The Frequency of Altruistic Behavior Based on Altruism in Noncognitive Skillsets

by

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Abstract

There are many implications and consequences of nurturing or neglecting the development of non-cognitive and cognitive skillsets. Previous studies have shown that both skillsets are significantly correlated to the creation of a stable socioeconomic status. The following study does not dissect the importance of these skills but rather the externalities created by both, specifically the frequency of altruistic behavior. In this examination I will attempt to answer the following questions: Is the study of extraversion from other noncognitive skills economically prevalent? What causes a person to be more inherently altruistic than another? And, what could be done to promote altruistic behavior if there is a significant correlation between these skillsets and a higher frequency of altruism?

Table of Contents

List of Tables

1. Introduction

A vast proportion of economic literature has been dedicated to the research and evaluation of intelligence. Intellect's returns to scale on the productivity and wellbeing of an individual provide the draw of economics research to this variable. Over the previous years, however, some economists, sociologists, and psychologists have been reviewing other contributing factors to success and productivity other than intelligence. Heckman's analysis of the Perry Preschool Program provided thorough evaluation and fortification of the validity behind the development of non-cognitive skills as well as the stability of households. The Perry Preschool Program Analysis was groundbreaking research in that it provided a framework to help shape the lives of underprivileged through the use of political interventions in developing non-cognitive skillsets. The review of this program has also opened another facet to the economic implications of not only developing cognitive skillsets, captured by standard IQ tests, but also the consequences of nurturing non-cognitive skillsets. Continuing the research beyond the Perry Preschool Program, Heckman, and other economists and psychologists, has begun to explore the consequences of either neglecting or nurturing these non-cognitive traits. Findings of non-cognitive skillset's importance have been illuminating: ranging in high correlation to a healthy lifestyle as well as stability within the household. The significant papers concerning this research will be covered in a following section.

These non-cognitive skillsets are sectioned into what is generally accepted as the "Big Five". The five non-cognitive skills attempt to capture those variables that are untested in traditional IQ tests. The "Big Five" personality traits are: conscientiousness, openness to experience,

extraversion, agreeableness, and neuroticism. Each non-cognitive variable plays a specific and unique role.

- Conscientiousness is defined as the tendency to be organized, responsible, and hardworking.[1] Conscientiousness has been deemed one of the greatest contributors to socioeconomic success as well as stable rates of employment. Not surprisingly conscientiousness is a popular point of study for many economists as it is relatively easy to isolate as a dependent or explanatory variable. Conscientiousness' outcomes are easily translated into economic consequences.

- Openness to Experience is more specifically known as the tendency to be open to new aesthetic, cultural, or intellectual experiences.[2] Though this may allow the person to experience new growth in certain areas of their life, it unfortunately does not render well into economic policy. At most openness to experience could be linked to policy variables in health economics. In Curie's research, which is discussed later in this paper, she discusses the difference between children's health development and their non-cognitive skillsets. Of course openness to experience could easily translate into policy variables for individuals susceptible to drug addictions. However, as this paper is concerned, there is little to no effect that openness to experience has on altruistic behavior.

- Extraversion is described as an orientation of one's interests and energies toward the outer world of people and things rather than the inner world of subjective experience;

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[1] (VandenBos 2007)

[2] (VandenBos 2007)

characterized by positive affect and sociability.[3] Though this trait does not necessarily

accompany great personal wealth or socioeconomic success, it possibly serves as one of

the key variables in explaining altruistic behavior and therefore will be the focus of the

paper. Extraversion has not been thoroughly studied within the economic community.

This lack of knowledge regarding extraversion was a catalyst behind the research done in

this paper. Though conscientiousness has proven to be a paramount variable in the

development of policies; I firmly believe the other four non-cognitive traits must be

researched thoroughly as well. The relatable traits and economic consequences that are so

easily correlated to conscientiousness are not as easily linked to extraversion. The

ambiguity behind the nature of extraversion understandably led to the neglect of study

concerning this non-cognitive trait.

- Agreeableness is the tendency to act in a cooperative, unselfish manner.[4] Studies have

  determined that agreeableness or lack thereof allows for an increase in earnings

  depending on the age of the individual. It has been indicated that individuals at the

  beginning terms of their employment are more likely to gain income by being

  disagreeable and somewhat 'cut-throat' in nature. However, towards the end of an

  individual's career, agreeableness becomes positive in respect to the overall yearly

  earnings of the individual.[5]

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[3] (VandenBos 2007)

[4] (VandenBos 2007)

[5] (Mueller and Plug 2006)

- Emotional Stability is described as predictability and consistency in emotional reactions, with absence of rapid mood changes.[6] Again we run into the problem that emotional stability is not easily translated into economic consequences. Some studies have shown that Neuroticism frequently will lead to higher rates of unemployment for the individuals. Though these economic concerns may be easily predictable through speculation the translation of emotion into economic doctrine is unfortunately complicated.

(Note: These definitions all come from APA Dictionary of Psychology however; economic interpretations are by the author.)

As the following studies will show, there has been extensive research completed on the variable Conscientiousness. Rightfully so, conscientiousness has been noted to have high correlations with improved job performance, higher grade point averages and higher education levels. Conscientiousness is both the most apparent in socioeconomic studies, and the most important when dissecting socioeconomic variables. This does not exclude the possibility however, that the other four of the "Big Five" have correlation to economic or psychological decision making.

2. Extraversion as a Focal Point

Though in many cases, especially when examining job performance and yearly earnings, intelligence is a greater explanatory factor than most non-cognitive traits. If posed in the right context, some non-cognitive traits are more explanative than intelligence measures. "The predictive power of any particular personality measure tends to be less than the predictive power

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[6] (VandenBos 2007)

of IQ but in some cases rivals or exceeds it."[7] Extraversion, generally speaking, does not promote personal socioeconomic gain. Extraversion, instead, describes the individual as one who values interaction with others and may in fact lead to the spread of socioeconomic gain through altruistic actions. My hypothesis then uses this property of extraversion to cause the individual to promote the welfare of others rather than their own. This theory of course assumes that there is certain utility gained from helping and meeting people. Also with the understanding that non-cognitive traits maintain the possibility of having greater explanatory power; it can go to reason that extraversion rather than IQ may be the greatest explanation as to why some individuals prefer altruistic behaviors. My reasoning behind the utility theory is that: if an individual were to find utility from the interaction with others, then this more extraverted individual should be more apt to perform altruistic behaviors than an individual more introverted in nature. This explains why Extraversion will be the key explanatory variable in attempting to define one's frequency of altruistic behavior.

There are, however, no standard tests that allow for the isolation and measurement of extraversion specifically. The Rotter Locus of Control will be employed to capture an individual's score on the 'Big Five'. As extraversion is one of the 'Big Five' it can be assumed that using the Rotter Locus of Control will be a sufficient variable in attempting to describe the non-cognitive skillsets of each individual within the cohort. As conscientiousness is the most prevalent trait there will be additional variables required to refine the specification of extraversion over the original isolation of non-cognitive skills. The Locus of Control or I-E Scale, as developed by Rotter measures the individual's perception of how their actions shape

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[7] (Heckman, Integrating Personality Psychology into Economics n.d.)

their own life. More specifically, "…individuals develop a generalized expectancy concerning their ability to control life's events. Those persons who believe that their actions can affect the course of their lives are said to have an expectance of internal control." [8] This study may provide an independent variable that is highly correlated to extraversion so that future studies may be able to more easily capture the effects that extraversion has on the community around the individual.

3. Previous Works

Impure Altruism and Donations to Public Goods was the true catalyst behind the research regarding altruistic behavior and its possible link to extraversion. This paper proposes that any altruistic action may have altruistic motivations but also selfish motivations that could adjust the involvement of an individual in altruistic behavior such as volunteerism. Many of these selfish perversions could be to seek friendship (foundation theory behind extraversion as a correlation), social standing, respect and self-indulgence.[9] This work attempts to find the root cause of one becoming involved with volunteerism of other altruistic behaviors through the analysis of public goods. Many of the motivations in participating in altruistic behavior, such as friendship and respect, are very difficult to ascertain through econometric analysis. Therefore this paper attempts to represent extraversion by the general utility gained through altruistic behavior. It is found that:

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[8] (Lange and Tiggemann 1981)

[9] (Andreoni 1990)

"When people make donations to privately provided public goods, they may not only gain utility from increasing its total supply, but they may also gain utility from the act of giving. However, a simple application of the public goods model ignores this phenomenon. A consequence of this omission is that the theoretical predictions are very extreme and implausible…"[10]

The purpose then of my study is to be able to further uncover the details of the involvement behind altruistic behavior. *Impure Altruism* was not a paper to discuss the economic pros and cons of altruistic behavior and volunteerism; instead they are finding economically related stimuli that aid in the involvement of altruistic actions. *Impure Altruism* also finds differences of utility gained throughout socioeconomic structure. Their model suggests that:

"…we find that altruism coefficients decline with income for all but the highest class. The result is that the predicted effects of policy are sometimes reversed when impure altruism is considered. This holds out the possibility that the conventional view of charitable giving may be inaccurate, and indicates the potential importance of developing empirical models that account for impure altruism and the interdependence of preferences."[11]

As stated above, the existence of preferences and utility gained allows the traditional view of charitable giving to be wrong. This then provides an excellent segue into studying if extravert behavior provides higher probability of volunteerism. Whether or not an individual could be

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[10] (Andreoni 1990)

[11] (Andreoni 1990)

described as extraverted could easily factor into their preferences of volunteerism as they are more inclined to meet and interact with new individuals and therefore gain utility from more extraverted behavior.

The paper also concludes that income has a very specific correlation to private giving. "As can be seen, the altruism coefficient falls as income rises until income reaches levels of approximately $100,000 or more (in pre-1876 dollars), and then the altruism coefficient begins to rise. Conditional on Cobb-Douglas utilities, therefore, we can imply the $50,000 - $100,000 income group as the least altruistic."[12] This interpretation becomes a very interesting dynamic within the regression as it suggests that those at higher and lower income brackets give a greater percentage of their wealth than the middle class. Andreon made this assumption by creating a nested model concerning income. They divide the income by levels of earnings and provide a more precise observation of how income effects charitable giving.

In Heckman and Cunha's paper *The Technology of Skill Formation*, they attempt to produce policy variables that would allow outcomes for those children who come from underprivileged homes to have similar outcomes to those from privileged homes.[13] They establish this study by controlling for cognitive and non-cognitive skills. Even when controlling for these two separate skillsets, the research concludes that the parental investment is paramount to the success of the child. It is noted that even though the study mainly focuses on the cognitive and non-cognitive skillsets of the cohort, there is definite significance found in the general health

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[12] (Andreoni 1990)

[13] (Cunha and Heckman 2007)

of the child.[14] This discovery turns out to be an interesting dichotomy in that the cognitive and

non-cognitive skills are higher in child that is healthy, but also that the child is healthier than

those with lower cognitive and non-cognitive skillsets. The correlation between parental

investment and the success of the child provides an interesting catalyst for possible future works

concerning non-cognitive skills that will not be discussed within this paper. If parents were to

pass on the values of altruistic behavior to their children then the child would be more likely to

continue altruistic behavior.[15] Within the NLSY (National Longitudinal Survey of Youth) there

is not a substantial gauge describing parental and child altruism. Therefore the link between the

two generations and their altruistic activities would be unlikely to quantify accurately through

the use of the NLSY dataset. As Heckman's and Cunha's paper concluded that there was a link

between the childhood behaviors and the investment of the parents, the proper data could

conclude that there is a much finer link between the parental investment of a child and the child's

altruistic outcomes.[16]

Expanding from the findings of Cunha and Heckman, Currie attempts to find the

developmental changes of socioeconomic status with health in her paper *Healthy, Wealthy, and*

Wise: Socioeconomic Status, Poor Health in Childhood, and Human Capital Development.

Currie finds that lower socioeconomic status is correlated with a higher probability of the child

being afflicted with a chronic illness.[17] Interestingly enough she also finds that even in countries

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[14] (Cunha and Heckman 2007)

[15] (Black, Devereux and Selvanes 2005)

[16] (Cunha and Heckman 2007)

[17] (Currie 2009)

with universal healthcare such as Great Britain and Canada there is still a difference in health of children stemming from higher socioeconomic status versus lower socioeconomic households.[18] Since non-cognitive and cognitive skillsets are responsible for the success of a household and individual it is natural that Curie would attempt to find some root causes for the development of non-cognitive abilities through the lens of healthcare. Of course this specific paper does not definitively mention the importance of extraversion, the Big Five serves as the focal point of the study and how health (or lack thereof) affects non-cognitive skillsets.[19] As discussed before, extraversion is a fragment of the Big Five and in some way is slightly correlated to the health development of the child.

The Nature (and Nurture) of Children's Perception of Family Chaos notes the importance of both cognitive and non-cognitive abilities in the success in educational attainment, crime commitment, earnings, and participation in risky behavior. The study finds that emotional stability within the household is principal in the fostering of childhood exploration. This exploration leads to a more vigorous learning of cognitive skills. Finally the discussion of interventions for the child is provided. Early childhood interventions provide higher returns to scale, and offer a significantly higher payoff that those interventions provided later in the child's developmental years. Reasoning for this change in returns to scale is referenced as the "elasticity of the mind at an early age."[20] The younger the child is, the more readily they will take hold of new ideas and information and therefore will be more affected by interventions concerning their

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[18] (Currie 2009)

[19] (Currie 2009)

[20] (Heckman, Economics of Health and Mortality Special Feature: The Economics, Technology, and Neuroscience of Human Capability Formation 2007)

behaviors. As the child ages their prefrontal cortex becomes more crystalline in nature and therefore does not adhere to new information as readily.[21] Combining this paper with the previously discussed Heckman and Cunha article and we can conclude that, through the use of intervention and timing, the child could easily develop a habit of altruistic behavior.[22] Which again, the research falls short lacking an information set that is both economically pertinent but also provides extensive psychological findings.

The Role of Mothers and Fathers in Providing Skills: Evidence from Parental Deaths examines the effects that each parent has on the child. The initial findings were that the mothers and fathers had specific effects concerning the non-cognitive development in children.[23] The loss of both mothers and fathers changed the developmental years of the child. The difference between the child's outcomes depended mainly on the gender of the child as well as the gender of the parent that had passed away. Adda, Björklund and Holmlund find that if the father was to pass away that he would have a greater effect on a male child rather than female. The exact opposite is true when studying the effects that mothers have on daughters.[24] Adda, Björklund and Holmlund also find that the earnings changes found in the boys were much greater when the father had passed away and were in fact compounded when you added the bereavement of the father's death with the cognitive and non-cognitive skills that were lost. This information, in conjunction with other works explains why I felt it was key to include the number of biological

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[21] (Knudsen, et al. 2006)

[22] (Cunha and Heckman 2007)

[23] (Adda, Bjorklund and Holmlund, The Role of Mothers and Fathers in Providing Skills: Evidence from Parental Deaths 2011)

[24] (Adda, Bjorklund and Holmlund 2011)

children as a variable. As traits are handed down to the next generation the child's altruistic outlook as well as other non-cognitive traits may be affected.

Psychology and Family Economics' inspiration originated from Becker's Treatise of the Family (1981). The risk adverse characteristic of conscientiousness has been found to increase the likelihood of individuals not only marrying early but also reduces the risk of divorce.[25] Conscientiousness then becomes a significant link to the success rate of the family unit.[26] Of course this study focuses on the importance of family stability through the development of conscientiousness. Again, like many studies before this have shown, conscientiousness has been studied extensively. Conscientiousness is one variable out of five that could better explain and create policy variables to help shape a more balanced socioeconomic lifestyle for those individuals in need.

Integrating Personality Psychology into Economics is a front running paper on how economics should adopt the research of personality economics into the contemporary discourse seen today. Specifically, though, this paper dissects the 'Big Five' variables into not only their own definitions but also their Related Temperament Traits and Facets that are indicative of the related variable. Extraversion had no known related traits, which was one of the catalysts in attempting to describe volunteerism as a relatable trait to extraversion. As of now the known economic consequences behind extraversion are somewhat of an enigma. Granted the economics literature discussed in this paper as well as in countless other journals focuses mainly on the development of conscientiousness as means of bettering the socioeconomic standing of

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[25] (Heckman, Integrating Personality Psychology into Economics n.d.)

[26] (Hanscombe, et al. 2010)

individuals. As conscientiousness is in many ways correlated to a better lifestyle, higher earnings and more stable environment fiscally as well as emotionally; it is still important to research fully the other four variables that constitute for an individual's non-cognitive skillset. In *Integrating Personality Psychology into Economics* Heckman provides the reasoning behind why Economists should be interested in the study of non-cognitive traits. The broadening of the spectrum and analysis provides a new toolset that would possibly be able to better explain reasoning behind economic based decisions. Non-cognitive skill analysis also provides a medium that explains the success rate of individuals in both educational and career attainment. In the end, economics provides a concrete framework to be able to analyze the decisions made through non-cognitive skills. The pairing of economics and non-cognitive skills promotes a strong theory crafting engine that can now be applied to future and previous economic works, however there is much work to be done. As Heckman states, "There are major challenges in linking the traits of psychology with the preferences, constraints and expectation mechanisms of economics. Developing rigorous methods for analyzing causal relationships in both fields remains to be done."[27]

In summary of this small sampling of the extensive research that has been completed on the importance of non-cognitive skills, it can be surmised that the development of non-cognitive skills is a principle factor in the development and success of an individual. Although, not much research has been completed on the socioeconomic consequences behind establishing extraversion, this paper will attempt to ratify the lack of information concerning extraversion. Much of the research has been focused on the variable conscientiousness. The study of

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[27] (Heckman, Integrating Personality Psychology into Economics n.d.)

conscientiousness has been most illuminating to not only the economic world but also the psychological community and sociological doctrine. As conscientiousness has been the main focus when concerning non-cognitive behaviors, it is important to keep expanding the horizons through the employment of variables such as the other four within the 'Big Five'. As a result for the basic OLS regression I plan on including some economic variables such as volunteerism as the independent variable in an attempt to capture the utility gained from an extroverted attitude as well as cognitive ability in attempts to capture residual correlations in relation to volunteerism. Consequently there will be other variables I will attempt to control for as to remove any bias within the model.

4. Variable Explanations

The dependent variable chosen was the Frequency of Volunteerism. The assumption being made is that the Frequency of Volunteerism can be an excellent gauge for the rate at which altruistic behavior is practiced through volunteer work. I assumed this because the individual is forced to give up time and energy to be able to volunteer rather than giving money to a charitable organization. Therefore a wealthier household would be more apt to give money rather than give time due to the increase in opportunity cost.[28] It can be assumed that the frequency of altruistic behavior could be captured within the non-cognitive skill of extraversion. Extraversion, though, is not easily captured through standard tests such as the Rotter Locus of Control or the AFQT. It can also be assumed that conscientiousness could play a large role in describing frequency of volunteer work. The characteristic of 'forward thinking' found in conscientiousness allows for there to be some facet of altruism to be explained within conscientiousness. The reasoning

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[28] (Andreoni 1990)

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behind this assumption is that if we can assume that the individual is concerned in any way about the quality of life for future generations, this concern would be captured in both conscientiousness and extraversion. This dual relationship between conscientiousness and extraversion is the reason why I have decided to include conscientiousness as a pivotal factor in attempting to describe the frequency of altruistic behavior.

The Rotter Locus of Control is also employed as a measurement of the non-cognitive skillsets of individuals within the cohort. The Rotter Scale provides a basis by which we are able to measure the non-cognitive skills of individuals. This provides a standardized toolset that will be able to measure the 'Big Five' characteristics of non-cognitive behavior. Though conscientiousness is the largest benefactor to this skillset, extraversion plays a key role as a variable within non-cognitive skills. For the purpose of attempting to best capture the framework of non-cognitive skills for each individual being studied, employing the Rotter Locus of Control provides the best unbiased toolset in evaluation.[29] It provides information that the individual believes they are able to change or shape their future in some way rather than random chance acting on them. The nature of this test provides revealing evidence on how the individual interacts with the world around them. If the individual believes that they are able to change their future through their own actions then generally this characteristic is correlated to a higher set of non-cognitive skills.[30] On the contrary an individual that does not believe that they or their actions have an effect on their future of course is correlated with lower non-cognitive traits.

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[29] (Lange and Tiggemann 1981)

[30] (Lange and Tiggemann 1981)

The AFQT (Air Force Qualification Test Score) was employed to capture intelligence. Though the NLSY contains many different variations of standardized IQ tests, the AFQT was applied to all individuals within the NLSY as well as being a widely accepted gauge of cognitive ability. This variable of course attempts to control for intelligence within the regression. However, as previous research has pointed out, performance on standardized tests fail to capture all the facets of intelligence and therefore the regression will include other variables to be able to fill in the analytical gaps pertaining to cognitive ability. The AFQT has however become a well-established and accepted measure of intelligence since its inception. As this variable was also required for all individuals within the cohort during the survey it was an extremely viable option as a key explanatory variable within the regression.

Another variable included within the regression equation is whether or not the individuals within the cohort have had children expressed in the variable Bio_Children. If an individual has a child under their care, their altruistic behavior is no longer set to their current lifetime. Instead their altruistic behavior begins to span multiple generations. I also made sure to provide that their child was a biological child and also include the number of children that the parents have. I believe that birthing, rather than adopting, invests the parent greatly in the world around them as well as attempting to instill desirable values into the child's upbringing. This assumption is not to undervalue the effects that adopted children have on the parents. The variable Bio_Children is more-so employed to better control for extraneous anomalies that could occur if the child was not biological. Do note that this variable was added after an initial testing of the regression equation in an attempt to evaluate the existence of heteroskedasticity which will be discussed further in upcoming sections.

Family income was added to control for the socioeconomic findings that were explained in *Impure Altruism*. The findings in *Impure Altruism* suggest that wealth and altruistic behavior are inversely related up to a specific income threshold. This variable was specifically meant to measure the outcome of the variable. However, as this variable was multidimensional in *Impure Altruism* in that it was negatively correlated until the $100,000 threshold of a households income, I assumed that the variable could be accepted 'as is' within the regression equation.[31]

Of course as described before, the nebulous characteristic of extraversion does not allow for it to be defined so easily which is why I cast a wide net using the Rotter Locus of Control as well as including the specific self-evaluation of extraversion. Noting that the Rotter Test also has the ability to capture other non-cognitive skills I assumed that the Rotter Test was a greater indicator of conscientiousness than extraversion. Therefore, the Rotter Locus of Control was used as a means of conveying the overall non-cognitive ability of the individual within the cohort.

Additionally, a variable analyzing extraversion was included within the model in attempts to capture any of the non-cognitive skill that the Rotter Test was not able to capture. The NLSY provides a self-evaluation of extraverted behavior. I included this variable as well as the Rotter Locus of Control in attempts to capture as much of extraversion as possible. As this is a self-evaluated variable the manner in which the variable is attained is key in ensuring that the data provided is not naturally bias. Due to the widely accepted and extensively used nature of the NLSY as well as the manner in which the data was ascertained, I found no reason to exclude this variable.

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[31] (Andreoni 1990)

Other socioeconomic related variables were added to the original model in order to provide market related consequences and correlations such as employment and marital status.

(Table 1 describes the definitions and their form as they pertain to the model.)

5. Regression

The summary statistics shown in Table 2 reveals the variables and information pertinent to the regression. The four dummy variables within the model are noted in Table 1 and have omitted data in Table 2, as it is not pertinent to the evaluation of the variable due to the nature of its representation. These variables were tailored from the code of NLSY. For gender, the male / female characteristic was changed from a 1/2 within the NLSY codebook to a 1/0 respectively. The purpose of the variable Race was to provide clarity to possible cultural or racial anomalies concerning volunteerism. As the NLSY was conducted within the United States; I wanted to focus mostly on the difference of whites and non-whites. The dummy variable grouped non-whites, including black and Hispanic, and also grouped whites with other races. The dummy variable Employment was to control for individuals or households that had an active income or not. The dummy variable was segmented by means of those individuals active within the workforce and those individuals that were not considered a part of the labor force and/or unemployed. Lastly, marital status is represented as a dummy variable within the regression. This variable's purpose was mainly to evaluate the effects that a chaotic versus stable household may have on the altruistic nature of the child. Marital Status within the NLSY contains options for self-evaluation by the individual within the cohort. These self-evaluation options include: single, married, divorced, separated and widowed. Again, as the purpose of this variable is to control for the chaotic nature of the household, I coupled single, separated, divorced, and

widowed. The developmental consequences that these characteristics ensue have been well documented in previous literature. The effects of this instability can be found in Hans et al.'s paper *The Timing of Mother's Employment after Childbirth* as well as Hanscombe et al.'s documentation *The Nature (and Nurture) of Children's Perceptions of Family Chaos.*

The model is formed as a basic OLS (ordinary least squares) model. The model is attempting to decipher the highest correlating factor in explaining altruistic behavior. The main focal points will be Rotter Test Scores, AFQT, and Income. Table 3 shows the multiple regressions and their variations in omitting Race and/or Gender from the model.

The outcome of the regression was decisive. Through the variables found within the NLSY, there was little evidence that non-cognitive skills and specifically extraversion played any role in the formulation or practice of altruistic practices. Interestingly basic measurements of intelligence (AFQT and Grade Completion) were the two variables that scored the highest out of the variables employed. Family income also was a significant variable within the model.

6. Analysis

I hypothesized that extraversion would have a greatest effect on both time and resources spent serving others through the frequency of altruistic actions. Interestingly enough the Rotter Locus of Control, used to measure non-cognitive skills such as extraversion, had no significant effect. The Rotter Score's p-test statistic was the greatest out of the variables included within the model, which is to say that the chance of it having no effect on the independent variable Frequency of Volunteerism was extremely high. There are a few explanations that can be included do defend why the Rotter Locus of Control would have no effect on the Frequency of

Volunteer Work. The Rotter Score is a test which is able to scale an individual's non-cognitive skills much like IQ Tests are able to quantify intelligence. The Rotter score has been noted to be overtly biased towards the measurement of conscientiousness rather than any of the other "Big Five" which were discussed previously.[32] The reason the Locus of Control is biased towards the evaluation of conscientiousness is due to the nature of the questions asked within the test. Many of them have to do with whether or not the individual has control of their own future. If an individual were to say that they have control over their future then the individual would by any standard be seen as more conscientious. This then causes the variable Rotter to be undoubtedly weak in attempting to define a level of non-cognitive skill correlated to altruistic behavior. The initial regression only included the Rotter Locus of Control but seeing as its significance was low, I supplemented the Extraversion variable by including a second variable concerning extraversion.

The second variable concerning extraversion is a self-evaluated variable describing the sociability of each individual within the cohort. The individuals were able to rate themselves on a scale of 1 to 4. Individuals were also allowed to omit the question completely if they desired. This scale allowed for a more direct inclusion of extraversion within the revised regression. The significance of this variable was still only at 10% significance. More specifically the variable Extraversion in all four variations of the model had a positive correlation ranging between 0.0254 to 0.0259. This is to say that with each standard deviation change in Extraversion, there is a 0.0254 to 0.0259 standard deviation change in the individual participating in volunteerism. Though this is an improvement from the zero statistical significance from the Rotter Score, it is

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[32] (Lange and Tiggemann 1981)

not a strong enough significance to draw conclusions about the non-cognitive skill of extraversion and its effects on altruistic behavior preferences. Though this statistical level was not as significant as I would have preferred, it is a promising step towards a better analysis of extraversion and its effect on altruistic behavior as well as other economically relevant variables.

The most significant variables testing at a 1% statistical significance level were: Stan_AFQT, Grade_Comp and Employment, throughout all four variations of the OLS model. The two variables Stan_AFQT and Grade_Comp were employed as basic measures of both intelligence and conscientiousness. However, since the Rotter Test Score variable was not statistically significant, it can be deduced that intelligence measures may be highly correlated to the frequency of volunteerism. The reasoning behind the assumption of intelligence's higher correlation is that the Rotter Locus of Control has little to no effect. As the control for non-cognitive ability has not proven to be a significant variable we can deduce that the control for intelligence and cognitive skills are more significant, which in fact is what the regression shows.

The Stan_AFQT, being a standardized form of measuring intelligence, is of course this regression's measurement of cognitive ability. The Stan_AFQT along with grade completion level, found in the variable Grade_Comp, are the two most significant variables within the regression. Both of these variables as stated previously are measurements of intelligence. Grade completion also measures the individual's conscientiousness. As previous studies by Heckman et al. have shown, conscientiousness levels are highly correlated to the individual's success rate in educational attainment.[33] Stan_AFQT tested at a 1% statistical significance level.

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[33] (Heckman, Economics of Health and Mortality Special Feature: The Economics, Technology, and Neuroscience of Human Capability Formation 2007)

To possibly isolate the effects that Race and Gender have on the frequency of altruistic nature of the individuals I have decided to process four models. Table 3 shows the models and the effects of including or excluding these two variables. Throughout all of the variations of the proposed model the other consistent variables remained stable. None of the variables significance had changed due to the inclusion or seclusion of Gender or Race within the regression. Out of those two variables, Gender was the only one that was statistically significant, measuring at a 10% significance level. Through both models that Gender was included as a variable it also maintained a constant significance. In the full model where both Gender and Race are included an increase in a single standard deviation causes a .8794 increase in the standard deviation of Volunteerism. Race, however, had no noticeable effect on Volunteerism through the lens provided by this model.

The only discouraging facet of this study is that the R-squared, describing the effectiveness of the models ability to define the dependent variable, is relatively low. This low R-squared could be due to an omitted variable that could far better explain the nature of Volunteerism. However, through the proposed models provided in this paper, that variable has yet to be discovered.

7. Why Intelligence?

Interestingly, the two variables attempting to describe intellectual ability turned out to be the most significant variables within the regression. Additionally, overall household income was also of great significance. The pairing of these two ideas is not that difficult of an economic hurdle to leap. As intellect of the individual increases typically the overall wealth of the individual also increases. The individual also must make the conscious decision between the opportunity cost of

the time spent volunteering versus continuing to accrue wealth or consume leisure. According to the model, the individual may not completely forego the consumption of leisure (as it is volunteering at least once within the 12 months), but the realization that the utility gained by those individuals in need is much greater than their own utility possibly gained. This model, through economic reasoning, begins to follow a very logical path. The individuals who do volunteer are either conscious of the overall social utility being maximized by their altruistic behavior and/or they are attempting to maximize their own utility through the valuation of helping others.

8. Conclusion

The model has revealed some of the explanatory variables that have effects on volunteerism and altruistic behavior; it by no means is a sufficient enough study concerning extraversion. In further studies it may be advantageous to find the effect that strength of religious affiliation would have on the regression. Though the NLSY had many religious related variables, there were none specifically that attempted to describe how devout the individuals within the cohort were to any specific religion. Many of the religions found within the United States are based around protestant beliefs which have a large focus of volunteering either within the surrounding community, or at the establishment the individuals attend. The interesting dichotomy between extraversion and intelligence, especially when attempting to describe altruistic behavior, is that in general the two are not nurtured simultaneously. Previous studies have shown that the more extraverted a child is, the worse their performance is in an educational environment. In an example given, an extroverted child is more likely to be easily distracted by classmates rather than concentrating on the lecture. On the exact opposite side of that same coin, however, is the

known effectiveness that both conscientiousness and intelligence have on an individual's performance in both the workplace as well as in the individual's education. The interesting nature behind altruistic behavior is that it is not dependent upon conscientiousness much like GPA and grade achievement level. Instead NLSY and grade completion seems to be the deciding factors behind the frequency altruistic behavior.

This study does not measure the monetary differences between individuals and therefore does not differentiate between the socioeconomic standing of the households that participate in altruistic behavior. Though monetary giving is not directly involved, the individuals involved with altruistic behaviors are subject to the opportunity cost of volunteerism rather than working or leisure. This then provides a certain skew to the regression itself. Those individuals with lower household income assumedly have lower opportunity cost when participating in volunteerism. Also, volunteerism rather than charitable giving requires the individual to actively participate in the altruistic activity. Through economic reasoning this active participation causes a possible skew to the individuals involved in volunteerism. An individual with a high opportunity cost of volunteering would be more apt to give to a charitable organization, whereas an individual of lower opportunity cost should be more inclined to volunteerism rather than charitable giving.

Previous studies have shown that there is a definitive link between charitable giving and the household's income. The goal of this research paper was to determine the reasoning behind the frequency of volunteerism and if this quality had a link with non-cognitive skillsets in any way, specifically extraversion. The findings were somewhat different from the proposed hypothesis but extraversion did play somewhat of a role with the decision to volunteer time and energy to

the community around you. Perhaps a finer filter could be applied to this research to also see if age of the individual within the cohort was important.

Much research is needed on the other four of the Big Five non-cognitive traits. The economic consequences correlated with conscientiousness have manufactured a new lens by which economics analyzes policy variables. It is a promising time in economic research that continues to reveal the interconnectivity between psychological and economic studies. More efficient policy variables have been developed and others have been altered by the continued discovery and research of non-cognitive skillsets within economics.

Table 1: Variable Definitions

Variable	Variable Definition	Form of Representation
Dependent Variable		
Volunteerism	The individual participated in any volunteer work within the last 12 months	Dummy Variable: (1:Yes, 0:No)
Independent Variable		
Gender	Gender of the individuals within the cohort	Dummy Variable: (1: Male, 0: Female)
Race	Race of the individuals within the cohort	Dummy Variable: representation attempting to control for white and non-white (1: Nonwhite, 0: White)
Rotter Locus of Control	Standard Rotter Locus of Control Scale. Segmenting certain scores into groups	Level: Groups include – (0, 1-4, 5-9, 10-14, 15-19)
Standardized AFQT Score	AFQT Percentile Scores. All individuals within the cohort participated in the evaluation.	Level: Test scores were standardized to aid in regression analysis
Number of Biological Children	Number of Biological Children.	Level
Log. of Family Income	Scaling of households yearly earnings.	Natural Logarithm
Grade Completion	Variable assigning value to the level of education attained	Level: Ranging from 1-20
Extraversion	Scale of 1-4 ranging from introvert to extrovert in nature. (Self-evaluated variable)	Level: Ranging from 1-4
Employment	Employment status of the individual within the cohort	Dummy Variable: representing
Marital Status	Marital status of the individuals within the cohort.	Dummy Variable: signifying the difference between a stable household and a chaotic household.

NLSY_79 was the source for all listed variables

Table 2: Summary Statistics

Variable	Notation	Source	Obs.	Mean	St. Dev.	Min	Max
Gender	Gender	NLSY_79	12686	‡	0.49	‡	‡
Race	Race	NLSY_79	12686	‡	0.49	‡	‡
Rotter Locus of Control	Rotter	NLSY_79	12541	8.66	2.42	4	16
Standardized AFQT Score	Stan_AFQT	NLSY_79	11914	1.155 e-16	1	-1.472	2.001
Number of Biological Children	Bio_Children	NLSY_79	3894	2.08	1.44	0	11
Log. of Family Income	l_Fam_Income	NLSY_79	6399	10.76	1.105	0.693	12.996
Grade Level Completion	Grade_Comp	NLSY_79	7565	13.32	2.566	0	20
Extraversion	Extraversion	NLSY_79	10873	2.87	0.711	1	4
Employment	Employment	NLSY_79	7654	‡	0.405	‡	‡
Marital Status	Marital_Stat	NLSY_79	7562	‡	0.497	‡	‡

Note: ‡ denotes values that have been omitted due to dummy variables within the model. Also, values in the 'Observations' column denote the data values acceptable for regression. These numbers are out of a total possible amount of 12686 individuals within the cohort.

Table 3: OLS Regressions

Estimation Method	(1) OLS	(2) OLS	(3) OLS	(4) OLS
Gender	--	0.8795**	--	0.8794**
		(0.4117)		(0.4119)
Race	--	--	0.0009	4.19e -5
			(0.0183)	(0.0183)
Rotter	-0.0003	-8.7841e-05	-0.0003	-8.767e -5
	(0.0034)	(0.0034)	(0.0034)	(0.0034)
Stan_AFQT	0.0986***	0.0985***	0.0989***	0.0985***
	(0.0101)	(0.01004)	(0.0113)	(0.0113)
Bio_Children	0.0122**	0.0125**	0.0122**	0.0125**
	(0.0056)	(0.0056)	(0.0056)	(0.0056)
l_Fam_Income	0.0214**	0.0217**	0.0214**	0.0217**
	(0.0091)	(0.0091)	(0.0091)	(0.0091)
Grade_Comp	0.0219***	0.0221***	0.0219***	0.0221***
	(0.0037)	(0.0037)	(0.0037)	(0.0037)
Extraversion	0.0254**	0.0259**	0.0254**	0.0259**
	(0.0109)	(0.0109)	(0.0109)	(0.0109)
Employment	-0.0596***	-0.0601***	-0.0595***	-0.601***
	(0.0193)	(0.0193)	(0.0193)	(0.0193)
Marital_Stat	0.0394**	0.0397**	0.0396**	0.0397**
	(0.0181)	(0.0181)	(0.0183)	(0.0183)
Constant	-0.3375***	-0.3463***	-0.3376***	-0.3464***
	(0.1049)	(0.1049)	(0.1049)	(0.10501)

Standard errors in parenthesis. *significance at 10% level; ** significance at 5% level; *** significance at 1% level.

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