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Students Today Into Entrepreneurs Tomorrow: The Impact of Major Choice on Grit and Risk Aversion

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STUDENTS TODAY INTO ENTREPRENEURS TOMORROW: THE IMPACT OF MAJOR CHOICE ON GRIT AND RISK AVERSION

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Introduction:

The Bureau of Labor Statistics reports that more than half of all start-ups in the US fail before their fifth year in operation (BLS, 2010). As a result, since the mid-1980s, colleges and universities nationwide have continued to increase opportunities and funding to improve entrepreneurial education. Yet, little is known about how the choices students make during their time in college, like major choice, impact personality traits that are beneficial to entrepreneurship. Specifically, these traits are grit and risk aversion. The theoretically successful entrepreneurs are able to be committed to goals and remain motivated despite setbacks. Simultaneously they must maintain comfort in a culture of uncertainty associated with self-employment. This study employs data from a survey taken by 470 of the 1650 Ursinus College students, in varying disciplines, to understand that major choice is able to positively impact a student's level of grit while it does not impact risk aversion.

Background:

Entrepreneurship and Education

Successful entrepreneurship has the ability to transform economies by expanding industry, providing jobs, and giving humanity solutions for previously unaddressed problems. According to the Bureau of Labor Statistics (2015), establishments less than 1 year old created 2.5 million new jobs in 2010. Although entrepreneurship can have a significant impact on the economy, the process of starting and maintaining a business is risky. BLS highlighted that of the 632,510 entrepreneurial ventures started in 2005, only 48.8% survived past year five (BLS, 2015). Because of this low success rate many look to education as a way of preparing young minds for the intense landscape of the entrepreneurial world.

The National Consortium for Entrepreneurial Education (2012) reported in their survey that 80% of states feel that teaching "Entrepreneurship Skills are extremely important in the future" for high school and college aged students. As a result, many colleges are investing more time and money into programs. According to a study by the Kauffman Center for Entrepreneurial Leadership (2005), college programs encouraging entrepreneurship have grown since the mid-1980s. In 1985 only 250 American colleges taught entrepreneurship. By 2005 over, 5,000 courses are offered engaging more than 400,000 students (Kauffman Center, 2005). These classes combine a myriad of methods including case study analysis, networking, idea workshopping, and mentorship to aid students in their pursuit of successful entrepreneurship. The goal of many institutions is to create an entrepreneurship friendly culture on campus, where contributors from multiple areas of study are able to develop their ideas. Incentives are created through contests, and scholarships to make the new programs more attractive. For example, the University of North Carolina at Chapel Hill posts "pitch parties" for cash prizes open to the entire campus. Rice University makes over $1.2 Million Available in cash, prizes, and resources for winners of its business plan competition. Furthermore, Ursinus College's U-Imagine Center provides start-up funding and housing to a winning business plan. Some schools even host faculty contests to add to the culture of innovation. (EDA, 2013) Overall, entrepreneurship is gradually becoming a prevalent facet of college culture that seeks to spur innovation.

Risk Aversion and Grit

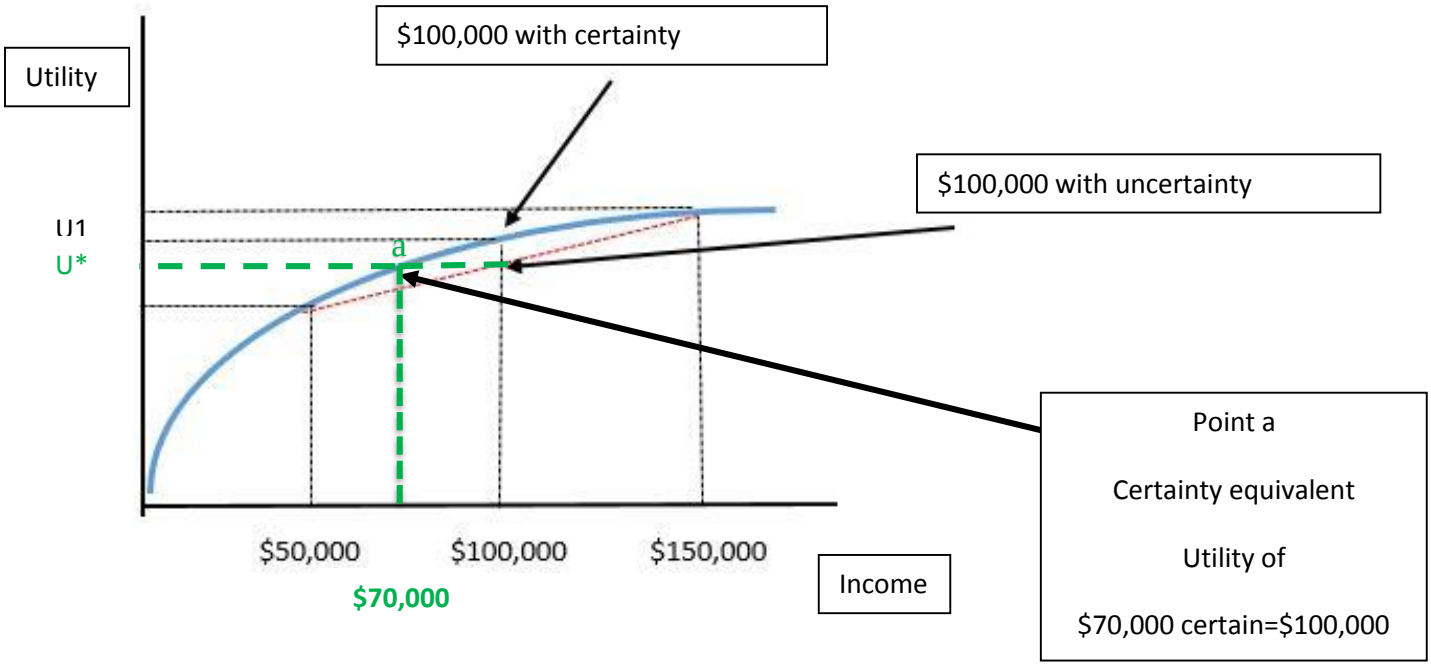
Risk Aversion

Some people are willing to take more risks than others. These differences are generally derived from a person's risk attitude. Risk attitude is a person's willingness to engage in a

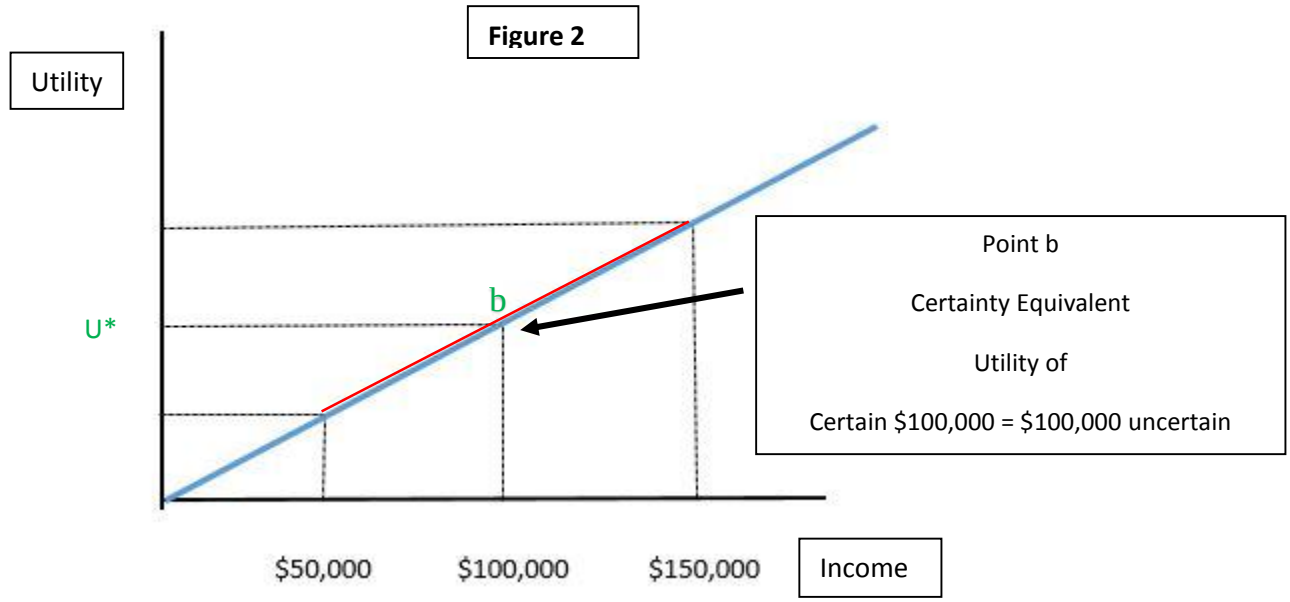
situation with a possible consequence. Risk attitudes are generally categorized as risk-averse, risk neutral, and risk loving. The difference between the three types is shown through the varying levels of marginal utility demonstrated during uncertain scenarios. Utility is total satisfaction derived from the decision a consumer makes. The amount of extra utility a person receives from consuming an additional unit of a good or service is marginal utility.

Given a choice between two events with the same expected return, a risk averse person chooses the event that is less risky. Additionally, risk averse people have a diminishing marginal utility of income in a certain or guaranteed scenario. For example, the amount of marginal utility a risk averse person receives from increasing income from $50,000 to $100,000 is greater than the marginal utility of increasing from $100,000 to $150,000 even though the net increase is $50,000 both times. The trend continues as every additional dollar of income increases marginal utility less and less. As a result, risk averse people have a concave utility curve for income as seen in **Figure 1** in blue. Additionally, a person is risk averse when the utility of the expected value of an uncertain scenario is less than the utility received from a certain event. Consider an uncertain scenario where there is a 50/50 chance that a person wins $50,000 or $150,000. In this situation, the expected value of the gamble is $100,000, illustrated by the red dashed line in Figure 1. The utility the person receives with a certain $100,000 (point U1) is greater than the utility demonstrated with uncertainty (point U*). Thus, the person is risk averse. Most investors are risk averse, however they vary in their degree of risk aversion.

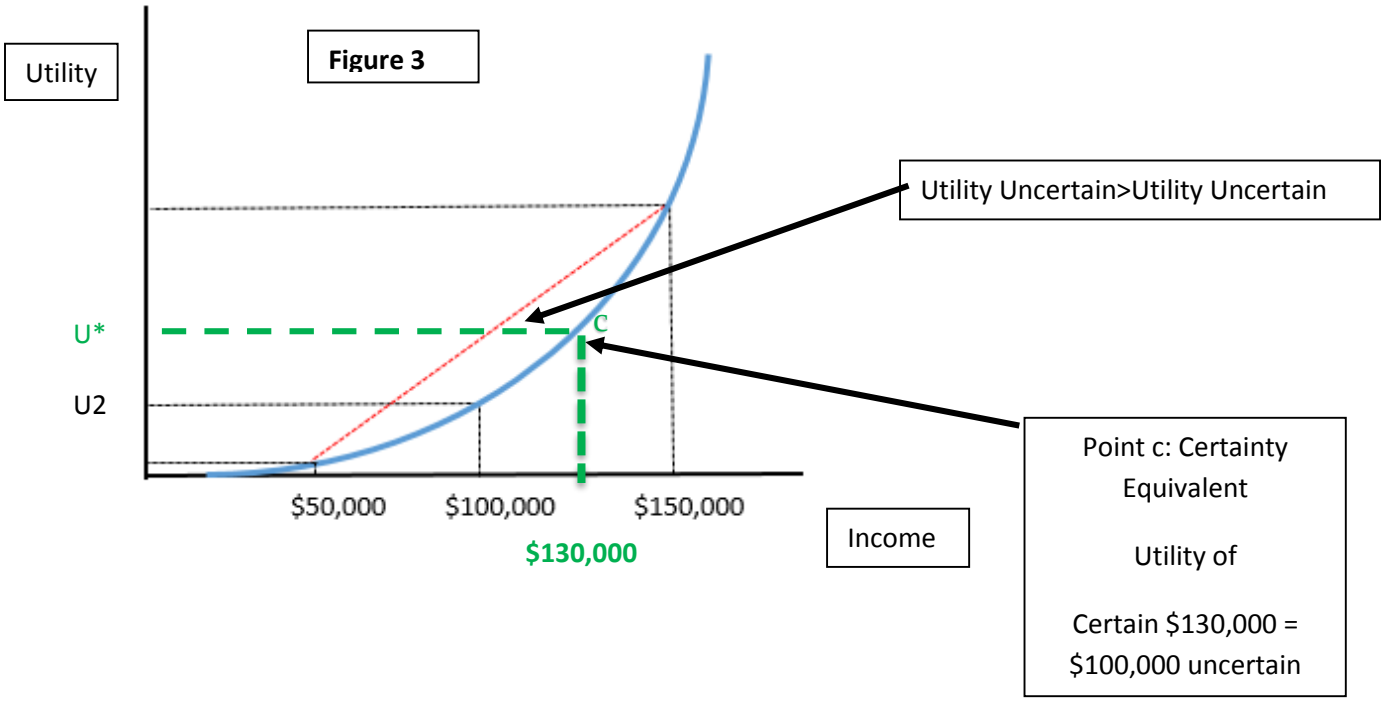
Figure 1



A risk neutral person has a linear utility function for income, meaning the marginal utility of income remains constant, as shown in Figure 2 below. This consistency implies, a risk neutral person receives the same utility from certainty as uncertainty. Given the same gambling scenario as above, the expected value of the gamble of $100,000 derives the same utility as the certainty of $100,000, as shown by point U*. A risk neutral person is indifferent to a gambling scenario.



A risk loving person has an increasing marginal utility of income. An increasing marginal utility of income suggests the marginal utility from increasing income from $50,000 to $100,000 is less than the marginal utility of increasing wealth from $100,000 to $150,000 even though the increase is $50,000 in both cases. Consequently, the shape of the blue income utility function is convex as shown in **Figure 3.** A risk loving person facing the same gambling scenario finds the utility received by taking the gamble an uncertain $100,000 (point U*) is greater than the utility of a certain $100,000 (point U2). Therefore, the risk loving person would be more prone to gamble.



Traditionally, risk is measured by creating gambling scenarios and alternating an individual's certainty equivalence. A certainty equivalence is the guaranteed amount of money that would be viewed as equally desirable as a gamble. It can be seen in **Figures 1, 2, 3** in green. It is evident in the three charts that risk averse, neutral, and loving have a difference in certainty requirement. For a risk averse person, the utility for the uncertain $100,000 shown as "point a" is associated with $70,000 with certainty. Therefore less income with certainty is equivalent to more income without certainty. Risk neutral people are indifferent in uncertain situations. Therefore, they equate the same amount of utility with uncertainty as certainty. Thirdly the risk loving person equates more income with certainty with less income without certainty. As seen as "point c" in **Figure 3**, the utility for an uncertain $100,000 is equal to the utility of a certain $130,000. The risk loving person equates more money with certainty with less uncertain money.

There is a positive relationship between risk loving and certainty equivalent. The more risk loving, the higher the required certainty equivalent.

Grit

Grit includes consistency of interest and perseverance of effort. Consistency of interest is one's ability to focus on a goal until it is completed, while perseverance of effort is an individual's persistence toward a goal when facing obstacles or challenges. Grit encapsulates an individual's ability to set a goal, plan, and execute an action. Duckworth (2007) sees grit as more important to classroom success than traditional measures of aptitude like IQ. She describes it as, "What goes through your head when you fall down, and how that-not talent or luck-makes all the difference" (Duckworth, 2016). Measuring grit is a recent phenomenon developed by Duckworth (2007). It is measured by asking a subject 8 questions that include a Likert Scale. The questions of the Grit Scale can be found in appendix A. Certain answers receive more "grit points." A simple arithmetic mean of the responses determines overall grit score. The score is built on a scale of 5, with 5 being extremely gritty and 1 being not at all gritty.

Literature Review:

Two common elements related to entrepreneurial activity are risk aversion and grit. Previous research regarding the two noted elements of entrepreneurial activities, risk aversion and grit, finds that these behaviors provide essential traits throughout different stages of entrepreneurship (Van Praag and Cramer, 2001; Claiendo, Fossen and Kritikos, 2009; Morgan and Sisak, 2015; Galton, 1892; Markman, Baron, Balkin, 2005) . Risk aversion allows for comfortable entry into the field, while grit leads to the sustainability of a goal. However, results are still inconclusive pertaining to the development of the two behaviors throughout the

educational process (Dohman, 2008; Van Praag and Cramer; 2010; Knight 2003; Halek, 2001; Huebner, 2015; Dweck, 2010; Cross, 2013; Duckworth, 2007; Duckworth, 2009).

Risk Aversion

Literature regarding the role risk aversion plays in entrepreneurial activities spans the disciplines of economics, psychology and education. Four key themes that accentuate the literature include entrepreneurial entry, cognitive ability, education level, and familial environment.

Literature suggests the personality trait of risk aversion correlates positively with entrepreneurs (Van Praag and Cramer, 2001; Claiendo, Fossen and Kritikos, 2009; Morgan and Sisak, 2015). In their longitudinal study of 5,800 Dutch citizens over a span of 30 years, Van Praag and Cramer (2001) find that respondents who chose to become entrepreneurs are more comfortable with risk. They were prompted with a question that asked them to buy into a gamble for a possible $10,000. For every additional dollar reported, the respondent is 1.52% more likely to choose to become an entrepreneur, ceteris paribus. Similarly, Caliendo, Fossen, and Kritikos (2009) find that individuals who exhibit a personality with lower risk aversion have a higher likelihood to be self-employed. They expand upon Van Praag and Cramer and establish a statistically significant relationship between low risk aversion and entrepreneurial entry, but only if an individual was previously in a wage bearing position. They based their findings on analysis using data from 22,000 individuals in 12,000 households from the German from the German Socio-Economic Panel where risk is measured on an 11 point scale. They find if an individual is characterized with low risk aversion their expected probability of entry into entrepreneurship increases by 3.4%, ceteris paribus. Additionally, Morgan and Sisak (2015) find that regardless

of a potential entrepreneur's level of confidence, fear of failure is negatively associated with entry into entrepreneurship. Therefore risk adverse individuals will be less likely to engage in entrepreneurial expectation if he or she has a high fear of failure.

While most literature establishes a correlation between levels of risk aversion and entrepreneurial entry, other factors also contribute to general levels of risk aversion (Dohman, 2008; Van Praag and Cramer; 2010; Knight 2003; Halek, 2001; Huebner, 2015). Two areas that impact risk aversion levels are cognitive ability and educational access. Dohman (2008) finds that individuals with higher cognitive ability are more comfortable taking risks. He measures cognitive ability of 1,000 German adults by having them take a symbol correspondence test and word fluency test. Dohman calculates certainty equivalent by asking 20 scenarios. They create scenarios where participants can flip a coin for €300 or take a varying safe amount from €0 in scenario 1 to €200 in scenario 20. Ceteris paribus, every additional point on the standardized symbol correspondence test increases the expected certainty equivalent by €8.16. Every additional point on word fluency test increases the expected certainty equivalent by €9.08, ceteris paribus. Therefore, individuals with higher cognitive ability are more comfortable with risk. While predisposed cognitive ability influences risk so does participation in school. Dohman (2008) also finds a statistically significant relationship between level of education and risk attitudes. Completion of high school increases the expected certainty equivalent by €21.54, ceteris paribus. The idea of educational access influencing risk attitudes is also found by Knight (2003). Knight (2003) using data from the Ethiopian Rural Household Survey which includes 1477 households in six regions of Ethiopia. He finds an additional year of education decreases the probability of an individual being risk averse by 2.6 percentage points, ceteris paribus. His rationalization for this occurrence is that the awareness of the positive and negative attributes of

the decision making process make an individual more comfortable with risk. However, results of the impact of education on risk attitude yields an opposite result in Halek (2001). In his study of 7.607 households in the University of Michigan Health and Retirement Study, finds a 10% increase in education increases risk aversion by 2.35%, ceteris paribus and Huebner (2015) in his study of 221 participants as part of the German Socio-Economic Panel Study, finds no statistical relationship between a son's academic level and risk aversion levels, but finds that highly risk-averse fathers limit a son's income mobility in the future. Therefore, education's role in risk behavior remains unclear.

Beyond education and cognitive ability, risk aversion is also influenced by an individual's family income (Halek, 2001; King, 1973). According to Halek (2001), a family's income has a diminishing marginal rate of risk aversion. When a family's wealth increases from $100,000 to $125,000 increase a child's expected risk aversion by 4.84%. Yet when a family's wealth increases from $1,000,000 to $1,025,000 risk aversion is expected to increase by 3.82%, ceteris paribus. This trend continues until a threshold of $4,359,000 is met then risk aversion would start to decrease. King (1973) finds similar results in his study of individuals entering riskier professions. His study has 511 participants in 37 occupational groups' subjects using data from the 1960 census. He measures risk by calculating the dispersion of salaries in a specific occupational field. For every increase in family income by $10,000 the expected dispersion of income within a profession increases by $600 ceteris paribus. Those who had higher initial income were more comfortable with risk. This may be because wealthier families can finance more human capital investments, which are often needed to be successful in high risk occupations.

Grit

Empirical, literature regarding measures of grit associated with entrepreneurial activities is limited because of the relative newness of the measured grit scale. However, three themes are most cited in literature surrounding grit including perseverance, academic achievement, and grit learned through education.

Despite risks in the decision making process, the sustainability of entrepreneurship depends on an individual's willingness to persevere and continue working despite setbacks (Galton, 1892; Markman, Baron, Balkin, 2005). Therefore, in order to be successful, entrepreneurs must pair a willingness to persevere with their products. Galton (1892) studies the career success qualitatively with his biographical study of top performers in different career fields. He believes that high achievers have "ability combined with zeal and with capacity for hard labour" (p.33). This capacity for hard labor allows high achievers to overcome obstacles that may get in their way. Markman et al (2005), find that entrepreneurs tend to be more able to persevere than wage working counterparts. In their study of 217 random patent investors they measure perseverance by using the Stotlz Scale. The Stoltz Scale measures perseverance by gauging an individual's perceived responsibility to achieve a task and perceived control overcoming adversity. Mean perceived control over adversity and perceived responsibility are significantly higher for entrepreneurs as they scored on average 0.33 points and 0.3 higher than their counterparts. Therefore, entrepreneurs tend to be able to persevere better than their wage-bearing counterparts. The Stotlz Scale only focuses on perseverance and not consistency of effort, unlike Duckworth's Grit Scale (2007).

Grit has been a reliable predictor for academic success (Duckworth, 2007; Bowman, 2015). Duckworth finds grit equal to IQ and other cognitive measures that can predict academic success. Duckworth's 2007 study of 139 Ivy League students at the University of Pennsylvania

shows that for every additional point on the grit scale the GPA of a students is expected to increase by 0.25 points, ceteris paribus. Additionally, a there is a negative relationship between grit and SAT scores. For every additional point of the grit scale, the expected SAT score decreases by 0.20 points suggesting that maybe, naturally gifted students are less gritty. In 2009 Duckworth uses data from 279 middle and high school students at a socioeconomically diverse school (Duckworth, 2009). Holding variables like time spent watching television and age constant, for every one point increase in grit expected GPA is increased by 0.30 points, ceteris paribus. Furthermore, Bowman (2015) breaks down components of grit to more specifically track areas that enhances academic capabilities. His study includes 417 undergrads at Bowling Green University. He finds that an additional point on the grit scale in perseverance increases expected GPA by .245 points, ceteris paribus. An additional point in consistency of interest increases expected GPA by .092 points, ceteris paribus. By these measures grittier students perform better academically.

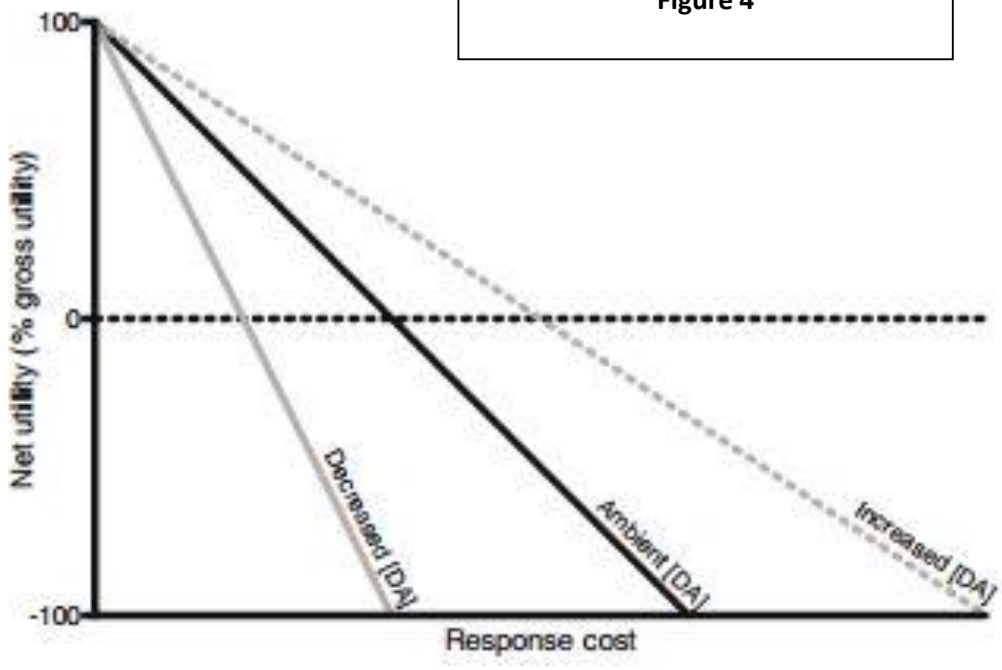
The effect of education on grit levels is still unclear. (Dweck, 2010; Cross, 2013; Duckworth, 2007; Duckworth, 2009). Dweck (2010) sees grit as a skill, best reflected through a growth mindset. Growth mindset is an intrinsic belief that talents, intelligence, and personality have the ability to grow overtime. Those who exhibit growth mindset see difficult obstacles as opportunities to improve their skills and create a better version of them. Therefore, long-term goals are more important than short term struggle. Dweck (2010) sees education that stresses long term projects as ways to develop growth mindset. Duckworth (2007) finds education level as a statistically significant predictor of grit level. In study of 1,545 random participants, Duckworth finds that more educated subjects are grittier, holding age constant. If a subject has an associate's degree instead of a high school degree, the expected grit score increases by 15.48

percentage points. However, Cross (2013) and Duckworth (2009) find no statistically significant relationship between education level and grit. Cross's (2013) study of 669 doctoral candidates over four years finds no statistically significant increase in grit scores, suggesting that doctoral candidates may already have high levels of grit prior to acceptance into the program. Meanwhile, Duckworth's (2009) study of socioeconomically diverse tested students in grades 7-11 for grit at the beginning of the school year and after the school year and sees no increase in grit. This was only based on a year of data, suggesting grit may take longer to develop.

Learning Risk Aversion and Grit

The behaviors of grit and risk-aversion are different. However, similar brain patterns cause an individual to repeat the two behaviors (Phillips, 2007; Kurniawan et al., 2011; Cousins Salamone, 1994). Literature explains that repeated behavior occurs because of conditioning of a reward pathway in the brain called the mesolimbic dopamine circuit (MLDC). Under normal conditions, the MLDC controls and individual's response to natural rewards, including food, sex, social interactions, and other rewards. The MLDC produces dopamine, a neurotransmitter that creates a pleasurable sensation in the body. The activation of this circuit and the response to retain high levels of dopamine can be seen as the basis for changes in grit and risk aversion.

Figure 4



MLDC activity is seen as a vehicle to develop risk behavior (Phillips, 2007). When a person is elicited with a risk scenario, midbrain dopamine neurons are activated by reward predicting environmental stimuli to encode a response to the possibility of future rewards. It biases decision making policies that are represented in the pathways to make decisions based on past positive experiences. In Phillips's (2007) study he illustrates this phenomenon as part of a cost discounting utility curve shown above in **Figure 4**. Phillips describes the curve as a figure with net utility on the vertical axis and response cost on the horizontal axis as seen. A response cost is a fine in response to bad behavior. As response cost increases, the net utility falls. Once the net utility drops below zero the outcome becomes unfavorable. Changes in dopamine alter the slope of the cost discounting utility curve. According to this model, individuals are enticed to make a more cost expensive expenditure when the dopamine levels rise because of the bias. Therefore, every decision made is accompanied by more units of risk per unit of utility. In essence the dopamine surge allows decisions to be made with higher consequence. If past risky

situations decisions have been successful the utility curve is biased more and more, and higher response cost are observed for every level of utility. This occurs because MLDC is malleable and can be conditioned. Activation of this circuit tells an individual to repeat what it did to get the reward. If this part of the brain is engaged repetitively, the memory centers in the brain pay attention to the positive response so it can easily be repeated in the future despite any foreseeable cost.

Similarly, the engagement of the MLDC can be found in gritty behavior (Kurniawan et al., 2011; Cousins Salamone, 1994). Kurniawan et al. (2011) see grit in terms of an effort based decision making model, which measures how individuals make a decision based on perceived effort. The study examines the MLDC's role in overcoming response costs. Response cost is the relative effort needed to conduct a task. Higher response costs are associated with more effort. This is illustrated by a scenario where an individual is forced to decide whether or not to engage in the arduous task of a long term goal or choose the lesser obstacle. Cousins and Salamone (1994) explain this occurrence with their experiments with rats. They created a T-like structure one with a high effort and high reward, and another with a low effort low reward. Rats with depleted levels of dopamine are less motivated to expend effort to achieve a goal, because there is no pleasure associated with the victory. This pleasure associated with goal acquisition can be conditioned through experience. Therefore, in the future they will be more willing to engage in goal oriented difficult tasks, which require grit for the need of the satisfaction.

While it appears that risk attitude and grit play some role in entrepreneurial mindset and success, the ability to develop of these skills are still debated. As shown Knight (2003), Halek (2001), and Duckworth (2007) education has a relationship with the two personality traits but they are refuted by studies like Cross (2013), Duckworth (2009) and Hubener (2015). However,

these studies focus more on general education. Previous literature does not follow an education process that has a specialty subject. Therefore it does not suggest which college major is best at fostering the development of traits crucial to successful entrepreneurship. It is unclear how different academic majors are able to alter these behaviors and at what magnitude. In the following paper, it is examined how the choice of a specific college major is able to impact a student's level of grit and risk aversion to prepare them to be an entrepreneur[1].

Economic Theory:

A person is born with an endowment of intellectual, social and emotional traits, which are affected over time through nurturing and education. The innate and learned attributes produce a stock of knowledge or human capital that enhances personal productivity. Years and quality of education and training, along with work ethic and social intelligence, contribute to how much a person's productivity can grow. The traditional human capital theory of labor markets suggests greater investments in time and resources toward building one's human capital generate greater productivity, leading to more demand for one's labor services and higher earnings.

Adapting the human capital model to entrepreneurial endeavors implies certain educational platforms lead to greater entrepreneurial development within a person. We test whether investing time in certain college majors leads to greater grit and less risk aversion. If more grit and less risk aversion lead to greater entrepreneurial human capital development, then college major choice impacts entrepreneurship. Two population regression models below demonstrate the goal to predict an individual's grit or risk aversion based on choice of major, years spent in college, gender and academic performance.

[1] The goal of this study is not to examine how the specific activities in a certain major (i.e. labs, presentations, ect.) prepare a student for entrepreneurship just simply an investment in time in a specific major's impact on grit and risk aversion.

Grit Population Regression Function:

(1)

$$Grit_i = \beta_0 + \beta_1 Class_i + \beta_2 CUMGPA_i + \beta_3 Male_i + \beta_4 Major_i + \in_i$$

(+) (+) (-) (+)

Where:

(2)

$$Major_i = \alpha_0 + \alpha_1 Peduc_i + \alpha_2 Famincome_i + \alpha_2 PSelfEmp_i + \alpha_2 Ath_i + \alpha_3 Adnights_i + \alpha_4 DIFGPA_i + \alpha_5 DaysTestPrep_i + \alpha_6 SATM_i + \alpha_7 SATV_i + \varphi_i$$

Risk Population Regression Function:

(3)

$$CE_i = \beta_0 + \beta_1 Class_i + \beta_2 CUMGPA_i + \beta_3 Male_i + \beta_4 Major_i + \delta_i$$

(+) (+) (+) (+)

Where:

(4)

$$Major_i = \alpha_0 + \alpha_1 Peduc_i + \alpha_2 Famincome_i + \alpha_2 PSelfEmp_i + \alpha_2 Ath_i + \alpha_3 Adnights_i + \alpha_4 DIFGPA_i + \alpha_5 DaysTestPrep_i + \alpha_6 SATM_i + \alpha_7 SATV_i + \varphi_i$$

Concentrating on the grit model equation (1), grit is the dependent variable that captures an individual's grit score, calculated by Duckworth's (2007) short grit scale. Extremely gritty

respondents score a five and respondents who are not gritty score a one. Class measures the student's year in college. First year students have a value of one and senior students have a value of four. Per Duckworth's (2007) findings more years of education are expected to yield higher grit scores, ceteris paribus, i.e., $\beta_1 > 0$. CUMGPA is a student's cumulative grade point average. Duckworth (2007) finds GPA as a positive indicator of grit so that β_2>0. Male is a student's gender. It is equal to 1 if a student is male and 0 for females. Systematic disadvantages in gender may lead to females to be grittier than males, therefore expected $\beta_3 < 0$. Lastly, major choice is expected to have varying effect on grit. There is no expected sign for major choice. $\in$ is a stochastic error term that includes how a student is hard wired to be gritty. This error term may include variables that effect both grit and major choice, therefore the coefficient on Major may suffer from omitted variable bias when estimating (1) via ordinary least squares due to the endogeneity between Major and the disturbance term. It is necessary to use a different econometric technique if omitted variable bias exists, namely the introduction of an instrumental variable in two stage least squares. Viable instrumental variables must be correlated with major choice but not with grit or the hardwiring variables included in the error term.

In the event of omitted variable bias found in ordinary least squares, we observe that major choice is endogenous. As seen in (2), a student's major is a function of factors that drive the decision making process that are not in (1). Equation 2 calculates the predicted value of major that is stripped of omitted variables by using instrumental variables. It is then included in Equation 1 as an independent variable. Ath is a binary variable that determines whether a respondent is a student athlete on campus. The demanding schedule of intercollegiate athletics leaves student athletes with less than average time to devote to studies. Therefore, athletes may gravitate towards majors with a less of a perceived time commitment. Adnights is a variable that

measures the number of nights per week a student goes out drinking or partakes in recreational drug use. Students that want to devote more time to drinking will be less likely to choose a time intensive major. DIFGPA is a variable that acts as a proxy for the difficulty of a major. It is calculated by taking a respondent's cumulative GPA and subtracting out the GPA within the major. Positive numbers indicate more success outside major, while negative numbers indicate success more academic success inside major relative to non-major courses. DaysTestPrep is the number of days in advance a student studies before a test. Like athletics, amount of time that a student is willing to spend studying impacts their likelihood of choosing a certain major. SATM and SATV are the respondent's score on the math and verbal sections of the Scholastic Achievement Test. These scores are likely to influence major choice because talent in a math field may encourage a student to pick a major that is math related, while verbal talent may be best represented in the humanities. φ_i is a stochastic error term that takes into account any other intrinsic factors that influence major choice.

In order to mitigate bias, instrumental variables are added to the major choice model. Peduc is a variable that indicates the highest education level of a respondent's parent. This variable acts as an instrumental variable for major choice. A parent's education level does not have an immediate impact on a student's hardwiring to be gritty, nor does it directly impact grit. However, it does impact major choice. Schneider, Swanson, Riegle-Crumb (1998) find that students with more educated parents take more tend to take science courses over their lifetime. Their study included data from the national longitudinal study from 1988-1994. Two other possible instrumental variables include family income and a binary variable for parent self-employment. Students with higher incomes may be more likely to choose a major that aligns with their interests rather than applicability to a job market or future earnings. This is supported

by evidence from Montmarquette et al (2002) in their study of 851 college students in 1979. They suggest that students from affluent families favor majors with a wider dispersion in future salaries. Family income does not have a direct impact on a student's level of grit or any hardwiring that causes grit, thus can be considered as an instrumental variable. A binary variable, measuring if a parent is self-employed is a possible instrument. Students may be influenced to pick specific majors that are related to their parental occupation. Thus, is correlated with major but not unobserved gritty hardwiring.

Equation (3) models the level of risk a student exhibits. CE is the dependent variable that represents a respondent's certainty equivalent. The higher a respondent's certainty equivalent the more comfortable the person is with risk, meaning less risk averse. As seen in (2), Class is anticipated to be positive, as consistent with Knight (2003) who finds that more educated people are more comfortable with risk. Therefore, $\beta_1 > 0$. CUMGPA is a variable measuring cognitive ability and it is expected to be positive as consistent with Dohman's (2008) findings that more cognitively gifted students are more comfortable with risk ($\beta_2 > 0$). Male is a binary variable signaling gender. Males have demonstrated less risk aversion in prior research (Hartog et al. 2002; Agnew et al. 2008). Thus, the expected coefficient is $\beta_3 > 0$. Major choice is expected to have varying effects on risk aversion and suffer omitted variable bias as above for the grit equation (1). δ_i is a stochastic error term that accounts for all intrinsic aspects of a person's level of risk aversion. It captures personality traits that impact both risk aversion and major choice that may not be measurable. For example, if a person is not materialistic, they may be more inclined to take risks. Consequently, they may choose a major that does not have high expected earnings. Thus, this model is subject to the same omitted variable bias as the grit model. Therefore, major is a function of the aforementioned variables.

Econometric techniques:

Ordinary Least Squares (OLS) and a 2-stage least squares (2SLS) with instrumental variables can be used as methods to estimate the relationship between the explanatory variables and the dependent variable. OLS offers the best linear unbiased estimator when all Gauss-Markov assumptions are held, but when omitted variable bias is present OLS yields biased and inconsistent estimates.

To mitigate bias a 2 stage least squares regression (2SLS) with strong instrumental variables can be performed. The strength of an instrument is important because weak instruments can bias the distribution of variances for variables. Therefore, point estimates can be inaccurate. Hill et al (2011) establish a strong instrument to have a t-value greater than 3.16 in the first stage of 2SLS, per Staiger and Stock (1997). These two findings are linked as Hill (2011) derives the t-value threshold from an F value of 10. If the instrument is not sufficiently strong, 2SLS is considered a worse estimation than OLS.

Since there are multiple options for major choice, a multinomial logit predicts the likelihood of a student choosing particular majors based on the determinants in (2). The probability associated with the choosing the major represents the first stage of 2SLS. In this model, the probability distribution for the outcome variable is assumed to be a multinomial rather than a binomial distribution, which would predict the individual probability of being one major against all others, the multinomial logit recognizes there are many options for major choice. For multinomial logits, the sum of the predicted major choices equals one, suggesting the sum of the likelihoods for all potential major choices is one for any respondent.

Data: Data for this study was collected through a 50 question survey of 504 students at Ursinus College in spring 2016. The survey can be found in Appendix B. The survey included a short-grit scale, questions about gambling tendencies, family background, social behavior, and demographics.

Figure 5 Summary Statistics

Variable	N	Mean	Std Dev	Minimum	Maximum
GRIT	504	3.4821429	0.5466472	1.7500000	4.7500000
CE	503	27.2521272	52.4714219	0	500.0000000
BIO	504	0.2678571	0.4432827	0	1.0000000
BE	504	0.2420635	0.4287581	0	1.0000000
HEP	504	0.1011905	0.3018804	0	1.0000000
ENG	504	0.0833333	0.2766600	0	1.0000000
OTHER	504	0.1428571	0.3502748	0	1.0000000
PSYCH	504	0.1587302	0.3657873	0	1.0000000
Male	504	0.4325397	0.4959204	0	1.0000000
Class	503	2.7952286	0.9939143	1.0000000	4.0000000
CUMGPA	483	3.2709317	0.4063148	1.7000000	4.0000000
MajGPA	400	3.2996275	0.4732679	0	4.0000000
Peduc	498	3.9779116	1.0450198	2.0000000	5.0000000
Famincome	404	169829.81	377351.09	0	7000000.00
PSelfEmp	502	0.3047809	0.4607737	0	1.000000
DaysTestPrep	503	4.7634195	2.0222108	1.0000000	9.0000000
Ath	504	0.4345238	0.4961868	0	1.0000000
Adnights	504	1.4305556	1.6846692	0	7.0000000
SATV	359	644.6657382	197.6906610	300.0000000	2170.00
SATM	375	618.2933333	115.9454017	300.0000000	1600.00
Fresh	504	0.1150794	0.3194348	0	1.0000000
Soph	504	0.2698413	0.4443182	0	1.0000000
Junior	504	0.3174603	0.4659507	0	1.0000000
Senior	504	0.2956349	0.4567810	0	1.0000000

As seen in **Figure 5** above, of the total respondents, 55 are freshman, 127 are sophomores, 156 are juniors and 148 are seniors. In our majors of interest, 130 respondents are Biology majors, and 119 are Business and Economics majors, 51 are Health and Exercise Physiology majors, 38 are English majors, and 77 are Psychology Majors, 72 have other interests. Females comprise the majority of the sample, accounting for 67% of all responses. Slightly less than half of the sample are athletes, 43%. On average, the highest educated parent in the sample has a bachelor's degree. Respondents are instructed to report the parent with the higher level of education. It is based on a five point scale with one being "less than high school" and five equaling "advanced professional degree" Furthermore, the average family in the sample has yearly income of $169,829.81 with top earners reporting $7,000,000.00 a year. Students who took this survey are good academic performers. The average cumulative GPA is 3.3. Respondents also claim they start studying on average 5 days before a significant test and only drink alcohol one night per week. The survey does have an option to decline answering a question and does not have limits for appropriate answers. As a result, respondents have incomplete answers or answers that were nonsense. For example some respondents report SAT math scores far exceeding the maximum of 800 points.

Culling inappropriate and missing data cut the sample size in half from 504 to 286 participants. Three popular majors at Ursinus are included Biology (BIO), Business and Economics (BE), and Health and Exercise Physiology (HEP). As seen in **Figure 6,** for the respondents used in the regression modeling, 34% are BIO Majors, 26% were BE majors, 8% were HEP majors and 8% had other academic interests[2].The sample was comprised by 53% male respondents and 47% female respondents. The sample contains 8.74% first year students,

[2] Double Majors were not accounted for in the data set.

27.62% sophomores, 32.17% juniors and 32.47% seniors. Athletes make up 48% of the sample, a larger percentage of this sample than before. Average cumulative GPA of the group decreases slightly to 3.27 and have a mean SAT scores of 611 and 617 in SAT verbal and math respectively. SAT scores have a relatively tight dispersion as both standard deviations are only 91 and 90 points. Students in this sample prepare for test 5 days ahead of time and drink 2 nights per week. The Ursinus students included in the survey have a mean grit score of 3.5 meaning that as a whole the sample is grittier than the average population (2.5). The certainty equivalent was elicited by asking respondents how much they would buy into a coin flip with a possible payoff of $500. The gamble has an expected value of $250. The average of the certainty equivalents equals $32.55, with the riskiest member reporting $500 and the most risk averse person opting out of the gamble completely.

Figure 6: Revised Summary Statistics

Variable	N	Mean	Std Dev	Minimum	Maximum
GRIT	**286**	3.4707168	0.5319457	1.8750000	4.7500000
CE	**286**	$32.3035315	$53.3848039	$0	$500.0000000
BIO	**286**	0.3391608	0.4742543	0	1.0000000
BE	**286**	0.2622378	0.4406222	0	1.0000000
Male	**286**	0.5349650	0.4996502	0	1.0000000
Class	**286**	2.8636364	0.9618728	1.0000000	4.0000000
CUMGPA	**286**	3.2770070	0.4030404	1.7000000	4.0000000
peduc	**286**	4.0524476	1.0365484	2.0000000	5.0000000
DaysTestPrep	**286**	4.7342657	2.0466525	1.0000000	9.0000000
ath	**286**	0.4755245	0.5002760	0	1.0000000
Adnights	**286**	1.5559441	1.6379329	0	7.0000000
difgpa	**286**	-0.0052902	0.3098807	-1.0000000	3.5800000
SATV	**286**	610.6328671	89.7961913	300.0000000	800.0000000
SATM	**286**	617.1328671	90.5954755	300.0000000	800.0000000
[3]**Famincome**	**258**	154558.61	133270.30	0	1000000.00

Regression Modeling:

As mentioned, majors of interest for the results are narrowed down to BIO, BE and HEP. Originally, it was planned to analyze the top 5 most populated majors at Ursinus. However, the data set does not include adequate sample size of students not in the top five majors to aid in estimation. There is not enough of a control group to predict the probability of major choice

[3] Of the 286 only 258 had family incomes listed. Therefore using this as an instrument was not helpful.

when all 5 majors are included in the regression. Additionally, there were no strong instruments to predict the likelihood of being an English or Psychology major.

OLS is seen as the best linear unbiased estimator to yield significant results, preferred to 2SLS if there are no strong instruments. However, due to potential omitted variable bias, 2SLS with a multinomial logit model is tested. Multiple combinations of instruments are used, including parent self-employment and family income. However, the only instrument that is significant to the model is parent education. The instrument parent education is used in the first stage of the 2SLS to predict major choice. Even though Peduc's coefficient yields a t statistic below the 3.17 t-value guideline established by Hill (2011) and Staiger and Stock (1997), results of the Hausman test imply endogeneity is present in the model[4]. Therefore, the Peduc instrument should be employed. Parent education had a t-value of 2.61 the first stage predicted BIO and a t-value of 2.51 for the first stage of the multinomial predicting BE. These numbers indicate significance in the first stage, even if they do not exceed conventional thresholds noted by Hill (2011). Although the multinomial logit model using parent education as a viable instrument and Hausman test results suggest this model is preferred over the OLS model, results from both are presented for comparisons in **Figure 7**. Breush-Pagan testing yields that there is no heteroskedasticity in our model[5].

[4] BIO residual p value 0.0631;HEP residual p-value 0.0012 forHausman test
[5] F statistic of Breush Pagan Test 1.75 BIO BE. F-Statistic 1.57 in Bio BE HEP model

Figure 7a: 2 Major Grit Regression BIO BE

Grit Results Dependent Variable Grit				
Variable	**Parameter Estimate OLS**	**P value**	**Multinomial 2SLS Parameter Estimate**	**P value**
Intercept	2.31285	<.0001	2.19788***	<.0001
BIO	0.19220[6]**	0.0069	0.46299**	0.07154
BE	0.07680	0.3450	0.42131**	0.05497
Male	-0.06968	0.2860	-0.09469	0.17113
Class	0.01335	0.6753	0.00688	0.83884
CUMGPA	0.32700***	<.0001	0.31598	<.0001
AIC[7]	-374.16		-374.70	

After examining regression results from both estimation techniques OLS and 2SLS-Multinomial - in **Figure 7a,** major choices of BIO and BE and cumulative GPA have a positive significant impacts on grit. The results of the multinomial 2SLS model indicate that BIO majors have an increased expected grit score by 0.46** points, ceteris paribus. Furthermore, if a student is a BE major, expected grit score increases by .42** grit points, paribus. BIO and BE increase by similar magnitudes. Testing yields that the coefficients are not statistically different[8]. Failing

[6] Results were deemed significant by conducting a two tail hypothesis test.

*** signifies significance at 99% confidence interval
** signifies significance at 95% confidence interval
*signifies significance at 90% confidence interval

[7] [7] The Akaike Information Criteria (AIC) score is a goodness of fit measure. The model with the smallest AIC is the model of best fit. It is derived by the formula. AIC=n *ln(MSE) + 2 k. where n is the number of observations and k is the number of variables in the model.

[8] P value Bio=BE is 0.4786

to reject the hypothesis that the two majors are the same suggests the impacts are not statistically different for BIO and BE. However, because of uncertainty we can never know definitively if they are equal. Yet, there is no evidence to suggest they are not equal. It is evident that omitted variables in the OLS model are negatively biasing results due to differences in magnitude of the impact of major choice on grit. The expected grit score for a Bio major increases from 0.25** to 0.46** grit points, while BE becomes more significant and increases from 0.13* to 0.42** grit points. The goodness of fit measure indicate that correcting for omitted variable bias improves results as AIC decreases slightly from -374.16 to -374.70. Notably, class is not significant to this model, nor is gender. These two variables are consistent with our hypothesis that males would be less gritty and class increases grit, yet the variables are insignificant.

Figure 7b: 3 Major Regression BIO BE HEP

Grit Results Dependent Variable Grit				
Variable	**OLS Parameter Estimate**	**P Value**	**Multinomial 2SLS Parameter Estimate**	**P Value**
Intercept	2.22085	<.0001	1.91894	<.0001
BIO	0.24724***	0.0010	0.63765***	0.0086
BE	0.12950*	0.1241	0.37701**	0.0613
HEP	0.26222**	0.0255	1.07635**	0.0037
Male	-0.06123	0.3457	-0.08789	0.1732
Class	0.01437	0.6498	0.02098	0.5115
CUMGPA	0.33618***	<.0001	0.34547***	<.0001
AIC	-378.81		-378.81	

This relationship still holds when a third Major, Health and Exercise Physiology, is introduced into the model. Adding more majors with a limited sample size may fail to find significant results. Given this data set, any major beyond HEP yields insignificant results. Adding HEP helps aid the variability in major choice which helps encourage significant results

across differing magnitudes of coefficients. As seen in **Figure 7b,** major choice still retains significance. From the multinomial 2SLS results, Bio majors have an expected grit score 0.64*** grit points higher than other majors, ceteris paribus. BE majors have an expected grit score of 0.38** grit points higher than non-BE majors, ceteris paribus. Lastly HEP majors increase Grit score by 1.08** grit points ceteris paribus. Coefficient testing yields that the hypothesis that the coefficients are equal can be rejected as BE and HEP are statistically different[9]. Omitted variable bias in the OLS negatively biases major choice's impact on grit. As every major impacts grit at a larger magnitude once endogeneity is corrected. Meanwhile, the AIC remains stable at -378.81.Similarly, class and major choice are not significant to the model.

Furthermore, cumulative GPA is highly significant and consistent in magnitude for both models. It aligns with Duckworth's (2007) findings that students who perform better in an academic setting tend to be grittier than their classmates who perform worse. A 1.0 unit increase in GPA, as in going from a 2.0 to a 3.0, increased expected grit score by 0. 33*** grit points in OLS and 0.32*** points in 2SLS, ceteris paribus. Even when HEP is introduced into the model the impact of a 1.0 increase in GPA remains stable as it increases grit score by 0.34*** grit points in OLS, ceteris paribus and 0.35*** in multinomial 2SLS, ceteris paribus.

Risk Results:

Similar regression modeling is employed to mitigate omitted variable bias. In the risk model parent education is the lone significant instrument. Although the t values[10] of parent education do not exceed Hill's (2011) threshold. Hausman testing yields significant residuals at 95% confidence in BIO and BE[11]. Thus, endogeneity is present in the model and multinomial

[9] P-value Bio=BE=HEP is 0.2259; p value Bio=HEP 0.2451; p value BE=HEP 0.1014

[10] Bio 2.61 BE 2.51

[11] P value bio residual-0.0844, p value BE residual 0.0579

2SLS is the preferred model. A Breusch -Pagan test yielded heteroskedasticity in the model. Therefore standard errors shown below are corrected for heteroskedasticity[12].

Figure 8a; Two Major Risk Results

Risk Results Dependent Variable CE				
Variable	**OLS Parameter Estimate**	**P Value**	**Multinomial 2SLS Parameter Estimate**	**P Value**
Intercept	1.44597	0.9573	-13.18400	0.6408
BIO	-8.04029	0.2654	17.01690	0.4903
BE	-13.82167	0.0961	12.73894	0.5454
Male	28.57416***	<.0001	24.61547***	0.0003
Class	-0.59922	0.8537	-0.57008	0.8610
CUMGPA	7.21355	0.3565	7.57151	0.3390
AIC	2270.55		2270.57	

Considering the results of the double major model in **figure 8a** multinomial 2SLS and OLS regressions yield no relationship between major choice and risk aversion. Interestingly, between the two methods the sign of the coefficients changes. This signals negative omitted variable bias in the OLS model. Results for major are also more significant but are still not statistically significant. However, Male is a notable significant variable in both regressions. These results are similar to findings from Halek (2001), Hartog et al. (2002) and Agnew et al. (2008) who all find that males are less risk averse than females. According to the multinomial 2SLS, being a male increases expected certainty equivalent by $24.62***. The difference

[12] F statistic of 15.19 in BIO BE model
F Stat of 12.55 in BIO BE HEP model

between the models is relatively small. In 2 major OLS males have a certainty requirement $28.57*** higher than other genders, ceteris paribus. As noted by this difference, omitted variables positively bias OLS results for gender. The multinomial 2SLS model slightly improves goodness of fit measure as the AIC remains relatively stable. Another notably insignificant variables is Class, as it is observed that additional time spent in college does not alter risk aversion, which aligns with Halek (2001). Furthermore, CUMGPA is not significant, which contrasts with Dohman's (2008) findings that more gifted students are less risk averse.

Figure 8b 3 Major Risk Results.

Variable	OLS Parameter Estimate	P Value	Multinomial 2SLS Parameter Estimate	P Value
Intercept	0.99541	0.9823	-23.83422	0.4254
BIO	-7.77072	0.3692	19.23053	0.4392
BE	-13.56357	0.2180	5.76064	0.7807
HEP	1.28422	0.9275	50.21680	0.1851
Male	28.61554***	0.0001	25.19847***	0.0002
Class	-0.59424	0.8876	0.11421	0.9723
CUMGPA	7.25849	0.4956	9.17045	0.2498
AIC	2271.60		2271.59	

When the model included HEP as seen in **Figure 8b**, the results are consistent with the 2 major regression. Major is still insignificant. Though, maleness retained significance. Being male increases expected certainty equivalent by $25.19**, ceteris paribus. In 3 major multinomial 2SLS expected certainty equivalent decreased from $28.51** indicating positive omitted variable bias in ordinary least squares. Similarly, the AIC remains stable as correcting for

omitted variable bias only improved AIC by 0.01 points. Again, Class is insignificant, as additional time spent learning does not have a relationship with risk aversion in this case and more gifted students are not less risk averse.

Conclusion:

The goal of this study was to identify which major is related to personality traits essential to an entrepreneur. The results of this study are an inconclusive. By focusing on the three majors at Ursinus it is clear that major choice has an impact on grit in the fields of Biology, Business & Economics and Health & Exercise Physiology at Ursinus College. All three major choices have a positive significant impact on grit, ceteris paribus. BIO, BE, or HEP major increases expected grit scores by 0.64 and 0.38 and 1.08, respectively. Considering the mean of the sample shows a grit score of 3.5, these represent an 18% increase in grit by solely by being a BIO major, a 11% increase in grit by solely being a BE major, and a 31% increase in grit by solely being a HEP major. Although the Health and Exercise Physiology major contributes considerably more to grit development than Biology or Business and Economics they all show statistically significant increases. Similarly, grit can be positively impacted through academic achievement. The clear correlation between cumulative GPA and grit was evident in every model, suggesting that students who do better in school are grittier not necessarily gifted. This is consistent with Duckworth's (2007, 2009) findings that GPA is a clear indicator of grit. A notable insignificant variable was Class. According to the study, grit does not have a relationship with educational level, which is consistent with Cross (2013). It does not demonstrate that as students make progress through the curriculum they get grittier nor do they become less gritty. Another hypothesis that gender impacts grit is not confirmed.

The results of risk aversion do not link major choice to risk aversion. It seems that the only significant association to risk attitude is through gender. Males demonstrate higher risk aversion than other genders. It was consistently significant and positive at large magnitudes across every regression that was run. It is possible that the socialization of males encourages them to be more risk friendly than any other gender. Again this notably was not linked with major. However, the coefficients changed significantly from OLS to multinomial 2SLS and became more significant. This suggests that a larger sample size may be able to yield significant results on major choice's impact on risk aversion. Class year is not significant, suggesting that other factors be more important to determining an individual's risk tendencies. Nor is cumulative GPA suggesting that 'smarter' students may not be less risk averse.

Avenues for future Research:

This study has a number of caveats which altered the likelihood of producing significant results. First, the sample size could be expanded to included different types of schools beyond liberal arts institutions. The data in this study only included data from Ursinus College in the 2015-2016 school year. Since the student population is only 1650 there are natural disadvantages to having a large sample size. Secondly, the data was cross sectional. Class may have been insignificant because it was comparing different people. The study may be benefitted by having students take the survey as a sophomore and a senior to see how for years has impacted them at an individual level. The time constraints of this project, however, did not permit that luxury. Lastly family income can be included in the risk aversion model. Many respondents of the survey were either unsure of family income or did not report. Therefore, when regression was run with family income included it severely limited sample size. Therefore in tandem with

increasing the overall size family income could aid in specifying risk. Overall, fixing these limitations within the study may be beneficial for producing significant results.

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Appendix A Short Grit Scale.

Scoring:

1. For questions 2, 4, 7 and 8 assign the following points: 5 = Very much like me 4 = Mostly like me 3 = Somewhat like me 2 = Not much like me 1 = Not like me at all 2.
2. For questions 1, 3, 5 and 6 assign the following points: 1 = Very much like me 2 = Mostly like me 3 = Somewhat like me 4 = Not much like me 5 = Not like me at all Add up all the points and divide by 8. The maximum score on this scale is 5 (extremely gritty), and the lowest score on this scale is 1 (not at all gritty).

Questions:

1. New ideas and projects sometimes distract me from previous ones.
    a. Very much like me
    b. Mostly like me
    c. Somewhat like me
    d. Not much like me
    e. Not like me at all
2. Setbacks don't discourage me
    a. Very much like me
    b. Mostly like me
    c. Somewhat like me
    d. Not much like me

e. Not like me at all

3. I have been obsessed with a certain idea or project for a short time but later lost interest
    a. Very much like me
    b. Mostly like me
    c. Somewhat like me
    d. Not much like me
    e. Not like me at all
4. I am a hard worker
    a. Very much like me
    b. Mostly like me
    c. Somewhat like me
    d. Not much like me
    e. Not like me at all
5. I often set a goal but later choose to pursue a different one.
    a. Very much like me
    b. Mostly like me
    c. Somewhat like me
    d. Not much like me
    e. Not like me at all
6. I have difficulty maintaining my focus on projects that take more than a few months to complete.
    a. Very much like me
    b. Mostly like me
    c. Somewhat like me
    d. Not much like me
    e. Not like me at all
7. I finish whatever I begin
    a. Very much like me

b. Mostly like me

c. Somewhat like me

d. Not much like me

e. Not like me at all

8. I am diligent

a. Very much like me

b. Mostly like me

c. Somewhat like me

d. Not much like me

e. Not like me at all

*Appendix **B:** Survey Questions:*

Q1 New ideas and projects sometimes distract me from previous ones.

- ❍ Very much like me
- ❍ Mostly like me
- ❍ Somewhat like me
- ❍ Not much like me
- ❍ Not like me at all

Q2 Setbacks don't discourage me.

- ❍ Very much like me
- ❍ Mostly like me
- ❍ Somewhat like me
- ❍ Not much like me
- ❍ Not like me at all

Q3 I have been obsessed with a certain idea or project for a short time but later lost interest.

- ❍ Very much like me
- ❍ Mostly like me
- ❍ Somewhat like me
- ❍ Not much like me
- ❍ Not like me at all

Q4 I am a hard worker.

- ❍ Very much like me
- ❍ Mostly like me
- ❍ Somewhat like me
- ❍ Not much like me
- ❍ Not like me at all

Q5 5*5=

Q6 Someone offers you the choice between $45 for sure, or flipping a coin. If the coin flip results in heads you win $100, but if it is tails you win $0. You choose to:

- ❍ Flip the Coin
- ❍ Take the $45

Q7 Someone Offers you the choice between $40 for sure, or flipping a coin. If the coin flip results in heads you win $100, but if it is tails you win $0. You choose to:

- ❍ Flip the Coin
- ❍ Take the $40

Q8 Someone offers you the choice between $35 for sure, or flipping a coin. If the coin flip results in heads you win $100, but if it is tails you win $0. You choose to:

- ❍ Flip the Coin
- ❍ Take the $35

Q9 You are again offered a gamble where a coin is flipped, and if it Is heads you win $500, and if it is tails you win nothing. However, this time there is a fee to play. What is the most you would be willing to pay to flip the coin once?

_____

Q10 10-8=

Q11 I often set a goal but later choose to pursue a different one.

- ❍ Very much like me
- ❍ Mostly like me
- ❍ Somewhat like me
- ❍ Not much like me
- ❍ Not like me at all

Q12 I have difficulty maintaining my focus on projects that take more than a few months to complete.

- ❍ Very much like me
- ❍ Mostly like me
- ❍ Somewhat like me
- ❍ Not much like me
- ❍ Not like me at all

Q13 I finish whatever I begin.
- ❍ Very much like me
- ❍ Mostly like me
- ❍ Somewhat like me
- ❍ Not much like me
- ❍ Not like me at all

Q14 14. I am diligent.
- ❍ Very much like me
- ❍ Mostly like me
- ❍ Somewhat like me
- ❍ Not much like me
- ❍ Not like me at all

Q15 Suppose you are in the workforce. You currently have a job that pays $50,000 a year. You think that if you go back on the job market there is an 80% chance you will find a job for $60,000 a year, but a 20% chance you will acquire a job that pays $30,000. Do you risk quitting your job?
- ❍ Yes
- ❍ No

Q16 Suppose a final exam in one of your classes is coming up. You have done the best you can to prepare. You think there is a 20% chance you will get a 'A-', a 30% chance you will get a 'B+', a 20% chance you will get a 'B', a 20% chance you will get a 'B-', and a 10% chance you will get a 'C+'. The morning of the exam your professor offers you the opportunity to skip the exam and just receive a "B" in the course. Do you accept?
- ❍ Yes
- ❍ No

Q17 Suppose you are in the workforce you currently have a job that pays $80,000 a year. You think that if you go back on the market there is a 70% chance you will find a job for $100,000 but a 30% chance you will find a job that pays $60,000 a year. Do you risk quitting your job?
- ❍ Yes
- ❍ No

Q18 Do you consume alcohol or partake in recreational drug use regularly?
- ❍ Yes
- ❍ No

Q19 If Yes, how many nights per week

- ❍ 1
- ❍ 2
- ❍ 3
- ❍ 4
- ❍ 5
- ❍ 6
- ❍ 7

Q20 Do you smoke cigarettes?

- ❍ Yes
- ❍ No

Q21 How many per day?

Q22 20. How many speeding/moving violation tickets have you accumulated in your driving history?

Q23 How many days before a perceived difficult test do you generally start studying?

- ❍ I do not study
- ❍ 1
- ❍ 2
- ❍ 3
- ❍ 4
- ❍ 5
- ❍ 6
- ❍ 7
- ❍ More than a Week

Q24 How many hours do you spend on homework each night?

- ❍ I do not do homework
- ❍ 1
- ❍ 2
- ❍ 3
- ❍ 4
- ❍ 5
- ❍ 6
- ❍ 7
- ❍ 8

Q25 23. What is your estimated family income?

Q26 23. What is your estimated income per year?

Q27 27. Does your parent/guardian ride a motorcycle?
- ❍ Yes
- ❍ No

Q28 27. Do you ride a motorcycle?
- ❍ Yes
- ❍ No

Q29 27. Does your parent/guardian enjoy roller-coasters?
- ❍ Yes
- ❍ No

Q30 Do you enjoy roller-coasters?
- ❍ Yes
- ❍ No

Q31 Is your parent/guardian self-employed?
- ❍ Yes
- ❍ No

Q32 Check the following that apply. My parent/guardian gambles on:
- ❑ Nothing
- ❑ Horses at Track
- ❑ Bingo
- ❑ Lottery Tickets
- ❑ Slot Machines
- ❑ Gambling Casinos
- ❑ Sporting Events
- ❑ Cards with Friends
- ❑ Dice
- ❑ Dog Tracks

Q33 Check the following that apply. I gamble on:

- ❑ Nothing
- ❑ Horses at Track
- ❑ Bingo
- ❑ Lottery Tickets
- ❑ Slot Machines
- ❑ Gambling Casinos
- ❑ Sporting Events
- ❑ Cards with Friends
- ❑ Dice
- ❑ Dog Tracks

Q34 34. What is your parent/guardian's highest level of education? (pick parent with higher level)

- ❍ Less than High School
- ❍ High School/ GED equivalent
- ❍ Associates Degree
- ❍ Bachelor's Degree
- ❍ Advanced Professional Degree

Q35 With what gender do you identify?

- ❍ Male
- ❍ Female
- ❍ Other

Q36 What is your age?

Q37 What year are you?

- ❍ First Year
- ❍ Sophomore
- ❍ Junior
- ❍ Senior

Q38 With what race do you identify?

- ❍ Caucasian
- ❍ African American
- ❍ Hispanic
- ❍ Asian
- ❍ Other

Q39 What is your academic major?
- ❍ Biology
- ❍ Business and Economics/Applied Economics
- ❍ Psychology
- ❍ English
- ❍ Health and Exercise Physiology
- ❍ Other

Q40 What is your current cumulative GPA?

Q41 What is your current GPA within your Major?

Q42 Have you ever switched your major?
- ❍ Yes
- ❍ No

Q43 From what to what?
Original Major
New Major

Q44 Are you a student-athlete?
- ❍ Yes
- ❍ No

Q45 What Sport?

Q46 Do you have a job on or off campus?
- ❍ Yes
- ❍ No

Q47 How many hours per week do you work?

Q48 What is your hourly wage?

Q49 What is your estimated highest SAT score verbal?

Q50 What is your estimated highest SAT score math?