities. The consequences of the present bias cognitive bias are vast. It can be used as an explanation for behaviors ranging from smoking, to failing to save enough for retirement, to inaccurately weighing the costs and benefits of attending college (Madrian, 2014).

Perceptions of College Costs

Research findings generally report that parents and students overestimate the cost of college tuition by a factor of two or more, and that estimates for community college tuition are more upwardly biased than estimates for four-year colleges. Moreover, cost estimates tend to be more biased among low-income and minority families relative to their higher-income, white counterparts (Avery & Kane, 2004; Ikenberry & Hartle, 1998). Grodsky and Jones (2007) similarly find that there are significant differences in perceptions of college costs stratified by race and social class. Black and hispanic parents are less likely than white parents to be able to accurately estimate tuition costs, as are less educated and lower income parents. Part of the problem, it seems, is that low-income and minority families have poor information when it comes to the costs of college. Given what we know about present bias, this may lead families to overestimate the present cost of attending college.

Perceptions of Returns to College

While parents and students tend to overestimate the costs of attending college, perceptions of the returns to a college degree are generally more accurate. Smith and Powell (1990) find that college seniors have fairly informed expectations of the earnings of other college graduates, although expectations about their own incomes were more skewed. Dominitz and Manski (1996) surveyed high school students and found that, even at a young age, there is a common belief that the returns to a college education are positive. Again, however, they find that students are rather uncertain about their own future earnings.

Avery and Kane (2004) contribute to the existing body of literature by showing that the wage expectations of low-income and higher-income high school students are not only surprisingly accurate, but that the two groups also have remarkably similar expectations to one another despite their different backgrounds.

It seems, therefore, that present bias does not actually prevent students from coming up with relatively accurate estimates of their expected returns to a college education. The bigger problem may be an information gap with respect to college costs. Regardless, the decisions of whether to apply to and attend college are presumably based on a weighing of the present costs against future benefits. This literature on perceived costs and benefits forms the basis of the research study's secondary question as explained in the "Objectives and Methodology" section.

RESEARCH STUDY

Objectives and Methodology

Purpose

Primary Purpose

The primary purpose of this study is to determine whether framing the financial benefits of attending college (i.e., the earnings premium) as a loss is likely to induce students to self-report a higher likelihood of applying to college than when those same benefits are framed as a gain. To clarify, the difference between framing benefits as a gain versus framing as a loss is a purely psychological phenomenon. As a substantive matter, the same exact information is provided in both frames.

For example, one can frame the earnings premium of attending college in terms of the gains one will experience as a result, i.e., "If you go to college, you will earn $21,100 more per year (on average) than if you do not go to college" (Baum, Ma & Payea, 2013). Alternatively, one can frame the same information in terms of the losses one will experience by not going to college, i.e., "If you do not go to college, you will earn $21,100 less per year (on average) than if you go to college." While both statements provide the same substantive information, the former uses gain framing whereas the latter leverages loss framing.

Secondary Purpose

A secondary purpose of this study is to assess whether providing any earnings premium information, framed as a loss or gain, is likely to induce students to self-report a higher likelihood of applying to college as compared to not providing any earnings premium information at all. Here, the issue is substantive and not merely a matter of framing. Students who receive earnings premium information are given substantively more information upon which to base their college application behavior than those who do not.

Note on Undermatching

Another goal of this study is to determine whether the effects of providing earnings premium information (framed as a gain or loss) are especially impactful for high-achieving students who may be vulnerable to undermatching, or applying to and enrolling in less selective institutions than those for which they are qualified to attend. As such, part of the study involves asking students about their likelihood of applying to specific colleges, not just college in general.

Target Population

Population Characteristics

The target population of this study includes high school students from the South Side of Chicago, a predominantly low-income area of the city. Specifically, students are high school sophomores and juniors at three charter schools in the city: (1) Catalyst Maria Charter School, located in the Chicago Lawn neighborhood; (2) Chicago International Charter School (CICS) Longwood, located in the Washington Heights neighborhood; and (3) UChicago Charter School Woodlawn Campus, located in the Woodlawn neighborhood.

The study focuses on sophomores and juniors because these students are far enough along in their high school careers to be thinking about post-high school plans, but not so far along (i.e., seniors) that they would have already applied to college. The problem with surveying seniors is that, by the time surveys were administered in March 2016, seniors have already presumably applied to college. Asking about their likelihood of applying to college after the fact, then, could potentially be a confounding factor in the study.

School Access

The study focuses on charter schools because they present fewer regulatory hurdles than Chicago Public Schools, which would have required that a Research Review Board (which meets only once every six weeks) approve the proposed research study. Charter schools, on the other hand, have more flexibility to administer the survey without formal regulatory approval. Finally, access to these specific schools was gained through personal referrals to administrators.

Survey Design [See Appendix A for complete survey]

Randomized Controlled Design

Using the Qualtrics Block Randomization feature, students were randomly assigned to complete one of three versions of the survey: control, gain frame, or loss frame. This feature not only randomly assigns students to one condition as soon as they click the survey link; it also ensures that students are evenly distributed among the three conditions.

Selection of Colleges

In all three conditions, students were asked about their likelihood of applying to college in general, as well as their likelihood of applying to five specific colleges. These include: (1) Northwestern University, (2) University of Illinois at Urbana-Champaign, (3) University of Illinois at Chicago, (4) Northeastern Illinois University, and (5) Columbia College Chicago.

These five colleges were chosen for two reasons. First, each is classified under a different selectivity category according to Barron's Profile of American Colleges. These categories are, in corresponding order with the list above: (1) "Most Competitive," (2) "Highly Competitive," (3) "Very Competitive," (4) "Competitive," and (5) "Less Competitive." The purpose of including

one college from each selectivity category is to analyze whether providing earnings premium information has an especially profound effect for certain types of colleges more than others.

The second reason these specific colleges were chosen is that they are all located in Illinois and, with the exception of the University of Illinois at Urbana-Champaign, in the Chicago metropolitan area. As previous research has shown, geographical proximity is an important factor when students are deciding where to apply to and enroll in college (e.g., Eagan et al., 2014). A student from the Chicago area is much more likely to apply to a college in Chicago than a college across the country, for example. Additionally, four out five of these (Northwestern is the exception) are among the seven most commonly enrolled four-year colleges for Chicago high school students (Nagaoka, Roderick & Coca, 2009).

Net Cost and Earnings Premium Data

When asked about their likelihood of applying to college in general, students in the gain and loss conditions were told that the earnings premium of attending college as compared to high school graduates is $21,100 per year (Baum, Ma & Payea, 2013).

Net cost and earnings premium data for specific colleges was obtained from the U.S. Department of Education's College Scorecard. Average annual net cost information was given based on the assumption that students' household income is in the $0-$30,000 bracket. It should be noted, though, that only 36% of households in the neighborhoods studied have a medium income of $35,000 or less (U.S. Census Bureau, 2014). While the net cost information provided could have presumably been based on the assumption that students' household income is in the $30,001-$48,000 bracket, this may have overstated the net cost for certain students. As such, the lower bracket was selected. A summary of the average annual net cost data (where the dollar amount is rounded to the nearest hundred) for the five schools is shown here in Figure 3:

Figure 3: Average Annual Net Cost Information

School	Average Annual Net Cost
Northwestern University	$15,800
University of Illinois at Urbana-Champaign	$8,000
University of Illinois at Chicago	$9,600
Northeastern Illinois University	$14,800
Columbia College Chicago	$26,600

Earnings premium data was also retrieved from the College Scorecard. According to the website, the average annual salary of workers in the U.S. with only a high school diploma is $34,300. For each of the five colleges, the website provides the median earnings of former students of that college who received federal financial aid, at 10 years after entering the school. To calculate the earnings premium, the difference between these two figures was calculated. A summary of the earnings premium data is shown here in Figure 4:

Figure 4: Average Earnings Premium Information

School	Annual Earnings Premium
Northwestern University	$39,100
University of Illinois at Urbana-Champaign	$31,600
University of Illinois at Chicago	$26,600
Northeastern Illinois University	$11,000
Columbia College Chicago	$7,700

It is perhaps interesting to observe the positive correlation between college selectivity and earnings premium. This fact should reaffirm our belief that undermatch is an important problem to solve if increasing intergenerational mobility and ameliorating income inequality are part of our national policymaking goals.

Admissions Selectivity Information

In addition to net cost and earnings premium data, students were also given two metrics to gauge admissions selectivity (Barron's ratings were not shown): acceptance rate and ACT interquartile range. These were obtained from U.S. News & World Report and The Princeton Review, respectively. The purpose of this was to provide students with a "reality check." For example, a student in the gain condition who sees that the earnings premium associated with attending Northwestern is $39,100 may be very tempted to report that he is "extremely likely" to apply. But if that student has poor academic credentials, then it is most likely not in his best interest to apply to Northwestern. Without providing this reality check, it is possible that survey responses would be overly enthusiastic and findings of the study would therefore be misleading.

Note on Simplification

The information conveyed by this survey is complex by nature. Asking high school students to process net cost, earnings premium, and selectivity information, and then make a decision about their likelihood of applying, is no easy task. Furthermore, out of respect for students' time, the survey was designed to take no longer than 10 minutes to complete.

As such, several efforts were made to simplify the survey-taking procedure for students and guide their attention appropriately. First, for students in the gain and loss conditions, the words "more" and "less," respectively, were bolded and underlined. Second, when students were

asked about specific colleges, they were provided with a table summarizing the selectivity and net cost information for all five colleges, not just the one in question. This was to ensure that students were making relevant comparisons and not considering any one college in a vacuum. That said, the college in question was always highlighted blue in the table. Finally, earnings premium and net cost information was rounded to the nearest hundred dollars in all cases.

Background Questions

In addition to the randomized controlled portion of the survey, all students regardless of condition were also asked several background questions. The first two questions asked what students' post-high school plans are and what, if any, concerns they have when thinking of applying to college. As explained in the "Results and Data Analysis" section, the first question was primarily used to ensure that students who reported that they planned on taking a job or enlisting in the military after high school would not be included in the study. The second question was primarily used to determine whether students who are concerned about college cost would be especially influenced by the provision of net cost and earnings premium information.

At the end of the survey, students were asked several additional background questions about what high school they attend, their grade level, ACT score, unweighted GPA, highest level of intended math, parental educational attainment, and how invested they feel their parents are in their children's education.

Survey Administration

Access to administrators at the three target schools was secured in late February and early March. Soon thereafter, these administrators communicated with teaching staff, who were responsible for administering the surveys.

The survey was designed and administered online using Qualtrics. On March 22, 2016, the survey link was sent to teachers at all three schools. At various points during the following three weeks, teachers sent the survey link to their students, who completed it online. On April 12, 2016, the survey was closed.

To incentivize participation in the study, every teacher who administered the survey was promised a $20 Amazon gift card. These will be distributed in late May 2016.

Unfortunately, administrators at UChicago Charter School Woodlawn Campus encountered logistical difficulties that prevented them from administering the survey according to plan. While the survey link was ultimately given to students on April 10, 2016, very few responses were recorded before the survey was closed two days later.

Research Timeline

February 28, 2016: First contact with Chicago International Charter School (CICS) Longwood

March 8, 2016: First contact with Catalyst Maria Charter School

March 8, 2016: IRB initial submission

March 17, 2016: First contact with UChicago Charter School

March 18, 2016: IRB submission approved

March 19, 2016: Parental consent opt-out form sent to schools

March 22, 2016: Qualtrics survey released to students

April 10, 2016: Data collection and analysis begins

April 12, 2016: Survey closed

Institutional Review Board Approval Process

Institutional Review Board (IRB) approval was sought in the event that the findings of this study are ever shared in a non-classroom setting. On March 8, 2016, the initial Human Subjects Electronic Research Application was submitted to Penn's Office of Regulatory Affairs.

The IRB officer commented that, because the study includes minors under the age of 18, parental consent would be required. This requirement was partially voided in accordance with 45 CFR 46.116(d), which says that parental consent is not necessary when the research involves no more than minimal risk to subjects and could not be practicably carried out without a waiver for the requirement. Despite this, the IRB submission was approved on March 18, 2016 under the condition that all parents receive an opt-out consent form (Appendix C) before the survey was given. This was sent to schools on March 19, 2016 and subsequently sent home with students.

Results and Data Analysis

Background Information

Survey Completion

Between March 22, 2016 and April 12, 2016, 279 survey responses were recorded, although not all surveys were fully completed.

This was lower than the anticipated number of responses due to logistical difficulties that prevented administrators at UChicago Charter School Woodlawn Campus from distributing the survey link according to plan. Had UChicago been able to administer the survey, this would have increased the number of survey responses by approximately 175 students.

Removals

While 279 responses were recorded, only 237 students were ultimately included in the sample size that was used for data analysis. A total of 42 students were removed from the sample size for several reasons explained below.

Five students did not agree to the consent language provided on the opening page of the survey and thus did not complete any of the survey past this point.

Eighteen students were removed because of their stated post-high school plans. Six students reported that they plan on taking a job immediately after high school and 12 students reported that they plan on enlisting in the military. To avoid complications with data analysis (e.g., students who intend to enlist in the military might report that they are "extremely unlikely" to apply to any college), these students were removed from the study.

Seven students from UChicago Charter School Woodlawn Campus eventually responded to the survey, but only after data analysis commenced on April 10, 2016. These students were thus removed from the study altogether.

Finally, 12 students started the survey but did not fully complete it. Students ended the survey at different points. Some completed questions about their likelihood of applying to specific colleges but did not answer background questions at the end, while others quit before reporting their likelihood of applying. In order to ensure that the dataset was complete, these students were removed.

Sample Size Characteristics

School and Grade Level

Of the 237 students included in the study, 145 students (61 percent) were from Chicago International Charter School (CICS) Longwood and 92 students (39 percent) were from Catalyst Maria Charter School. With respect to grade level, the study included 152 juniors (64 percent) and 85 sophomores (36 percent).

Intended Post-High School Plans

By far the most common intended post-high school plan is to attend four-year or two-year college; 205 students (86 percent) recorded this option. Next, 27 students (11 percent) reported being undecided. Finally, five students (2 percent) said they intend to enroll in a technical college after high school.

Concerns When Applying to College

The most commonly reported concern that students have when applying to college is the high cost of attendance; 169 students (71 percent) recorded this option. Next, 76 students (32 percent) reported being concerned about attending college far from home. Next, 72 students (30 percent) reported being concerned about the difficulty of the application process. Next, 59 (25

percent) said they are worried that they would not do well in college. Finally, in the free response field, seven students (3 percent) expressed some sort of concern about whether their academic qualifications would prevent them from getting into the college of their choice.

Academic Credentials

Students were asked about their academic performance on three dimensions: ACT score, unweighted high school GPA, and highest level of math they intend to take in high school.

Given that the survey was administered to sophomores and juniors, very few had taken the ACT and received their scores by the time of survey administration. In fact, only 21 students (9 percent) of students reported an ACT score. As a result, this was not used as a metric of academic achievement during data analysis.

All students, however, reported their unweighted high school GPA (out of 4.0). The average reported GPA was 2.97. The standard deviation was 0.56. Although the two schools may have slightly different grading standards, GPA was used as the primary metric of academic achievement due to the fact that it was reported by all students.

Finally, students were asked about the highest level of math they intend to take before graduating high school. Precalculus/trigonometry was the most common response; 75 students (32 percent) recorded this option. Next, 68 students (29 percent) reported calculus. Next, 63 students (27 percent) reported algebra. Finally, 31 students (13 percent) reported geometry.

Parents' Educational Attainment

When asked about their mother's highest level of educational attainment, 74 students (31 percent) reported a college degree or higher, 52 students (22 percent) said they did not know, 51

students (22 percent) reported some college, 35 students (15 percent) reported a high school degree, and 25 students (11 percent) reported no high school degree.

The overall level of of educational attainment among fathers was slightly lower; 87 students (37 percent) said they did not know, 52 students (22 percent) reported a high school degree, 43 students (18 percent) reported a college degree or higher, 29 students (12 percent) reported no high school degree, and 26 students (11 percent) reported some college.

Parents' Belief in Importance of Education

When students were asked how much their parents care about their children's education, 213 students (90 percent) reported that their parents care a lot, 17 students (7 percent) reported that their parents care somewhat, five students (2 percent) reported that their parents do not care much, and two students (1 percent) reported that their parents do not care at all. Given that the vast majority of students reported that their parents care a lot, the data collected from this question was not used during the analysis.

Results of Randomized Controlled Portion (All Students)

Random Assignment

Students were randomly assigned to one of three conditions: control, gain, or loss. In total, 75 students were assigned to the control condition, 80 to the gain condition, and 82 to the loss condition. While Qualtrics assigned an equal number of students to each of the three conditions, the reason that the sample size here is not evenly distributed is that 42 students were removed from the study.

Internal Validity

To ensure that composition of each of the three groups was representative of the total sample size of 237 students, chi-squared tests were performed for several characteristics: (1) whether students were concerned about college cost, (2) high school, (3) grade, (4) mother's education level, and (5) father's education level. The purpose of this was to ensure that, for example, a disproportionate number of students concerned about cost were not assigned to the gain condition as compared to the loss condition.

The full results of the chi-squared tests are shown in Appendix D. A summary of the results is shown here in Figure 5:

Figure 5: Sample Representativeness (All Students)

	Chi-square value	**Significance**
Cost Concern	1.462	0.481
High School	0.423	0.809
Grade	0.105	0.949
Mother's Education	6.321	0.611
Father's Education	10.483	0.233

Given that the p-values of all five characteristics are much larger than 0.05, this indicates that there are no statistically significant differences between the three groups along these dimensions. As such, the three groups are representative of the total sample size and the study has internal validity.

Coding

Students were asked to report their likelihood of applying to various colleges (and college in general) on a five point Likert scale that used the following language: "Extremely likely,"

Somewhat likely," "Neither likely nor unlikely," "Somewhat unlikely," and "Extremely unlikely." For the purposes of data analysis, these responses were coded numerically. "Extremely likely" was coded as 5, "Somewhat likely" was coded as 4, "Neither likely nor unlikely" was coded as 3, "Somewhat unlikely" was coded as 2, and "Extremely unlikely" was coded as 1.

College (General)

The mean reported likelihood of applying to college was 4.56 in the control, 4.31 in the gain, and 4.34 in the loss condition. None of the differences were statistically significant. The fact that the mean likelihood of applying in the control condition was higher than in the gain and loss conditions is curious, but the lack of statistical significance should prevent us from jumping to conclusions based on this finding. A summary of the descriptive data and one-way ANOVA post-hoc test is shown here in Figure 6:

Figure 6: College (General) [All Students]

Condition	Mean	Std. Deviation	Comparison Condition	Mean Difference	Sig.
Control	4.5600	.77529	Gain	.24750	.191
			Loss	.21854	.269
Gain	4.3125	.85082	Control	-.24750	.191
			Loss	-.02896	.976
Loss	4.3415	.99653	Control	-.21854	.269
			Gain	.02896	.976

Northwestern University

The mean reported likelihood of applying to Northwestern University was 3.01 in the control, 3.96 in the gain, and 3.74 in the loss condition. The difference between the control and gain conditions was statistically significant, as was the difference between the control and loss conditions. The difference between the gain and loss conditions, however, was not significant. A summary is shown here in Figure 7:

Figure 7: Northwestern University (All Students)

Condition	Mean	Std. Deviation	Comparison Condition	Mean Difference	Sig.
Control	3.0133	1.26804	Gain	-.94917	.000
			Loss	-.73057	.000
Gain	3.9625	.98654	Control	.94917	.000
			Loss	.21860	.442
Loss	3.7439	1.15268	Control	.73057	.000
			Gain	-.21860	.442

University of Illinois at Urbana-Champaign

The mean reported likelihood of applying to the University of Illinois at Urbana-Champaign was 3.51 in the control, 3.88 in the gain, and 3.60 in the loss condition. None of the differences were statistically significant. A summary is shown here in Figure 8:

Figure 8: University of Illinois at Urbana-Champaign (All Students)

Condition	Mean	Std. Deviation	Comparison Condition	Mean Difference	Sig.
Control	3.5067	1.01839	Gain	-.36833	.083
			Loss	-.09089	.856
Gain	3.8750	1.05991	Control	.36833	.083
			Loss	.27744	.226
Loss	3.5976	1.12062	Control	.09089	.856
			Gain	-.27744	.226

University of Illinois at Chicago

The mean reported likelihood of applying to the University of Illinois at Chicago was 3.76 in the control, 3.79 in the gain, and 3.80 in the loss condition. None of the differences were statistically significant. A summary is shown here in Figure 9:

Figure 9: University of Illinois at Chicago (All Students)

Condition	Mean	Std. Deviation	Comparison Condition	Mean Difference	Sig.
Control	3.7600	.99784	Gain	-.02750	.985
			Loss	-.04488	.959
Gain	3.7875	.98974	Control	.02750	.985
			Loss	-.01738	.994
Loss	3.8049	1.05922	Control	.04488	.959
			Gain	.01738	.994

Northeastern Illinois University

The mean reported likelihood of applying to Northeastern Illinois University was 3.64 in the control, 3.56 in the gain, and 3.51 in the loss condition. None of the differences were statistically significant. A summary is shown here in Figure 10:

Figure 10: Northeastern Illinois University (All Students)

Condition	Mean	Std. Deviation	Comparison Condition	Mean Difference	Sig.
Control	3.6400	1.19277	Gain	.07750	.897
			Loss	.12780	.742
Gain	3.5625	.97881	Control	-.07750	.897
			Loss	.05030	.953
Loss	3.5122	1.08005	Control	-.12780	.742
			Gain	-.05030	.953

Columbia College Chicago

The mean reported likelihood of applying to Columbia College Chicago was 3.55 in the control, 3.30 in the gain, and 3.12 in the loss condition. None of the differences were statistically significant. A summary is shown here in Figure 11:

Figure 11: Columbia College Chicago (All Students)

Condition	Mean	Std. Deviation	Comparison Condition	Mean Difference	Sig.
Control	3.5467	1.33855	Gain	.24667	.458
			Loss	.42472	.099
Gain	3.3000	1.17355	Control	-.24667	.458
			Loss	.17805	.652
Loss	3.1220	1.33694	Control	-.42472	.099
			Gain	-.17805	.652

Results of Randomized Controlled Portion (High-Achieving Students)

Definition of "High-Achieving" Students

Existing literature (e.g., Hoxby & Avery, 2013) typically defines "high-achieving" students as those with a GPA of 3.70 or higher. However, defining it as such for the purposes of this study would have limited the sample size to only 34 students. Therefore, "high-achieving" students here are defined as those with a GPA of 3.50 or higher. In doing so, the sample size is slightly expanded to include 50 students.

Random Assignment

As in the previous analysis, students were randomly assigned to one of three conditions: control, gain, or loss. Of the 50 students included in this analysis, 18 were assigned to the control condition, 16 to the gain condition, and 16 to the loss condition.

Internal Validity

As before, five separate chi-squared tests were performed to ensure that composition of each of the three groups was representative of the total sample size of 237 students. A summary of the results is shown here in Figure 12 (the full results can be found in Appendix D):

Figure 12: Sample Representativeness (GPA 3.5+)

	Chi-square value	**Significance**
Cost Concern	2.287	0.319
High School	0.625	0.732
Grade	0.112	0.946
Mother's Education	5.122	0.744
Father's Education	5.250	0.731

Given that the p-values of all five characteristics are much larger than 0.05, this indicates that there are no statistically significant differences between the three groups along these dimensions. As such, the three groups are representative of the total sample size and this portion of the analysis has internal validity.

College (General)

Among students with a GPA of 3.50 or higher, the mean reported likelihood of applying to college was 4.94 in the control, 4.81 in the gain, and 4.75 in the loss condition. None of the differences were statistically significant. As before, the fact that the mean likelihood of applying in the control condition was higher than in the gain and loss conditions is curious, but the lack of statistical significance should give us pause. A summary of the descriptive data and one-way ANOVA post-hoc test is shown here in Figure 13 (the full results can be found in Appendix B):

Figure 13: College (General) [GPA 3.5+]

Condition	Mean	Std. Deviation	Comparison Condition	Mean Difference	Sig.
Control	4.9444	.23570	Gain	.13194	.554
			Loss	.19444	.284
Gain	4.8125	.40311	Control	-.13194	.554
			Loss	.06250	.881
Loss	4.7500	.44721	Control	-.19444	.284
			Gain	-.06250	.881

Northwestern University

The mean reported likelihood of applying to Northwestern University was 3.22 in the control, 4.25 in the gain, and 4.06 in the loss condition. The difference between the control and gain conditions was statistically significant, while the other two differences were not. A summary is shown here in Figure 14:

Figure 14: Northwestern University (GPA 3.5+)

Condition	Mean	Std. Deviation	Comparison Condition	Mean Difference	Sig.
Control	3.2222	1.30859	Gain	-1.02778	.050
			Loss	-.84028	.133
Gain	4.2500	1.06458	Control	1.02778	.050
			Loss	.18750	.905
Loss	4.0625	1.34009	Control	.84028	.133
			Gain	-.18750	.905

University of Illinois at Urbana-Champaign

The mean reported likelihood of applying to the University of Illinois at Urbana-Champaign was 3.78 in the control, 4.31 in the gain, and 3.44 in the loss condition. None of the differences were statistically significant. A summary is shown here in Figure 15:

Figure 15: University of Illinois at Urbana-Champaign (GPA 3.5+)

Condition	Mean	Std. Deviation	Comparison Condition	Mean Difference	Sig.
Control	3.7778	1.26284	Gain	-.53472	.352
			Loss	.34028	.651
Gain	4.3125	.79320	Control	.53472	.352
			Loss	.87500	.078
Loss	3.4375	1.20934	Control	-.34028	.651
			Gain	-.87500	.078

University of Illinois at Chicago

The mean reported likelihood of applying to the University of Illinois at Chicago was 4.00 in the control, 4.00 in the gain, and 4.13 in the loss condition. None of the differences were statistically significant. A summary is shown here in Figure 16:

Figure 16: University of Illinois at Chicago (GPA 3.5+)

Condition	Mean	Std. Deviation	Comparison Condition	Mean Difference	Sig.
Control	4.0000	1.02899	Gain	.00000	1.000
			Loss	-.12500	.949
Gain	4.0000	1.15470	Control	.00000	1.000
			Loss	-.12500	.952
Loss	4.1250	1.36015	Control	.12500	.949
			Gain	.12500	.952

Northeastern Illinois University

The mean reported likelihood of applying to Northeastern Illinois University was 3.78 in the control, 3.56 in the gain, and 3.69 in the loss condition. None of the differences were statistically significant. A summary is shown here in Figure 17:

Figure 17: Northeastern Illinois University (GPA 3.5+)

Condition	Mean	Std. Deviation	Comparison Condition	Mean Difference	Sig.
Control	3.7778	1.35280	Gain	.21528	.866
			Loss	.09028	.975
Gain	3.5625	.96393	Control	-.21528	.866
			Loss	-.12500	.955
Loss	3.6875	1.30224	Control	-.09028	.975
			Gain	.12500	.955

Columbia College Chicago

The mean reported likelihood of applying to Columbia College Chicago was 3.61 in the control, 3.44 in the gain, and 3.25 in the loss condition. None of the differences were statistically significant. A summary is shown here in Figure 18:

Figure 18: Columbia College Chicago (GPA 3.5+)

Condition	Mean	Std. Deviation	Comparison Condition	Mean Difference	Sig.
Control	3.6111	1.41998	Gain	.17361	.932
			Loss	.36111	.737
Gain	3.4375	1.26326	Control	-.17361	.932
			Loss	.18750	.925
Loss	3.2500	1.52753	Control	-.36111	.737
			Gain	-.18750	.925

Discussion

Qualitative Analysis

Effects of Providing Net Cost and Earnings Premium Information

In general, we find that very few of the differences between the control, gain, and loss conditions are statistically significant. This is likely due to relatively small sample size and, as a result, low statistical power of the study.

That said, three of the differences were indeed significant: (1) control vs. gain for Northwestern (all students), (2) control vs. loss for Northwestern (all students), and (3) control vs. gain for Northwestern (high-achieving students). These findings, while not the primary aim of this study, are nonetheless encouraging. Without average earnings premium information, students may believe that Northwestern is not worth applying to because it will cost too much, the investment will not be worthwhile, it is too hard to get in, or for other reasons.

When given earnings premium information framed as a gain (in the case of all students and high-achieving students) or loss (in the case of all students, but not high-achieving students), however, students reported a significantly higher likelihood of applying to Northwestern. It should be noted that, for high-achieving students, the reason that the difference between the control and loss conditions was not significant is likely due to small sample size. Given a larger sample size, it is reasonable to expect that the findings of the analysis of high-achieving students would match those in the analysis of all students.

These findings are important because they show that, for the most selective institutions (Northwestern falls under the "Most Competitive" category according to Barron's), there may be an especially large information gap between what students think net costs and average earnings premiums are, and what they actually are. Moreover, this study shows that "pushing" this

information directly to students, as opposed to having them "pull" the information for themselves, makes a difference. All of the cost and earnings premium information contained in this survey is widely available online (the Department of Education's College Scorecard, in particular), but mere availability does not mean that all students will receive and process this information. Pushing the information to students as they are thinking about their college options thus may reduce cognitive barriers and induce more students to apply.

While this finding is certainly encouraging, it is also not especially novel. For example, Oreopoulos and Dunn (2013) have shown that when low-income students in Toronto were exposed to information about the benefits of college attendance and were invited to use a financial aid calculator, they reported significantly higher expected returns, lower concerns about cost, and greater likelihood of applying to college. Similarly, Jensen (2010) surveyed students in the Dominican Republic and found that students' perceived returns to schooling are quite low despite high measured returns. When students were given information about the measured returns, they reported increased perceived returns several months later.

Therefore, while these findings are not novel per se, they are still meaningful. For high-achieving students in particular, the effects of providing net cost and earnings premium information are profound. High-achieving students in the control condition reported a 3.22 average likelihood of applying to Northwestern, while those in the gain condition averaged 4.25. If part of the aim of this study is to encourage more low-income, high-achieving students to apply to selective colleges, then an increase of more than a full point should give us cause for optimism.

Effects of Loss Framing

There were four instances in which the reported likelihood of applying in the loss condition was greater than in the gain condition. These were: (1) college in general (all students), (2) University of Illinois at Chicago (all students), (3) University of Illinois at Chicago (high-achieving students), and (4) Northeastern Illinois University (high-achieving students).

In all cases, though, the difference between the reported likelihood of applying in the gain condition versus the loss condition was not statistically significant. This is likely due to the study's relatively small sample size, as previously discussed. That said, it is not clear whether the gain or loss frame would be more effective given a larger sample size (or whether there would be a difference at all). In any case, we conclude that the hypothesis of this study – that providing students with earnings premium data framed as a loss will induce greater reported likelihood of applying to college than information framed as a gain – cannot be accepted or rejected.

Additional Considerations

It is potentially worthwhile to examine whether additional subsets of the total sample size have varying reported likelihoods of applying. First, it is possible that students who list the high cost of college as one of their concerns will be especially receptive to the net cost and earnings premium information. For all students and only high-achieving students, though, we find there are no significant differences. Figures 19 and 20 summarize the findings, where the number outside the parentheses is the likelihood of applying among students concerned about cost, and the number inside the parentheses is the likelihood of applying among students in the entire sample size.

Figure 19: Likelihood of Applying Among Students with Cost Concerns (All Students)

	College (General)	Northwestern University
Control	4.58 (4.56)	3.02 (3.01)
Gain	4.33 (4.31)	4.02 (3.96)
Loss	4.34 (4.34)	3.64 (3.74)

Figure 20: Likelihood of Applying Among Students with Cost Concerns (GPA 3.5+)

	College (General)	Northwestern University
Control	4.92 (4.94)	3.50 (3.22)
Gain	4.79 (4.81)	4.43 (4.25)
Loss	4.77 (4.75)	3.92 (4.06)

It is also possible that students from higher socioeconomic status (where parental educational attainment level serves as a proxy of SES) are more receptive to net cost and earnings premium information. Here, higher SES is defined as having at least one parent with a college degree or higher (88 out of 237 students in the total sample size). Figures 21 and 22 show the results.

Figure 21: Likelihood of Applying Among Students with Higher SES (All Students)

	College (General)	Northwestern University
Control	4.85 (4.56)	3.08 (3.01)
Gain	4.39 (4.31)	4.40 (3.96)
Loss	4.44 (4.34)	3.68 (3.74)

Figure 22: Likelihood of Applying Among Students with Higher SES (GPA 3.5+)

	College (General)	Northwestern University
Control	5.00 (4.94)	2.40 (3.22)
Gain	4.78 (4.81)	4.44 (4.25)
Loss	4.71 (4.75)	4.00 (4.06)

We find that, for all students as well as just high-achieving students, there are generally no significant differences between students with higher SES and the total sample size. The few seemingly large discrepancies should be attributed to very small sample size. For example, the fact that high-achieving, higher SES students in the control condition report an average 2.40 likelihood of applying to Northwestern is concerning at first, until we realize that this an average of only five students.

Explanation of Failed Hypothesis

The hypothesis cannot be accepted, which may be surprising (and disappointing) at first glance. There is, however, a potential explanation for why the hypothesis failed, and it lies in a concept known as reference dependence, which stems from Kahneman and Tversky's (1979) original prospect theory.

Koszegi and Rabin (2006) show that how a person assesses the outcome of a choice is often determined as much by its contrast with a reference point as by intrinsic taste for the outcome itself. This is known as having reference dependent preferences. Camerer, Babcock, Loewenstein, and Thaler (1997) providence evidence of this phenomenon in an unusual setting: the working habits of New York City cab drivers. They find that, in a given day, cab drivers typically work only as many hours as they need to in order to hit a daily income target they have set for themselves. Once they hit the income target, they typically quit for the day, ignoring opportunities to make even more money on especially profitable days, like when it is raining. This behavior contradicts what standard economic theory predicts, but is consistent with a model of reference dependent decision making. The decision to stop working has more to do with the cab driver's reference point (i.e., his daily income target) than it does with his intrinsic taste for the outcome itself (i.e., to earn more money).

Pope and Schweitzer (2011) provide similar evidence of reference dependency and, more specifically, loss aversion. They note that, in golf, the par value of a hole actually makes for a very salient reference point. Shooting one stroke over par is known as a bogey, while shooting one stroke under par is a birdie. Of course, the fewer the strokes, the better. By analyzing over 2.5 million putts on the PGA Tour, they find that players are more successful when shooting to avoid a bogey than when they are shooting to achieve a birdie. In other words, if par is the relevant reference point, then players typically invest more focus in order to avoid a loss than they do in order to realize a gain.

The parallel with the findings here may not be intuitively obvious. The students in this study come from predominantly low-income communities. Growing up in this environment may, over time, lead them to believe that they will earn a similarly low income as adults. In other words, this low income level becomes the student's reference point. The possibility of gaining an additional $39,100 more per year by attending Northwestern, then, seems very attractive relative to the reference point. For the low-income student, going to Northwestern (or any college at all) is equivalent to the golfer who shoots for birdie.

By contrast, consider a student of much higher socioeconomic status. For this student, having a high income is expected; this is his reference point. The possibility of attending Northwestern and earning $39,100 more than the average high school graduate, therefore, is not especially appealing. After all, this is what he expects to happen. On the other hand, for the high-income student, not going to Northwestern and not earning $39,100 more than the average high school graduate feels like a loss. For the high-income student, not going to Northwestern (or college in general) is equivalent to the golfer who shoots to avoid a bogey.

All of this suggests that loss framing may have been more effective had the target population of this study been high-income students. This is probably true, but what can be done about low-income students? Is loss framing a hopeless cause for them? We turn to this question in the section entitled “Areas for Further Research.”

Study Limitations

Issues with Experimental Design

Small Sample Size

As previously mentioned, the study suffers greatly from small sample size and, as a result, low statistical power. Not only does the full sample only include 237 students, but this is split further among three conditions. The result, as we have seen, is that very few (three, to be exact) of the differences between conditions are statistically significant. Furthermore, none of the differences between gain and loss conditions – the primary focus of this study – are significant. It is possible that loss framing is simply an ineffective intervention, but it is also possible that the small sample size prevents us from knowing whether or not this is the case.

Had UChicago Charter School Woodlawn Campus been able to participate in the study, the total sample size would have increased by approximately 175 students, taking the total to approximately 400 students. This could have potentially led to more statistically significant findings, but it is hard to tell. Only with a much larger sample size could we be more certain.

Students Attend College-Focused Charter Schools

While working with charter schools was beneficial in the sense that it meant fewer regulatory hurdles, there are potential complications with focusing exclusively on charters. More so than traditional public schools, charters typically place extra emphasis on the value of higher education. In fact, Booker, Gill, Sass, and Zimmer (2014) show that charter high school enrollment in Chicago leads to an 11 percentage point increase in the probability of attending college, as compared to traditional public high school enrollment.

Whereas the college enrollment rate of Chicago Public School students in 2014 was approximately 41 percent, the enrollment rates of the three charter schools in this study are

significantly higher (Nagaoka, Roderick & Coca, 2009). At Chicago International Charter School (CICS) Longwood, 72 percent of graduates in the class of 2014 enrolled in college the following fall. At Catalyst Maria Charter School, 44 percent of 2014 graduates enrolled in college (CPS 2015 School Quality Rating Report). Finally, while UChicago Charter School Woodlawn Campus was not included in the study, it is worthwhile to note that the school enrolls 83 percent of students in college and has a 100 percent college acceptance rate (UChicago Report).

The fact that these charter schools constantly emphasize the value of college to their students is a potentially confounding factor in the study, particularly as it relates to the difference we would observe between the control vs. gain and control vs. loss conditions. If students are already well-informed about the benefits of attending college, then receiving earnings premium information (framed as a gain or loss) will likely have less of an effect.

Use of Specific Colleges

Another potential problem with the study's design is that students were asked to report their likelihood of attending specific colleges.While this was an important and perhaps necessary feature in order to understand the effects on undermatching, it may have introduced confounding factors into the study. For example, a student might report high likeliness of applying to the University of Illinois at Urbana-Champaign not because of the earnings premium information provided, but because he is a fan of the school's football team. Conversely, another student may report low likelihood of applying to Northeastern Illinois University not because of the information that is presented, but because she has an older friend who went there and did not enjoy the experience. In sum, there are a myriad of potential problems associated with asking students about their likelihood of attending specific colleges. One question for future research is, assuming we are using stated and not revealed preferences, how do we gauge the effects of

undermatch without asking about specific colleges? Perhaps we could ask about the likelihood of applying to schools of different selectivity brackets, but the risk here would be a loss of salience.

Stated vs. Revealed Preference

Finally, there is the general limitation of using stated preferences (i.e., by using a survey) as opposed to revealed preferences. In order to understand how students truly respond to gain vs. loss framing, as opposed to how they say they would respond, we would have to run an actual field experiment and track their application behavior. Given time constraints and limited financial resources, however, this was not practicably feasible.

General Limitations, Results Notwithstanding

Selection Effect

Several efforts have been made in recent years to quantify the earnings premium associated with attending specific colleges, including the U.S. Department of Education's College Scorecard (used in this study) and *The Economist*'s 2015 college rankings, among others. As Dale and Krueger (2002) demonstrate, however, estimates of earnings premia may be biased because selective colleges admit students, in part, based on characteristics that are related to future earnings. In other words, saying that the earnings premium associated with attending Northwestern is $39,100, for example, overstates the effect that Northwestern itself has on future earnings. In all likelihood, students who are admitted to Northwestern in the first place would still have high earnings even if they chose to attend a less selective institution.

While this might suggest that the earnings premium information in this study was overstated, this may not be the case completely. This is because the salary data provided by the College Scorecard specifically only looks at the median earnings of former students who

received federal financial aid, not all students. Furthermore, Dale and Krueger (2002) also show that, while the selection effect may skew earnings premium estimates in general, attending a selective college has a real effect particularly for low-income students. Whereas the high-income student who is admitted to Penn and Penn State will likely be successful regardless of which school he chooses to attend, the low-income student may benefit more by choosing Penn.

Importance of College Persistence

While closing information gaps and minimizing cognitive biases are important insofar as they encourage students to apply to college, applying is just one of many steps along the path to college completion. Bowen, Chingos, and McPherson (2009) observe that, in the U.S., only 56 percent of students who enter postsecondary education finish college. Low college persistence is especially problematic for low-income students. Whereas 77 percent of high SES college graduates finished in four years, only 59 percent of their low SES counterparts did the same.

This problem is even more profound for low-income students in Chicago. Nagaoka, Roderick, and Coca (2009) report that only 45 percent of Chicago graduates who enrolled in a four-year college during the year after high school attained a four-year college degree within six years. Furthermore, of the seven most popular institutions for Chicago graduates, only two have an institutional graduation rate at or above the national average. All to say that, while encouraging more low-income students to apply to college – and the right colleges, at that – is an important goal, so too is encouraging college persistence.

Falsity of "College for All" Mantra

One implication of this study is that applying to more and better colleges is always a good thing for low-income students. But this is not necessarily the case. As Carnevale, Smith,

and Strohl (2010) project, only a third of jobs in the U.S. economy in 2018 will require a bachelor's degree or higher. Moreover, 27 percent of people with postsecondary licenses or certificates – credentials short of an associate's degree – earn more than the average bachelor's degree recipient (Symonds, Schwartz & Ferguson, 2011).

None of this is to say that a college degree is not worth it. Clearly, starting and graduating from college is a worthwhile investment in one's future. But it is not the only path to success. For many low-income students, going to college may not be a worthwhile investment at all, and can contribute to large amounts of student debt as well as rising loan defaults (e.g., Looney & Yannelis, 2015). Community colleges may not be a viable pathway to a bachelor's degree, either. While some students may believe that community college provides an easier entryway to ultimately attaining a college degree, Long and Kurlaender (2009) show that students who initially begin at a community college are 14.5 percent less likely to complete a bachelor's degree within nine years than those who start at four-year colleges. All of this suggests that the "college for all" mantra may not, in fact, always be appropriate.

Areas for Further Research

Interventions Based in Loss Aversion

Loss Framing of Nonfinancial Information

At the end of the "Discussion" section, I offered a possible explanation for why the hypothesis of this study ultimately failed. The thought is that, because low-income students have a low expected earnings reference point to begin with, touting the financial returns of attending college is actually more powerful when framed as a gain than when framed as a loss. That is, loss aversion may not be all that powerful when subjects' reference points are already quite low.

When the reference point is higher, though, loss aversion features more prominently. Low-income students may have low reference points when it comes to their expected future earnings, but what about other, nonfinancial outcomes associated with attending college? As Taylor et al. (2014) as well as Oreopoulos and Salvanes (2009) show, going to college leads to a myriad of nonfinancial benefits in addition to higher salary. Among these are higher rates of full-time employment, lower rates of unemployment, higher self-reported job satisfaction, higher self-reported happiness, greater perceived attractiveness in the dating/marriage market, and lower divorce rates, and healthier lifestyles.

The implication for future research is that, while low-income students may have low reference points for their expected salaries, it seems unlikely that they have low reference points when it comes to all sorts of nonfinancial outcomes. A student growing up on the South Side of Chicago hopefully still has high expectations for his job satisfaction, happiness level, and health, to name just a few outcomes. If this is the case, then loss aversion will feature more strongly for these outcomes than for future earnings. Consider the following statistic: 53 percent of college graduates say they are "very satisfied" with their current job, while only 37 percent of high

school grads feel the same way (Taylor et al., 2014). Framed relative to one another, the gain frame says that college graduates are 16 percent more likely than high school graduates to say they are very satisfied with their current job, while the loss frame says that high school graduates are 16 percent less likely than college graduates to say they are very satisfied.

Further research will ideally use a similar design to this study but test students' receptiveness to loss framing of nonfinancial information instead of earnings premia. It seems reasonable to expect that this research design would create more of a significant difference between the gain and loss frames.

Additional Interventions Based in Behavioral Economics

Identity Labeling

Identity labeling involves explicitly reinforcing a facet of a person's real or ideal self that is linked with the behavior one aims to elicit (Rogers, Fox & Gerber, 2012). The concept behind this is that once someone is told he possesses a certain identity, he will want to behave in ways that are consistent with that identity in order to avoid cognitive dissonance (Festinger, 1957).

One can create an identity label in one of two ways. The first method is to reinforce or make salient an identity that a person likely already has. The second method is to induce a label that may not already exist, but is conceivable. One study used this second technique in an effort to increase voter mobilization. Participants were told to complete a survey about an upcoming election. Participants were then told what their responses indicated about their level of civic engagement. What they did not know was that the feedback they received had been randomly assigned to them. Those in the first condition were labeled as "above average citizens who are very likely to vote," while those in the second condition were labeled as "average citizens with an average likelihood of voting." One week later, the identity labeling technique had a significant

effect on voter turnout. In fact, 87 percent of participants in the "above average" condition voted, while only 75 percent of those in the "average" condition voted (Tybout & Yalch, 1980).

The implication for future research on college access is that we can theoretically prompt low-income students to think of themselves as the type of people who would go to college. For example, a survey similar to the one above could ask students to what extent they agree with statements like, "I am a hardworking student who cares about my education" or, "I think that I will attend and graduate from college." It is likely that many students already agree with these statements, in which case the survey would merely reinforce their self-identities. Even if students do not agree with the statements, though, we could still give false feedback in order to falsely induce an identity label. Of course, we might question the ethics of such an experiment given that it involves lying to participants. Regardless, the goal of inducing the identity label would be for students to apply to more and better colleges in order to preserve their self-identity and avoid cognitive dissonance.

Choice Overload

Schwartz (2004) explains that, contrary to popular belief, having more options to choose from is not always a good thing. In one study, Iyengar and Lepper (2000) show that consumers in a grocery store are more likely to purchase gourmet jams or chocolates, and students are more likely to undertake optional class essay assignments, when they are offered a limited array of six choices rather than a more extensive array of 24 or 30 choices. Moreover, participants who were given only six options reported greater subsequent satisfaction with their selections than those who were given more options. "Choice overload," Schwartz explains, can have a paralyzing effect on people's decision making abilities, and we would actually be better off if we embraced voluntary constraints on our freedom of choice.

For high school students, the college application process may be the paradigmatic example of choice overload. Students do not just choose from a dozen or two dozen colleges; they are forced to choose from literally hundreds. In some cases, this may lead to students feeling overwhelmed by choice and to fewer applications submitted. In other cases, it may mean that students will feel less sure about their choices even after they have made them. One area for additional research would be to test whether constraining students' college choices to a handful of options would lead to more applications submitted or greater subsequent satisfaction with choices made. For example, instead of telling students to browse online in order to make a decision of where to apply, college counselors could prepare a short list of 10 or 15 schools and tell students to choose among these.

Conclusion

Improving college access for low-income students, particularly high-achievers, is more important than ever as the U.S. faces rising income inequality and poor intergenerational mobility. In recent years, "nudges" have been proven to effectively influence students' application behavior and encourage them to enroll in selective institutions. This study uses a novel premise to build on this existing body of literature. By surveying low-income high school students in Chicago, I examine whether loss framing of earnings premium information causes students to report greater likelihood of applying to college than gain framing.

While I ultimately find no significant differences between the gain and loss conditions, there are still reasons for optimism. First, the study suffered from a small sample size, and it is therefore possible that future iterations of the study would find significant results given a larger sample size. Second, while no significant differences were observed between the gain and loss conditions, students in both conditions reported greater likelihood of applying to Northwestern (the most selective college in the study) as compared to the control. In other words, "pushing" earnings premium information to low-income students may make them more likely to apply to selective colleges. While this finding is not novel per se, it is important nonetheless. Finally, loss framing may prove more effective when students have higher mental reference points for the information being conveyed. Future research should use a similar design to determine whether loss framing of the nonfinancial benefits of going to college is an effective nudge.

References

Autor, D. (2010). "The Polarization of Job Opportunities in the U.S. Labor Market." *Center for American Progress* and *The Hamilton Project*.

Avery, C. & Kane, T.J. (2004). Student Perceptions of College Opportunities: The Boston COACH Program. 355- 394 edited by C. M. Hoxby. Vol. College Choices: The Economics of Where to Go, When to Go, and How to Pay For It. Chicago: University of Chicago Press.

Bailey, M., & Dynarski, S. (2011). "Gains and Gaps: Changing Inequality in U.S. College Entry and Completion." *NBER Working Paper 17633*. Cambridge, MA: National Bureau of Economic Research.

Barr, A., & Castleman, B. (2016). "Advising Students To and Through College: Experimental Evidence from the Bottom Line Advising Program." *Bottom Line.*

Barron's Profile of American Colleges 2016 (32nd ed.). (2015). Barron's Educational Series.

Baum, S., Ma, J., & Payea, K.. (2013). "Education Pays 2013: The Benefits of Higher Education for Individuals and Society." *College Board*.

Baumeister, R., Bratslavsky, E., Finkenauer, C., & Vohs, K.. (2001). Bad Is Stronger Than Good. Review of General Psychology 5(4), 323-370.

Bertrand, M., Karlan, D., Mullainathan, S., Shafir, E., and Zinman, J.. (2010). "What's Advertising Content Worth? Evidence from a Consumer Credit Marketing Field Experiment," Quarterly Journal of Economics 125(1), 263-305.

Bettinger, E. & Baker, R. (2014). The Effects of Student Coaching An Evaluation of a Randomized Experiment in Student Advising. *Educational Evaluation and Policy Analysis*, 36(1), 3-19.

Bettinger, E., Long, B. T., Oreopoulos, P., & Sanbonmatsu, L. (2012). "The Role of Application Assistance and Information in College Decisions: Results from the H&R Block FAFSA Experiment." *Quarterly Journal of Economics 127(3).*

Booker, K., Gill, B., Sass, T., & Zimmer R. (2014). Charter high schools' effects on long-term attainment and earnings. *Mathematica Policy Research*.

Bowen, W. G., Chingos, M. M., & McPherson, M. S. (2009). *Crossing the Finish Line: Completing College at America's Public Universities*. Princeton, N.J.: Princeton University Press.

Brewer, D., Eide, E., & Ehrenberg, R. (1999). "Does It Pay to Attend an Elite Private College? Cross-Cohort Evidence on the Effects of College Type on Earnings." *The Journal of Human Resources 34(1)*, 104-123.

Bulman, G. (2012). *The effect of access to college assessments on enrollment and attainment*. Unpublished manuscript, Stanford University.

Camerer, C., Babcock, L., Loewenstein, G., & Thaler, R. (1997). "Labor Supply of New York City Cabdrivers: One Day at a Time." *The Quarterly Journal of Economics 112(2),* 407-441.

Carrell, S., & Sacerdote, B. (2013). "Late interventions matter too: The case of college coaching in New Hampshire." *NBER Working Paper 19031*. Cambridge, MA: National Bureau of Economic Research.

Castleman, B.L., & Page, L.C. (2013). "Summer Nudging: Can Personalized Text Messages and Peer Mentor Outreach Increase College Going Among Low-Income High School Graduates?" Center for Education Policy and Workforce Competitiveness Working Paper No. 9. Charlottesville, VA: University of Virginia.

Castleman, B.L. & Page, L.C. (2014). Freshman Year Financial Aid Nudges: An Experiment to Increase FAFSA Renewal and College Persistence. Center for Education Policy and Workforce Competitiveness Working Paper No. 28. Charlottesville, VA: University of Virginia.

Catalyst Maria 2015 School Progress Report. (2015). *Chicago Public Schools*. Retrieved from <http://schoolreports.cps.edu/SQRP_2015/2015_SQRP_Summary_400115.pdf>.

CICS - Longwood 2015 School Progress Report. (2015). *Chicago Public Schools*. Retrieved from <http://schoolreports.cps.edu/SchoolProgressReport_2015/English/HighProgressReport2015/SPR15_HS_400033.pdf>.

Dale, S.B., & Krueger, A.B. (2002). "Estimating the payoff to attending a more selective college: An application of selection on observables and unobservables." *The Quarterly Journal of Economics 107(4)*, 1491-1527.

Dominitz, J., & Manski, C. (1996). "Eliciting student expectations of the returns to schooling." *Journal of Human Resources 31(1)*, 1-26.

Dynarski, S.M., & Scott-Clayton, J.E. (2006). "The Cost Of Complexity In Federal Student Aid: Lessons From Optimal Tax Theory And Behavioral Economics," *National Tax Journal 59*, 319-356.

Dynarski, S. & Wiederspan, M. (2012). "Student Aid Simplification: Looking Back and Looking Ahead." *National Tax Journal 65(1)*, 211–234.

Eagan, K., Stolzenberg, E. B., Ramirez, J. J., Aragon, M. C., Suchard, M. R., & Hurtado, S. (2014). *The American freshman: National norms fall 2014*. Los Angeles: Higher Education Research Institute, UCLA.

Festinger, L. (1957). *A theory of cognitive dissonance,* Stanford, CA: Stanford University Press.

Fryer, R. G., Levitt, S. D., List, J., & Sadoff, S. (2012). "Enhancing the efficacy of teacher incentives through loss aversion: A field experiment." *Working Paper 18237.* Cambridge, MA: National Bureau of Economic Research.

Ganzach, Y., & Karsahi, N. (1995). "Message framing and buying behavior: A field experiment." *Journal of Business Research 32,* 11-17.

Carnevale, A., Smith, N., & Strohl, J. (2010). *Help Wanted: Projections of Jobs and Education Requirements Through 2018* (Rep.). Retrieved from <http://cew.georgetown.edu/wp-content/uploads/2014/12/HelpWanted.ExecutiveSummary.pdf>.

Giancola, J., & Kahlenberg, R. (2016). "True Merit: Ensuring Our Brightest Students Have Access to Our Best Colleges and Universities." *Jack Kent Cooke Foundation*.

Goldin, C., & Katz, L. (2010). *The Race Between Education and Technology*. Cambridge, MA: Harvard University Press.

Goodman, S. (2012). "Learning from the Test: Raising Selective College Enrollment by Providing Information." Working paper. Columbia University and University of California, Berkeley.

Grodsky, E., & Jones, M. (2007). "Real and Imagined Barriers to College Entry: Perceptions of Cost." *Social Science Research 36(2)*, 745–766.

Houssain, T., & List, J. (2012). "The Behavioralist Visits the Factory: Increasing Productivity Using Simple Framing Manipulations." *Management Science 58(12)*, 2151-2167.

Hoxby, C. (2001). "The Return to Attending a More Selective College: 1960 to the Present," in *Forum Futures: Exploring the Future of Higher Education*, eds. Maureen Devlin and Joel Meyerson (Jossey-Bass Inc., 2001): 13-42.

Hoxby, C., & Avery, C. (2013). "The Missing "One-Offs": The Hidden Supply of High-Achieving, Low-Income Students." Brookings Papers on Economic Activity, Economic Studies Program, The Brookings Institution, Vol. 46(1), 1-65.

Hoxby, C., & Turner, S. (2013). "Expanding College Opportunities for High-Achieving, Low Income Students," Stanford Institute for Economic Policy Research, Discussion Paper No. 12-014.

Ikenberry, S., & Hartle, T. (1998). "Too Little Knowledge Is a Dangerous Thing: What the Public Thinks and Knows about Paying for College." *American Council on Education*.

Iyengar, S., & Lepper, M. (2000). "When Choice is Demotivating: Can One Desire Too Much of a Good Thing?" *Journal of Personality and Social Psychology 79(6),* 995-1006.

Jensen, R. (2010). "The (Perceived) Returns to Education and the Demand for Schooling." *The Quarterly Journal of Economics 125(2),* 515-548.

Kahneman, D., & Tversky, A. (1979). “Prospect Theory: An Analysis of Decision Under Risk.” *Econometrica 47(2)*, 263-291.

Kahneman, D. (2011). *Thinking Fast and Slow*. New York: Macmillan.

Kahneman, D., Knetsch, J., & Thaler, R. (1991). “Anomalies: The Endowment Effect, Loss Aversion, and Status Quo Bias.” *The Journal of Economic Perspectives 5(1)*, 193-206.

Koszegi, B., & Rabin, M. (2006). "A Model of Reference-Dependent Preferences." *The Quarterly Journal of Economics 121(4)*, 1133-1165.

Kraft, M. A., & Rogers, T. (2015). “The underutilized potential of teacher-to-parent communication: Evidence from a field experiment.” *Economics of Education Review 47*, 49-63.

Leslie, L., & Brinkman, P. (1988). *The Economic Value of Higher Education*. New York: Macmillan Publishing Company.

Levitt, S., List, J., Neckermann, S., & Sadoff, S. (2012). “The Behavioralist Goes to School: Leveraging Behavioral Economics to Improve Educational Performance.” *NBER Working Paper 18165*. Cambridge, MA: National Bureau of Economic Research.

Long, B. T., & Kurlaender, M. (2009). “Do Community Colleges provide a Viable Pathway to a Baccalaureate Degree?” *Educational Evaluation and Policy Analysis 31(1)*, 30-53.

Looney, A., & Yannelis, C. (2015). “A crisis in student loans? Hos changes in the characteristics of borrowers and in the institutions they attend contributed to rising loan defaults.” *Brookings Papers on Economic Activity*.

Madrian, B.C. (2014). “Applying Insights from Behavioral Economics to Policy Design.” *Annual Review of Economics 6(1)*, 663-688.

Nagaoka, J., Roderick, M., & Coca, V. (2009). *Barriers to College Attainment: Lessons from Chicago* (Rep.). Chicago, IL: UChicago Consortium on School Research.

O'Donoghue, T., & Rabin, M. (1999). "Doing It Now or Later."*American Economic Review 89(1)*, 103-124.

Oreopoulos, P., & Dunn, R. (2013). "Information and College Access: Evidence from a Randomized Field Experiment," *Scandinavian Journal of Economics 115(1)*, 3-26.

Oreopoulos, P., & Salvanes, K. (2009). “How large are returns to schooling? Hint: Money isn’t everything.” *NBER Working Paper 15339*. Cambridge, MA: National Bureau of Economic Research.

Pallais, A. (2015). “Small Differences that Matter: Mistakes in Applying to College.” *Journal of Labor Economics 33(2)*.

Piketty, T. (2014). *Capital in the Twenty-First Century*. Cambridge, MA: Harvard University Press.

Pope, D., & Schweitzer, D. (2011). "Is Tiger Woods loss averse? Persistent bias in the face of experience, competition, and high stakes." *American Economic Review 101*, 129-157.

Putnam, R. (2015). *Our Kids: The American Dream in Crisis*. New York: Simon & Schuster.

Rogers, T., Gerber, A. S., & Fox, C. R. (2012). "Rethinking Why People Vote: Voting as Dynamic Social Expression." In Behavioral Foundations of Policy.

Schwartz, B. (2004). *The Paradox of Choice*. New York: Harper Perennial.

Smith, H.L., & Powell, B. (1990). "Great expectations: variations in income expectations among college seniors." *Sociology of Education 63*, 194–207.

Smith, J. (2013). "The effect of college applications on enrollment." *The B.E. Journal of Economic Analysis & Policy 14(1)*, 151–188.

Smith, J., Pender, M., & Howell, J. (2012). "The full extent of student-college academic undermatch." *Economics of Education Review 32*, 247-261.

Sunstein, C., & Thaler, R. (2009). *Nudge: Improving Decisions About Health, Wealth, and Happiness*. New York: Penguin Books.

Symonds, W.C., Schwartz, R, & Ferguson, R.F. (2011). "Pathways to prosperity: Meeting the challenge of preparing young Americans for the 21st century." Cambridge, MA: Pathways to Prosperity Project, Harvard University Graduate School of Education.

Taylor, P., Parker, K., Morin, R., Fry, R., Patten, E., & Brown, A. (2014). *The Rising Cost of Not Going to College* (Rep.). Pew Research Center.

Thaler, R. (1980). "Toward a Positive Theory of Consumer Choice." *Journal of Economic Behavior and Organization 1*, 39-60.

Thaler, R. (2015). *Misbehaving: The Making of Behavioral Economics*. New York: W.W. Norton & Company.

Tversky, A., & Kahneman, D. (1981). "The Framing of Decisions and the Psychology of Choice." *Science* 211(4481), 453-458.

Tversky, A., & Kahneman, D. (1991). "Loss Aversion in Riskless Choice: A Reference-Dependent Model." *The Quarterly Journal of Economics 106(4)*, 1039-1061.

Tybout, A.M., & Yalch, R.R. (1980). "The Effect Experience: A Matter of Salience?" *Journal of Consumer Research 6*, 406-413.

U.S. Census Bureau. (2014). *Median household income in Chicago, Illinois*. Retrieved from <http://www.census.gov/quickfacts/table/INC110214/1714000,00>.

UChicago Charter Scorecard: Woodlawn Campus - High School 2012-13. (2013). Retrieved from <http://bit.ly/1TPXfg7>.

APPENDICES

APPENDIX A
Randomized Controlled Survey

Consent Page

The following survey is completely anonymous and optional. If you agree to participate, you will be asked several questions about your high school background, post-high school plans, and attitudes towards college.

The results will be used for a research study that examines college application behavior among high school students in the Chicago area. If you have questions about this study, please contact Benjamin Feis (bfeis@sas.upenn.edu).

Do you agree to participate in this survey?

- ○ Yes
- ○ No

Condition #1: Control

What are your post-high school plans?

- ○ College (four-year or two-year)
- ○ Technical college
- ○ Job
- ○ Military service
- ○ I haven't decided

Which of the following factors are you worried about when thinking of applying to college? (check all that apply)

- ☐ College is expensive
- ☐ Distance from home

- [ ] Applying to college seems complicated
- [ ] I don't think I would do well in college
- [ ] I would rather work after high school
- [ ] Other: _____

How likely are you to apply to college?

Extremely likely	Somewhat likely	Neither likely nor unlikely	Somewhat unlikely	Extremely unlikely
○	○	○	○	○

Look at the chart below for a minute or two. Then click to the next page.

	Northwestern University	University of Illinois at Urbana-Champaign	University of Illinois at Chicago	Northeastern Illinois University	Columbia College Chicago
Location	Evanston, IL	Champaign, IL	Chicago, IL	Chicago, IL	Chicago, IL
Acceptance rate	13.1%	59.0%	72.7%	56.7%	90.5%
ACT range[1]	31-34	26-32	21-26	16-20	19-25
Average cost[2]	$15,800	$8,000	$9,600	$14,800	$26,600

[1] ACT range refers to the middle 50% of scores of students enrolled at this college. At Northeastern Illinois University, for example, 50% of students scored between 16 and 20 on the ACT. However, 25% of students scored below 16 and 25% of students scored above 20.

[2] Average cost refers to the *approximate* cost per year that your family can expect to pay if you attend this college, taking financial aid into account.

Look at the information below about Northwestern University.

	Northwestern University	University of Illinois at Urbana-Champaign	University of Illinois at Chicago	Northeastern Illinois University	Columbia College Chicago
Location	Evanston, IL	Champaign, IL	Chicago, IL	Chicago, IL	Chicago, IL
Acceptance rate	13.1%	59.0%	72.7%	56.7%	90.5%
ACT range[1]	31-34	26-32	21-26	16-20	19-25
Average cost[2]	$15,800	$8,000	$9,600	$14,800	$26,600

Given this information, how likely are you to apply to Northwestern University?

Extremely likely	Somewhat likely	Neither likely nor unlikely	Somewhat unlikely	Extremely unlikely
○	○	○	○	○

Look at the information below about the University of Illinois at Urbana-Champaign.

	Northwestern University	University of Illinois at Urbana-Champaign	University of Illinois at Chicago	Northeastern Illinois University	Columbia College Chicago
Location	Evanston, IL	Champaign, IL	Chicago, IL	Chicago, IL	Chicago, IL
Acceptance rate	13.1%	59.0%	72.7%	56.7%	90.5%
ACT range[1]	31-34	26-32	21-26	16-20	19-25
Average cost[2]	$15,800	$8,000	$9,600	$14,800	$26,600

Given this information, how likely are you to apply to the University of Illinois at Urbana-Champaign?

Extremely likely	Somewhat likely	Neither likely nor unlikely	Somewhat unlikely	Extremely unlikely
○	○	○	○	○

Look at the information below about the University of Illinois at Chicago.

	Northwestern University	University of Illinois at Urbana-Champaign	University of Illinois at Chicago	Northeastern Illinois University	Columbia College Chicago
Location	Evanston, IL	Champaign, IL	Chicago, IL	Chicago, IL	Chicago, IL
Acceptance rate	13.1%	59.0%	72.7%	56.7%	90.5%
ACT range[1]	31-34	26-32	21-26	16-20	19-25
Average cost[2]	$15,800	$8,000	$9,600	$14,800	$26,600

Given this information, how likely are you to apply to the University of Illinois at Chicago?

Extremely likely	Somewhat likely	Neither likely nor unlikely	Somewhat unlikely	Extremely unlikely
○	○	○	○	○

Look at the information below about Northeastern Illinois University.

	Northwestern University	University of Illinois at Urbana-Champaign	University of Illinois at Chicago	Northeastern Illinois University	Columbia College Chicago
Location	Evanston, IL	Champaign, IL	Chicago, IL	Chicago, IL	Chicago, IL
Acceptance rate	13.1%	59.0%	72.7%	56.7%	90.5%
ACT range[1]	31-34	26-32	21-26	16-20	19-25
Average cost[2]	$15,800	$8,000	$9,600	$14,800	$26,600

Given this information, how likely are you to apply to Northeastern Illinois University?

Extremely likely	Somewhat likely	Neither likely nor unlikely	Somewhat unlikely	Extremely unlikely
○	○	○	○	○

Look at the information below about Columbia College Chicago.

	Northwestern University	University of Illinois at Urbana-Champaign	University of Illinois at Chicago	Northeastern Illinois University	Columbia College Chicago
Location	Evanston, IL	Champaign, IL	Chicago, IL	Chicago, IL	Chicago, IL
Acceptance rate	13.1%	59.0%	72.7%	56.7%	90.5%
ACT range[1]	31-34	26-32	21-26	16-20	19-25
Average cost[2]	$15,800	$8,000	$9,600	$14,800	$26,600

Given this information, how likely are you to apply to Columbia College Chicago?

Extremely likely	Somewhat likely	Neither likely nor unlikely	Somewhat unlikely	Extremely unlikely
○	○	○	○	○

Condition #2: Gain Frame

What are your post-high school plans?

- ○ College (four-year or two-year)
- ○ Technical college
- ○ Job
- ○ Military service
- ○ I haven't decided

Which of the following factors are you worried about when thinking of applying to college? (check all that apply)

- ☐ College is expensive
- ☐ Distance from home
- ☐ Applying to college seems complicated
- ☐ I don't think I would do well in college
- ☐ I would rather work after high school
- ☐ Other: _____

If you go to college, you will earn $21,100 **more** per year (on average) than if you do not go to college.

Given this information, how likely are you to apply to college?

Extremely likely	Somewhat likely	Neither likely nor unlikely	Somewhat unlikely	Extremely unlikely
○	○	○	○	○

Look at the chart below for a minute or two. Then click to the next page.

	Northwestern University	University of Illinois at Urbana-Champaign	University of Illinois at Chicago	Northeastern Illinois University	Columbia College Chicago
Location	Evanston, IL	Champaign, IL	Chicago, IL	Chicago, IL	Chicago, IL
Acceptance rate	13.1%	59.0%	72.7%	56.7%	90.5%
ACT range[1]	31-34	26-32	21-26	16-20	19-25
Average cost[2]	$15,800	$8,000	$9,600	$14,800	$26,600

[1] ACT range refers to the middle 50% of scores of students enrolled at this college. At Northeastern Illinois University, for example, 50% of students scored between 16 and 20 on the ACT. However, 25% of students scored below 16 and 25% of students scored above 20.

[2] Average cost refers to the *approximate* cost per year that your family can expect to pay if you attend this college, taking financial aid into account.

Look at the information below about Northwestern University.

	Northwestern University	University of Illinois at Urbana-Champaign	University of Illinois at Chicago	Northeastern Illinois University	Columbia College Chicago
Location	Evanston, IL	Champaign, IL	Chicago, IL	Chicago, IL	Chicago, IL
Acceptance rate	13.1%	59.0%	72.7%	56.7%	90.5%
ACT range[1]	31-34	26-32	21-26	16-20	19-25
Average cost[2]	$15,800	$8,000	$9,600	$14,800	$26,600

If you go to Northwestern University, you will earn $39,100 **more** per year (on average) than if you do not go to college.

Given this information, how likely are you to apply to Northwestern University?

Extremely likely	Somewhat likely	Neither likely nor unlikely	Somewhat unlikely	Extremely unlikely
○	○	○	○	○

Look at the information below about the University of Illinois at Urbana-Champaign.

	Northwestern University	University of Illinois at Urbana-Champaign	University of Illinois at Chicago	Northeastern Illinois University	Columbia College Chicago
Location	Evanston, IL	Champaign, IL	Chicago, IL	Chicago, IL	Chicago, IL
Acceptance rate	13.1%	59.0%	72.7%	56.7%	90.5%
ACT range[1]	31-34	26-32	21-26	16-20	19-25
Average cost[2]	$15,800	$8,000	$9,600	$14,800	$26,600

If you go to the University of Illinois at Urbana-Champaign, you will earn $31,600 **more** per year (on average) than if you do not go to college.

Given this information, how likely are you to apply to the University of Illinois at Urbana-Champaign?

Extremely likely	Somewhat likely	Neither likely nor unlikely	Somewhat unlikely	Extremely unlikely
○	○	○	○	○

Look at the information below about the University of Illinois at Chicago.

	Northwestern University	University of Illinois at Urbana-Champaign	University of Illinois at Chicago	Northeastern Illinois University	Columbia College Chicago
Location	Evanston, IL	Champaign, IL	Chicago, IL	Chicago, IL	Chicago, IL
Acceptance rate	13.1%	59.0%	72.7%	56.7%	90.5%
ACT range[1]	31-34	26-32	21-26	16-20	19-25
Average cost[2]	$15,800	$8,000	$9,600	$14,800	$26,600

If you go to the University of Illinois at Chicago, you will earn $26,600 **more** per year (on average) than if you do not go to college.

Given this information, how likely are you to apply to the University of Illinois at Chicago?

Extremely likely	Somewhat likely	Neither likely nor unlikely	Somewhat unlikely	Extremely unlikely
○	○	○	○	○

Look at the information below about Northeastern Illinois University.

	Northwestern University	University of Illinois at Urbana-Champaign	University of Illinois at Chicago	Northeastern Illinois University	Columbia College Chicago
Location	Evanston, IL	Champaign, IL	Chicago, IL	Chicago, IL	Chicago, IL
Acceptance rate	13.1%	59.0%	72.7%	56.7%	90.5%
ACT range[1]	31-34	26-32	21-26	16-20	19-25
Average cost[2]	$15,800	$8,000	$9,600	$14,800	$26,600

If you go to Northeastern Illinois University, you will earn $11,000 **more** per year (on average) than if you do not go to college.

Given this information, how likely are you to apply to Northeastern Illinois University?

Extremely likely	Somewhat likely	Neither likely nor unlikely	Somewhat unlikely	Extremely unlikely
○	○	○	○	○

Look at the information below about Columbia College Chicago.

	Northwestern University	University of Illinois at Urbana-Champaign	University of Illinois at Chicago	Northeastern Illinois University	Columbia College Chicago
Location	Evanston, IL	Champaign, IL	Chicago, IL	Chicago, IL	Chicago, IL
Acceptance rate	13.1%	59.0%	72.7%	56.7%	90.5%
ACT range[1]	31-34	26-32	21-26	16-20	19-25
Average cost[2]	$15,800	$8,000	$9,600	$14,800	$26,600

If you go to Columbia College Chicago, you will earn $7,700 **more** per year (on average) than if you do not go to college.

Given this information, how likely are you to apply to Columbia College Chicago?

Extremely likely	Somewhat likely	Neither likely nor unlikely	Somewhat unlikely	Extremely unlikely
○	○	○	○	○

Condition #3: Loss Frame

What are your post-high school plans?

- ○ College (four-year or two-year)
- ○ Technical college
- ○ Job
- ○ Military service
- ○ I haven't decided

Which of the following factors are you worried about when thinking of applying to college? (check all that apply)

- ☐ College is expensive
- ☐ Distance from home
- ☐ Applying to college seems complicated

- [ ] I don't think I would do well in college
- [ ] I would rather work after high school
- [ ] Other:

If you do not go to college, you will earn $21,100 **less** per year (on average) than if you go to college.

Given this information, how likely are you to apply to college?

Extremely likely	Somewhat likely	Neither likely nor unlikely	Somewhat unlikely	Extremely unlikely
○	○	○	○	○

Look at the chart below for a minute or two. Then click to the next page.

	Northwestern University	University of Illinois at Urbana-Champaign	University of Illinois at Chicago	Northeastern Illinois University	Columbia College Chicago
Location	Evanston, IL	Champaign, IL	Chicago, IL	Chicago, IL	Chicago, IL
Acceptance rate	13.1%	59.0%	72.7%	56.7%	90.5%
ACT range[1]	31-34	26-32	21-26	16-20	19-25
Average cost[2]	$15,800	$8,000	$9,600	$14,800	$26,600

[1] ACT range refers to the middle 50% of scores of students enrolled at this college. At Northeastern Illinois University, for example, 50% of students scored between 16 and 20 on the ACT. However, 25% of students scored below 16 and 25% of students scored above 20.

[2] Average cost refers to the *approximate* cost per year that your family can expect to pay if you attend this college, taking financial aid into account.

Look at the information below about Northwestern University.

	Northwestern University	University of Illinois at Urbana-Champaign	University of Illinois at Chicago	Northeastern Illinois University	Columbia College Chicago
Location	Evanston, IL	Champaign, IL	Chicago, IL	Chicago, IL	Chicago, IL
Acceptance rate	13.1%	59.0%	72.7%	56.7%	90.5%
ACT range[1]	31-34	26-32	21-26	16-20	19-25
Average cost[2]	$15,800	$8,000	$9,600	$14,800	$26,600

If you do not go to college, you will earn $39,100 **less** per year (on average) than if you go to Northwestern University.

Given this information, how likely are you to apply to Northwestern University?

Extremely likely ○ Somewhat likely ○ Neither likely nor unlikely ○ Somewhat unlikely ○ Extremely unlikely ○

Look at the information below about the University of Illinois at Urbana-Champaign.

	Northwestern University	University of Illinois at Urbana-Champaign	University of Illinois at Chicago	Northeastern Illinois University	Columbia College Chicago
Location	Evanston, IL	Champaign, IL	Chicago, IL	Chicago, IL	Chicago, IL
Acceptance rate	13.1%	59.0%	72.7%	56.7%	90.5%
ACT range[1]	31-34	26-32	21-26	16-20	19-25
Average cost[2]	$15,800	$8,000	$9,600	$14,800	$26,600

If you do not go to college, you will earn $31,600 **less** per year (on average) than if you go to the University of Illinois at Urbana-Champaign.

Given this information, how likely are you to apply to the University of Illinois at Urbana-Champaign?

Extremely likely Somewhat likely Neither likely nor unlikely Somewhat unlikely Extremely unlikely

Look at the information below about the University of Illinois at Chicago.

	Northwestern University	University of Illinois at Urbana-Champaign	University of Illinois at Chicago	Northeastern Illinois University	Columbia College Chicago
Location	Evanston, IL	Champaign, IL	Chicago, IL	Chicago, IL	Chicago, IL
Acceptance rate	13.1%	59.0%	72.7%	56.7%	90.5%
ACT range[1]	31-34	26-32	21-26	16-20	19-25
Average cost[2]	$15,800	$8,000	$9,600	$14,800	$26,600

If you do not go to college, you will earn $26,600 **less** per year (on average) than if you go to the University of Illinois at Chicago.

Given this information, how likely are you to apply to the University of Illinois at Chicago?

Extremely likely	Somewhat likely	Neither likely nor unlikely	Somewhat unlikely	Extremely unlikely
○	○	○	○	○

Look at the information below about Northeastern Illinois University.

	Northwestern University	University of Illinois at Urbana-Champaign	University of Illinois at Chicago	Northeastern Illinois University	Columbia College Chicago
Location	Evanston, IL	Champaign, IL	Chicago, IL	Chicago, IL	Chicago, IL
Acceptance rate	13.1%	59.0%	72.7%	56.7%	90.5%
ACT range[1]	31-34	26-32	21-26	16-20	19-25
Average cost[2]	$15,800	$8,000	$9,600	$14,800	$26,600

If you do not go to college, you will earn $11,000 **less** per year (on average) than if you go to Northeastern Illinois University.

Given this information, how likely are you to apply to Northeastern Illinois University?

Extremely likely	Somewhat likely	Neither likely nor unlikely	Somewhat unlikely	Extremely unlikely
○	○	○	○	○

Look at the information below about Columbia College Chicago.

	Northwestern University	University of Illinois at Urbana-Champaign	University of Illinois at Chicago	Northeastern Illinois University	Columbia College Chicago
Location	Evanston, IL	Champaign, IL	Chicago, IL	Chicago, IL	Chicago, IL
Acceptance rate	13.1%	59.0%	72.7%	56.7%	90.5%
ACT range[1]	31-34	26-32	21-26	16-20	19-25
Average cost[2]	$15,800	$8,000	$9,600	$14,800	$26,600

If you do not go to college, you will earn $7,700 **less** per year (on average) than if you go to Columbia College Chicago.

Given this information, how likely are you to apply to Columbia College Chicago?

Extremely likely	Somewhat likely	Neither likely nor unlikely	Somewhat unlikely	Extremely unlikely
○	○	○	○	○

Background Questions

What school do you attend?

- ○ Catalyst Maria High School
- ○ Chicago International Charter School (CICS) - Longwood Campus
- ○ UChicago Charter School - Woodlawn Campus

What grade are you currently in?

- 9th grade
- 10th grade
- 11th grade
- 12th grade

Have you already taken the ACT and received your score?

- Yes
- No

What was your score on the ACT?

What is your unweighted high school GPA (out of 4.0)?

What is the highest level of math that you plan to take before graduating high school?

- Calculus
- Pre-calculus or trigonometry
- Geometry
- Algebra

What is your mother's highest level of education?

- College degree or higher
- Some college but did not graduate
- High school degree
- Did not graduate from high school
- I don't know

What is your father's highest level of education?

- College degree or higher
- Some college but did not graduate
- High school degree
- Did not graduate from high school
- I don't know

How much would you say your parent(s)/guardian(s) care about your education?

- My parent(s)/guardian(s) care a lot about my education
- My parent(s)/guardian(s) care somewhat about my education
- My parent(s)/guardian(s) do not care much about my education
- My parent(s)/guardian(s) do not care at all about my education

APPENDIX B
Institutional Review Board Approval Letter

University of Pennsylvania
Office of Regulatory Affairs
3624 Market St., Suite 301 S
Philadelphia, PA 19104-6006
Ph: 215-573-2540/ Fax: 215-573-9438
INSTITUTIONAL REVIEW BOARD
(Federalwide Assurance # 00004028)

18-Mar-2016

Laura W Perna
lperna@gse.upenn.edu
Attn: Benjamin Feis
bfeis@sas.upenn.edu

PRINCIPAL INVESTIGATOR	: Laura W Perna
TITLE	: Survey Regarding Behavioral Interventions to Improve College Access
SPONSORING AGENCY	: No Sponsor Number
PROTOCOL #	: 824640
REVIEW BOARD	: IRB #8

Dear Dr. Perna:

The above referenced protocol and was reviewed and approved using the expedited procedure set forth in 45 CFR 46.110, category 7, on 17-Mar-2016. This study will be due for continuing review on or before 16-Mar-2017.

Approval by the IRB does not necessarily constitute authorization to initiate the conduct of a human subject research study. Principal investigators are responsible for assuring final approval from other applicable school, department, center or institute review committee(s) or boards has been obtained. If any of these committees require changes to the IRB-approved protocol and informed consent/assent document(s), the changes must be submitted to and approved by the IRB prior to beginning the research study.

If this protocol involves cancer research with human subjects, biospecimens, or data, you may not begin the research until you have obtained approval or proof of exemption from the Cancer Center's Clinical Trials Review and Monitoring Committee.

The following documents were included in this review:
-HS ERA Initial Application, confirmation code: cafabbeh, submitted 3/13/16
-CITI Training Report of Completion for Benjamin Feis, passed 3/9/15
-Response Cover Letter, uploaded 3/17/16
-Survey, version date 3/7/16
-IRB Vulnerable Populations: Children Form, uploaded 3/7/16
-Parental Opt-Out Form, uploaded 3/13/16

The IRB reviewed and approved the Subpart D review as per Federal Regulations 45 CFR 46.404 (FDA 50.51), as the research was determined to be no greater than minimal risk. The IRB determined that permission of one parent is sufficient and that adequate provisions are made for soliciting permission via an opt-out process (the only documented permission will be those parents who do not want their child to participate). The IRB has determined that assent must be obtained from subjects and appropriately documented.

When enrolling subjects at a site covered by the University of Pennsylvania's IRB, a copy of the IRB approved informed consent form with the IRB approved from/to stamp must be used unless a waiver of written documentation of consent has been granted.

If you have any questions about the information in this letter, please contact the IRB administrative staff. Contact information is available at our website: http://www.upenn.edu/IRB/directory.

Thank you for your cooperation.

Sincerely,

Christina Kolenut

Digitally signed by Christina Kolenut
DN: cn=Christina Kolenut, o=IRB, ou=ORA, email=ckolenut@upenn.edu, c=US
Reason: I attest to the accuracy and integrity of this document
Date: 2016.03.18 10:48:20 -04'00'

IRB Administrator

APPENDIX C
Parental Consent Opt-Out Form

Dear Parent/Guardian,

During the week of Monday, March 21st, your son/daughter may complete a short online survey (10 minutes or less) about college access and his/her attitudes towards college. This survey is completely optional and anonymous.

The results will be used for a research study that examines college application behavior among high school students in the Chicago area.

If you DO NOT wish your child to participate in this survey, please complete this form.

Student Name: _____

Student School: _____ Grade: _____

Parent/Guardian Name (please print): _____

Parent/Guardian Signature: _____ Date: _____

Reason(s) for not participating:

APPENDIX D
Statistical Representativeness Tests

Cost Concern (All Students)

Descriptives

		Cost Concern		
		No	Yes	Total
Condition	Control	23	52	75
	Gain	19	61	80
	Loss	26	56	82
Total		68	169	237

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	1.462	2	.481
Likelihood Ratio	1.490	2	.475
N of Valid Cases	237		

High School (All Students)

Descriptives

		School		
		Catalyst	CICS	Total
Condition	Control	31	44	75
	Gain	29	51	80
	Loss	32	50	82
Total		92	145	237

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	.423	2	.809
Likelihood Ratio	.424	2	.809
N of Valid Cases	237		

Grade (All Students)

Descriptives

		Grade		
		Junior	Sophomore	Total
Condition	Control	47	28	75
	Gain	52	28	80
	Loss	53	29	82
Total		152	85	237

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	.105	2	.949
Likelihood Ratio	.105	2	.949
N of Valid Cases	237		

Mother's Education (All Students)

Descriptives

		Mother's Educational Attainment					
		College Degree or Higher	Some College	High School Degree	Did Not Graduate From HS	I Don't Know	Total
Condition	Control	23	20	9	11	12	75
	Gain	25	15	14	8	18	80
	Loss	26	16	12	6	22	82
Total		74	51	35	25	52	237

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	6.321	8	.611
Likelihood Ratio	6.311	8	.612
N of Valid Cases	237		

Father's Education (All Students)

Descriptives

		Father's Educational Attainment					
		College Degree or Higher	Some College	High School Degree	Did Not Graduate From HS	I Don't Know	Total
Condition	Control	13	10	15	12	25	75
	Gain	9	9	23	10	29	80
	Loss	21	7	14	7	33	82
Total		43	26	52	29	87	237

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	10.483	8	.233
Likelihood Ratio	10.496	8	.232
N of Valid Cases	237		

Cost Concern (GPA 3.5+)

Descriptives

		Cost Concern		
		No	Yes	Total
Condition	Control	6	12	18
	Gain	2	14	16
	Loss	3	13	16
Total		11	39	50

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	2.287	2	.319
Likelihood Ratio	2.277	2	.320
N of Valid Cases	50		

High School (GPA 3.5+)

Descriptives

		School		
		Catalyst	CICS	Total
Condition	Control	7	11	18
	Gain	6	10	16
	Loss	8	8	16
Total		21	29	50

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	.625	2	.732
Likelihood Ratio	.622	2	.733
N of Valid Cases	50		

Grade (GPA 3.5+)

Descriptives

		Grade		
		Junior	Sophomore	Total
Condition	Control	11	7	18
	Gain	9	7	16
	Loss	9	7	16
Total		29	21	50

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	.112	2	.946
Likelihood Ratio	.112	2	.945
N of Valid Cases	50		

Mother's Education (GPA 3.5+)

Descriptives

		Mother's Educational Attainment					
		College Degree or Higher	Some College	High School Degree	Did Not Graduate From HS	I Don't Know	Total
Condition	Control	4	7	1	2	4	18
	Gain	8	3	2	1	2	16
	Loss	7	3	1	2	3	16
Total		19	13	4	5	9	50

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	5.122	8	.744
Likelihood Ratio	5.194	8	.737
N of Valid Cases	50		

Father's Education (GPA 3.5+)

Descriptives

		Father's Educational Attainment					
		College Degree or Higher	Some College	High School Degree	Did Not Graduate From HS	I Don't Know	Total
Condition	Control	2	1	2	4	9	18
	Gain	4	2	2	2	6	16
	Loss	5	0	3	2	6	16
Total		11	3	7	8	21	50

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	5.250	8	.731
Likelihood Ratio	6.029	8	.644
N of Valid Cases	50		

APPENDIX E

Full Results and One-Way ANOVA Post Hoc Tests

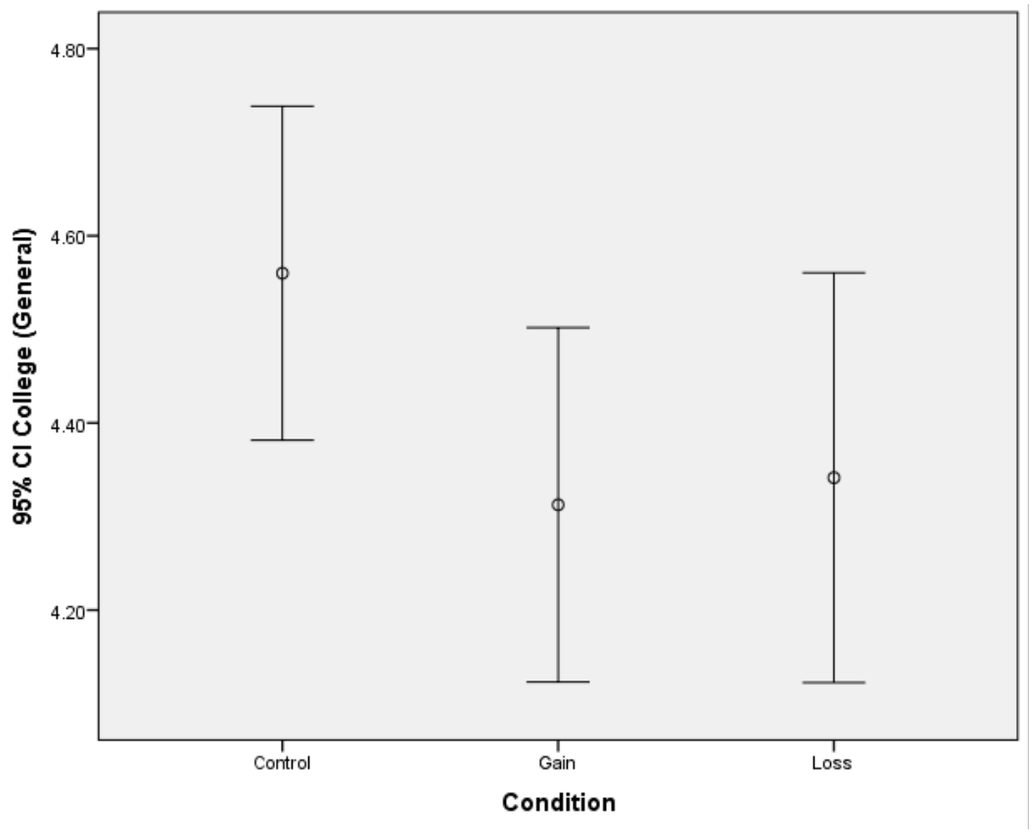
College (General)

Descriptives

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Control	75	4.5600	.77529	.08952	4.3816	4.7384	1.00	5.00
Gain	80	4.3125	.85082	.09512	4.1232	4.5018	1.00	5.00
Loss	82	4.3415	.99653	.11005	4.1225	4.5604	1.00	5.00
Total	237	4.4008	.88519	.05750	4.2876	4.5141	1.00	5.00

One-Way ANOVA Post Hoc Test

(I) Condition	(J) Condition	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Control	Gain	.24750	.14179	.191	-.0869	.5819
	Loss	.21854	.14095	.269	-.1139	.5510
Gain	Control	-.24750	.14179	.191	-.5819	.0869
	Loss	-.02896	.13863	.976	-.3560	.2980
Loss	Control	-.21854	.14095	.269	-.5510	.1139
	Gain	.02896	.13863	.976	-.2980	.3560



Northwestern University

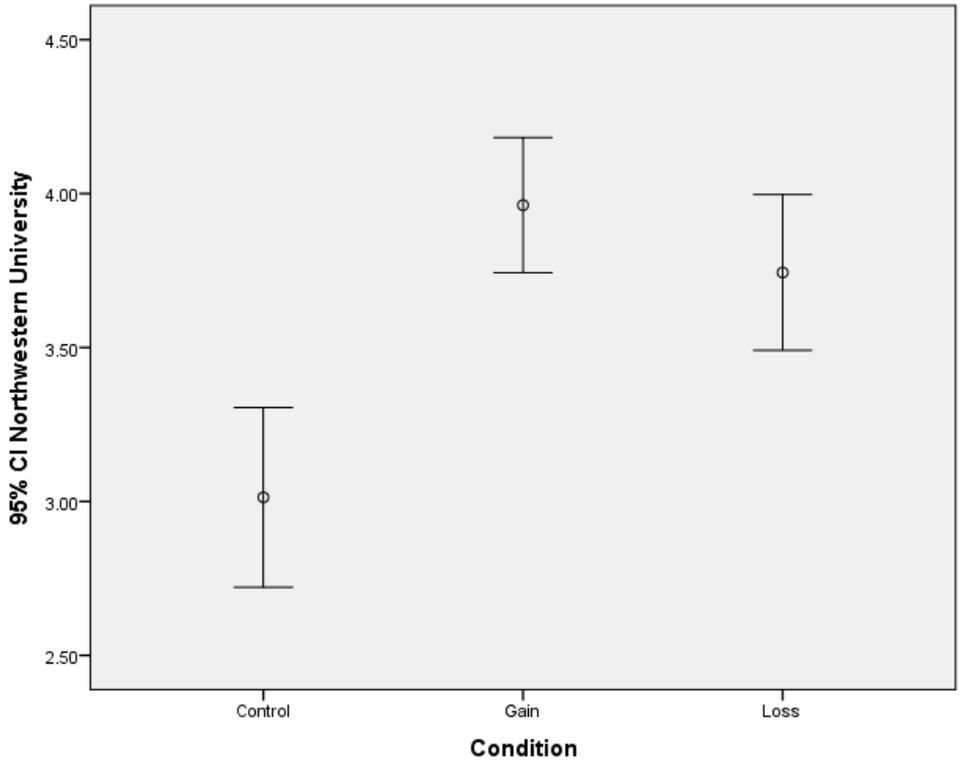
Descriptives

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Control	75	3.0133	1.26804	.14642	2.7216	3.3051	1.00	5.00
Gain	80	3.9625	.98654	.11030	3.7430	4.1820	1.00	5.00
Loss	82	3.7439	1.15268	.12729	3.4906	3.9972	1.00	5.00
Total	237	3.5865	1.20289	.07814	3.4326	3.7404	1.00	5.00

One-Way ANOVA Post Hoc Test

(I) Condition	(J) Condition	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Control	Gain	**-.94917***	.18305	.000	-1.3809	-.5174
	Loss	**-.73057***	.18196	.000	-1.1598	-.3014
Gain	Control	**.94917***	.18305	.000	.5174	1.3809
	Loss	.21860	.17897	.442	-.2035	.6407
Loss	Control	**.73057***	.18196	.000	.3014	1.1598
	Gain	-.21860	.17897	.442	-.6407	.2035

* The mean difference is significant at the 0.05 level.



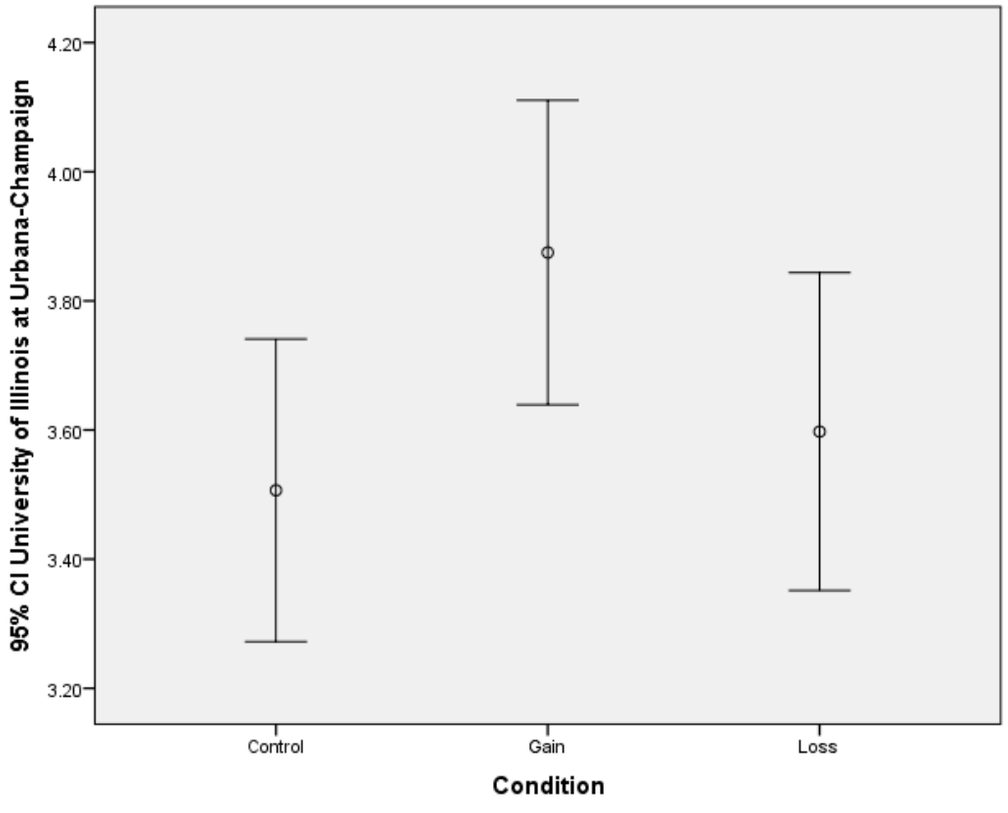
University of Illinois at Urbana-Champaign

Descriptives

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Control	75	3.5067	1.01839	.11759	3.2724	3.7410	1.00	5.00
Gain	80	3.8750	1.05991	.11850	3.6391	4.1109	1.00	5.00
Loss	82	3.5976	1.12062	.12375	3.3513	3.8438	1.00	5.00
Total	237	3.6624	1.07553	.06986	3.5248	3.8001	1.00	5.00

One-Way ANOVA Post Hoc Test

(I) Condition	(J) Condition	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Control	Gain	-.36833	.17176	.083	-.7735	.0368
	Loss	-.09089	.17074	.856	-.4936	.3118
Gain	Control	.36833	.17176	.083	-.0368	.7735
	Loss	.27744	.16793	.226	-.1187	.6735
Loss	Control	.09089	.17074	.856	-.3118	.4936
	Gain	-.27744	.16793	.226	-.6735	.1187



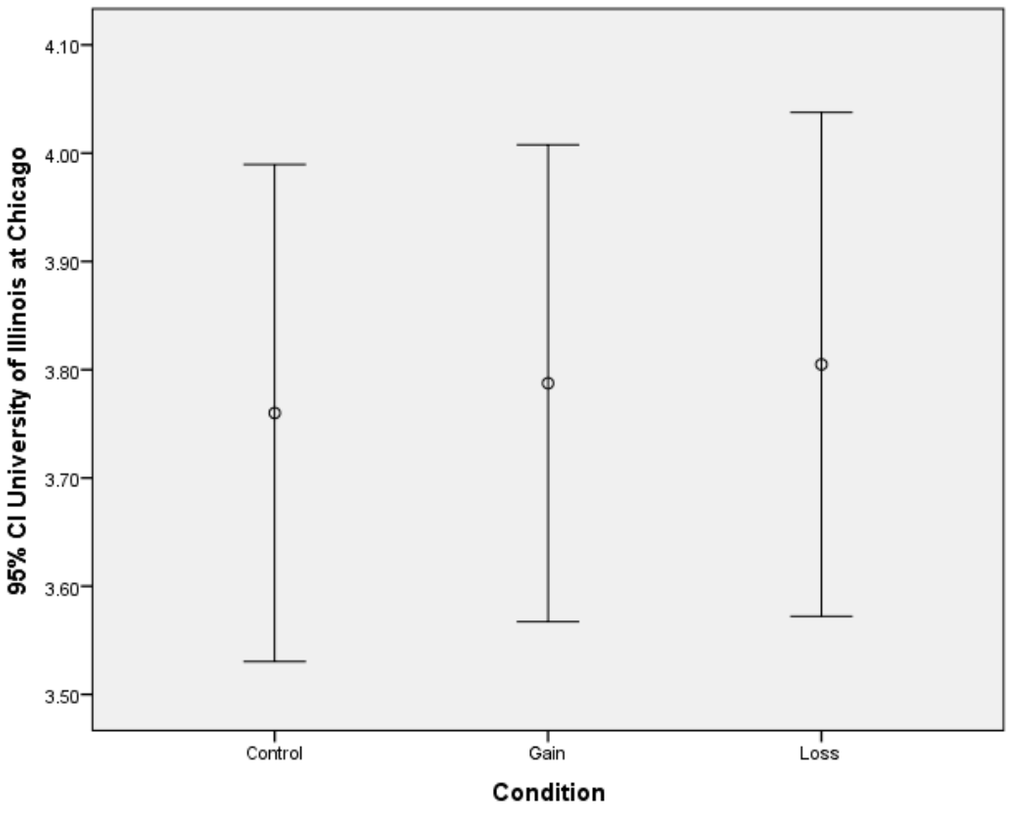
University of Illinois at Chicago

Descriptives

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Control	75	3.7600	.99784	.11522	3.5304	3.9896	1.00	5.00
Gain	80	3.7875	.98974	.11066	3.5672	4.0078	1.00	5.00
Loss	82	3.8049	1.05922	.11697	3.5721	4.0376	1.00	5.00
Total	237	3.7848	1.01269	.06578	3.6552	3.9144	1.00	5.00

One-Way ANOVA Post Hoc Test

(I) Condition	(J) Condition	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Control	Gain	-.02750	.16343	.985	-.4130	.3580
	Loss	-.04488	.16247	.959	-.4281	.3383
Gain	Control	.02750	.16343	.985	-.3580	.4130
	Loss	-.01738	.15979	.994	-.3943	.3595
Loss	Control	.04488	.16247	.959	-.3383	.4281
	Gain	.01738	.15979	.994	-.3595	.3943



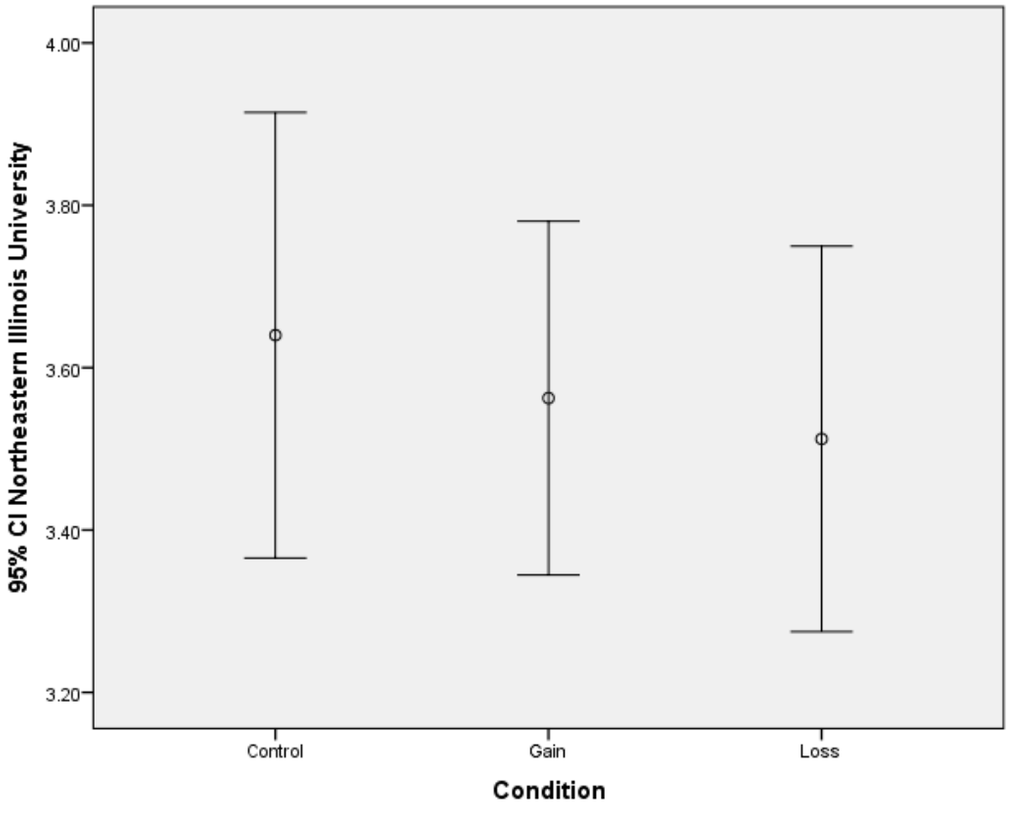
Northeastern Illinois University

Descriptives

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Control	75	3.6400	1.19277	.13773	3.3656	3.9144	1.00	5.00
Gain	80	3.5625	.97881	.10943	3.3447	3.7803	1.00	5.00
Loss	82	3.5122	1.08005	.11927	3.2749	3.7495	1.00	5.00
Total	237	3.5696	1.08163	.07026	3.4312	3.7080	1.00	5.00

One-Way ANOVA Post Hoc Test

(I) Condition	(J) Condition	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Control	Gain	.07750	.17438	.897	-.3338	.4888
	Loss	.12780	.17335	.742	-.2811	.5367
Gain	Control	-.07750	.17438	.897	-.4888	.3338
	Loss	.05030	.17050	.953	-.3519	.4525
Loss	Control	-.12780	.17335	.742	-.5367	.2811
	Gain	-.05030	.17050	.953	-.4525	.3519



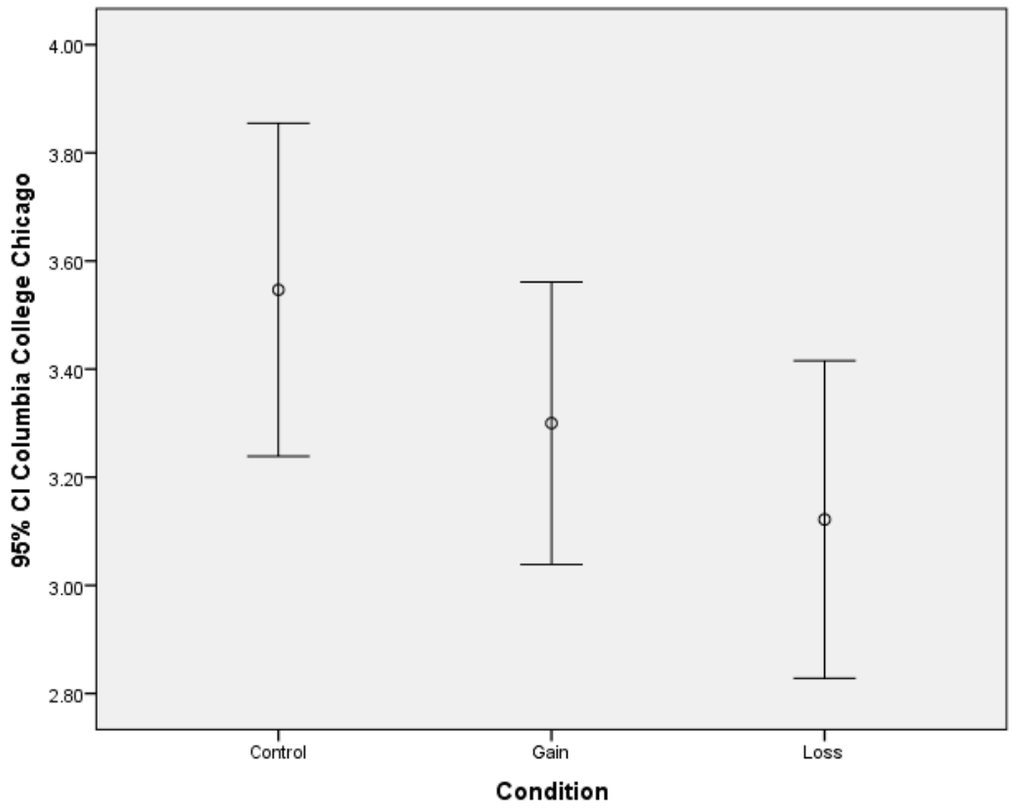
Columbia College Chicago

Descriptives

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Control	75	3.5467	1.33855	.15456	3.2387	3.8546	1.00	5.00
Gain	80	3.3000	1.17355	.13121	3.0388	3.5612	1.00	5.00
Loss	82	3.1220	1.33694	.14764	2.8282	3.4157	1.00	5.00
Total	237	3.3165	1.29088	.08385	3.1513	3.4816	1.00	5.00

One-Way ANOVA Post Hoc Test

(I) Condition	(J) Condition	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Control	Gain	.24667	.20648	.458	-.2404	.7337
	Loss	.42472	.20525	.099	-.0594	.9089
Gain	Control	-.24667	.20648	.458	-.7337	.2404
	Loss	.17805	.20188	.652	-.2981	.6542
Loss	Control	-.42472	.20525	.099	-.9089	.0594
	Gain	-.17805	.20188	.652	-.6542	.2981



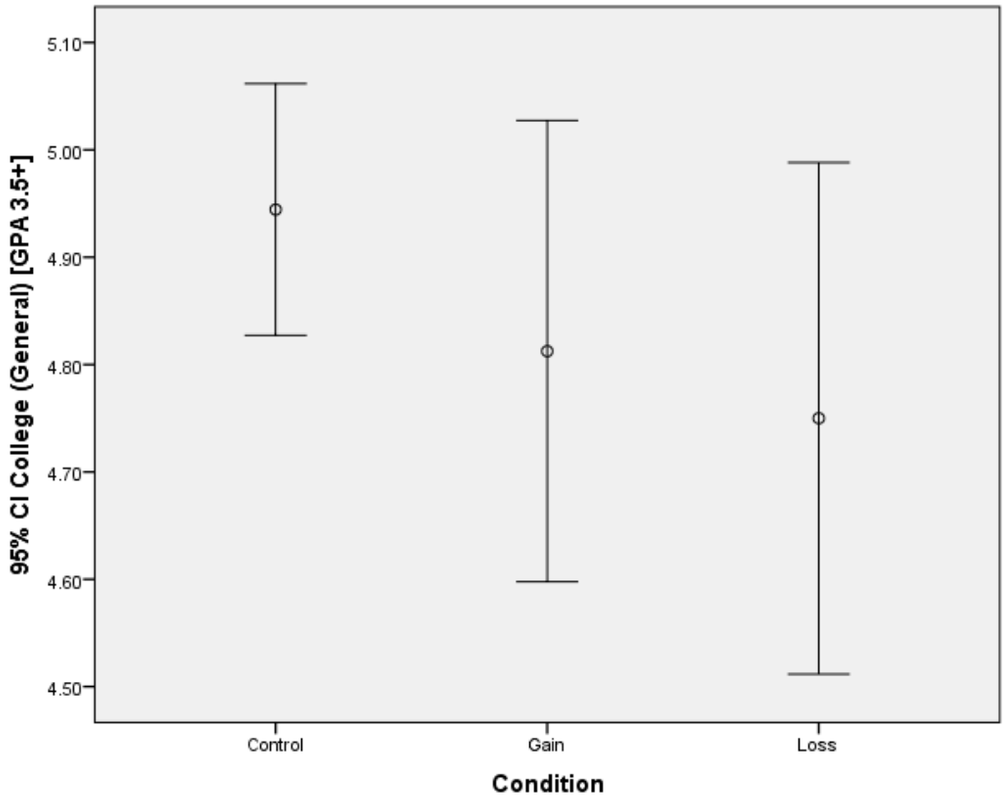
College (General) [GPA 3.5+]

Descriptives

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Control	18	4.9444	.23570	.05556	4.8272	5.0617	4.00	5.00
Gain	16	4.8125	.40311	.10078	4.5977	5.0273	4.00	5.00
Loss	16	4.7500	.44721	.11180	4.5117	4.9883	4.00	5.00
Total	50	4.8400	.37033	.05237	4.7348	4.9452	4.00	5.00

One-Way ANOVA Post Hoc Test

(I) Condition	(J) Condition	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Control	Gain	.13194	.12661	.554	-.1745	.4384
	Loss	.19444	.12661	.284	-.1120	.5009
Gain	Control	-.13194	.12661	.554	-.4384	.1745
	Loss	.06250	.13028	.881	-.2528	.3778
Loss	Control	-.19444	.12661	.284	-.5009	.1120
	Gain	-.06250	.13028	.881	-.3778	.2528



Northwestern University (GPA 3.5+)

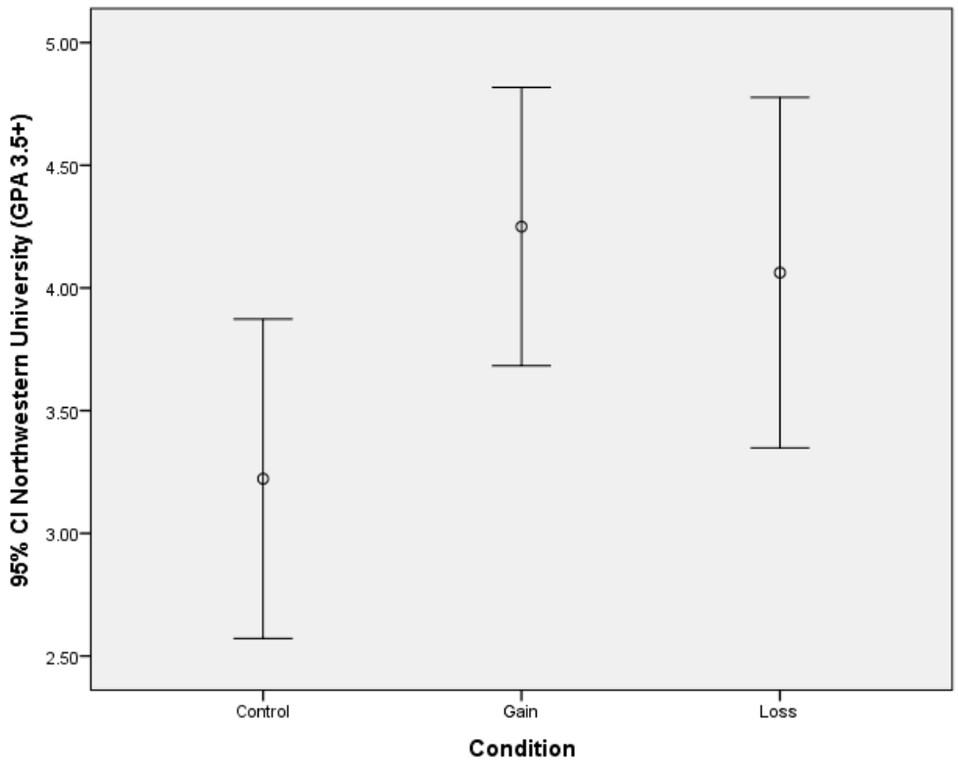
Descriptives

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Control	18	3.2222	1.30859	.30844	2.5715	3.8730	1.00	5.00
Gain	16	4.2500	1.06458	.26615	3.6827	4.8173	1.00	5.00
Loss	16	4.0625	1.34009	.33502	3.3484	4.7766	1.00	5.00
Total	50	3.8200	1.30447	.18448	3.4493	4.1907	1.00	5.00

One-Way ANOVA Post Hoc Test

(I) Condition	(J) Condition	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Control	Gain	**-1.02778***	.42835	.050	-2.0644	.0089
	Loss	-.84028	.42835	.133	-1.8769	.1964
Gain	Control	**1.02778***	.42835	.050	-.0089	2.0644
	Loss	.18750	.44077	.905	-.8792	1.2542
Loss	Control	.84028	.42835	.133	-.1964	1.8769
	Gain	-.18750	.44077	.905	-1.2542	.8792

* The mean difference is significant at the 0.05 level.



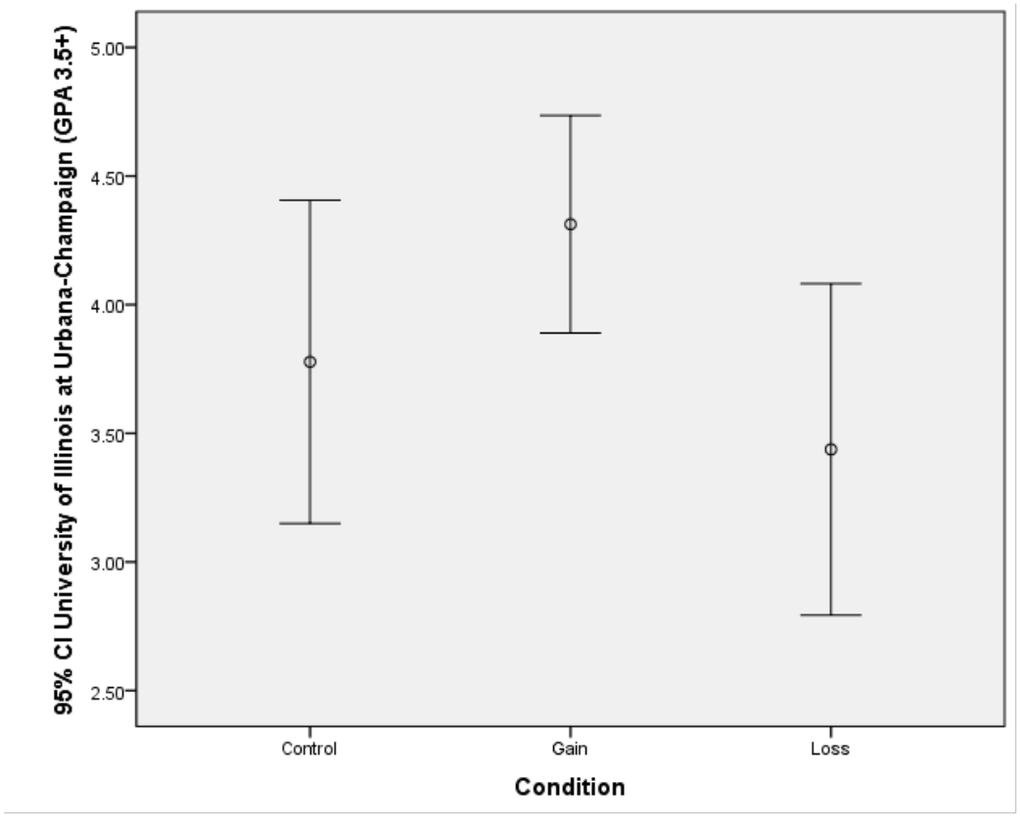
University of Illinois at Urbana-Champaign (GPA 3.5+)

Descriptives

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Control	18	3.7778	1.26284	.29765	3.1498	4.4058	1.00	5.00
Gain	16	4.3125	.79320	.19830	3.8898	4.7352	3.00	5.00
Loss	16	3.4375	1.20934	.30233	2.7931	4.0819	1.00	5.00
Total	50	3.8400	1.14927	.16253	3.5134	4.1666	1.00	5.00

One-Way ANOVA Post Hoc Test

(I) Condition	(J) Condition	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Control	Gain	-.53472	.38328	.352	-1.4623	.3929
	Loss	.34028	.38328	.651	-.5873	1.2679
Gain	Control	.53472	.38328	.352	-.3929	1.4623
	Loss	.87500	.39440	.078	-.0795	1.8295
Loss	Control	-.34028	.38328	.651	-1.2679	.5873
	Gain	-.87500	.39440	.078	-1.8295	.0795



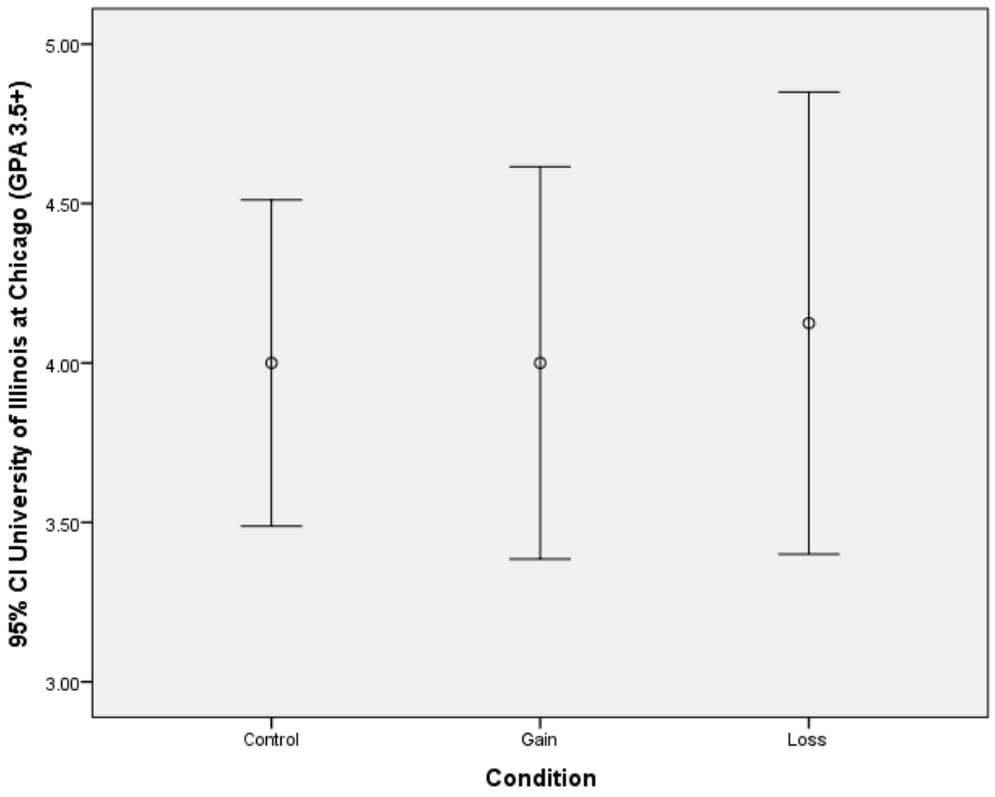
University of Illinois at Chicago (GPA 3.5+)

Descriptives

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Control	18	4.0000	1.02899	.24254	3.4883	4.5117	1.00	5.00
Gain	16	4.0000	1.15470	.28868	3.3847	4.6153	1.00	5.00
Loss	16	4.1250	1.36015	.34004	3.4002	4.8498	1.00	5.00
Total	50	4.0400	1.15987	.16403	3.7104	4.3696	1.00	5.00

One-Way ANOVA Post Hoc Test

(I) Condition	(J) Condition	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Control	Gain	.00000	.40639	1.000	-.9835	.9835
	Loss	-.12500	.40639	.949	-1.1085	.8585
Gain	Control	.00000	.40639	1.000	-.9835	.9835
	Loss	-.12500	.41817	.952	-1.1370	.8870
Loss	Control	.12500	.40639	.949	-.8585	1.1085
	Gain	.12500	.41817	.952	-.8870	1.1370



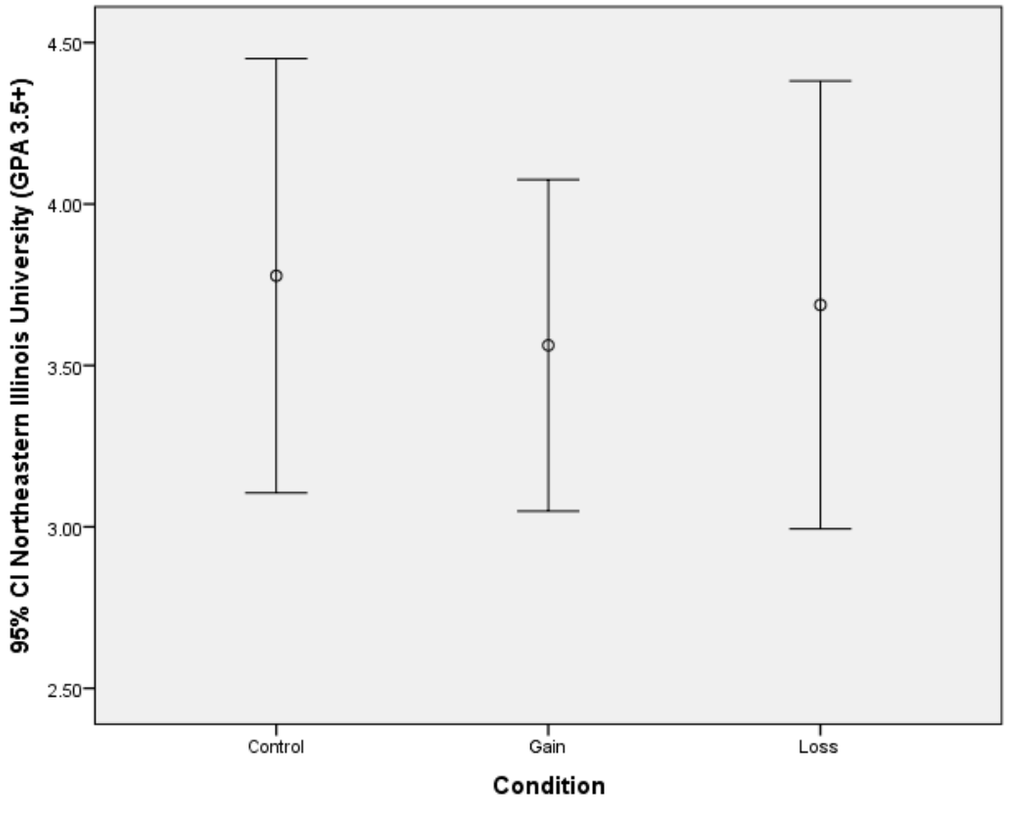
Northeastern Illinois University (GPA 3.5+)

Descriptives

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Control	18	3.7778	1.35280	.31886	3.1050	4.4505	1.00	5.00
Gain	16	3.5625	.96393	.24098	3.0489	4.0761	1.00	5.00
Loss	16	3.6875	1.30224	.32556	2.9936	4.3814	1.00	5.00
Total	50	3.6800	1.20272	.17009	3.3382	4.0218	1.00	5.00

One-Way ANOVA Post Hoc Test

(I) Condition	(J) Condition	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Control	Gain	.21528	.42077	.866	-.8030	1.2336
	Loss	.09028	.42077	.975	-.9280	1.1086
Gain	Control	-.21528	.42077	.866	-1.2336	.8030
	Loss	-.12500	.43297	.955	-1.1728	.9228
Loss	Control	-.09028	.42077	.975	-1.1086	.9280
	Gain	.12500	.43297	.955	-.9228	1.1728



Columbia College Chicago (GPA 3.5+)

Descriptives

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Control	18	3.6111	1.41998	.33469	2.9050	4.3172	1.00	5.00
Gain	16	3.4375	1.26326	.31582	2.7644	4.1106	1.00	5.00
Loss	16	3.2500	1.52753	.38188	2.4360	4.0640	1.00	5.00
Total	50	3.4400	1.38741	.19621	3.0457	3.8343	1.00	5.00

One-Way ANOVA Post Hoc Test

(I) Condition	(J) Condition	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Control	Gain	.17361	.48388	.932	-.9974	1.3447
	Loss	.36111	.48388	.737	-.8099	1.5322
Gain	Control	-.17361	.48388	.932	-1.3447	.9974
	Loss	.18750	.49791	.925	-1.0175	1.3925
Loss	Control	-.36111	.48388	.737	-1.5322	.8099
	Gain	-.18750	.49791	.925	-1.3925	1.0175