

Innate Talent: A Holistic Rejection of Exceptionalism

by
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Abstract

This thesis investigates the validity of talent-based assumptions and explain how these assumptions take form as a philosophy and how this Talent Exceptionalism philosophy holds up to an evaluation from the perspective of multiple schools of moral philosophy. To do so this thesis interpreted and reviewed the methodology and findings from 30 relevant studies and meta-analyses. The analysis of these studies demonstrates that both nativist and empiricist leaning perspectives of talent are far from adequate in achieving an understanding of talent. This thesis further finds that the interactionist perspective is both the most beneficial one to hold both in terms of operating a study and in terms of use in assessing talent-based claims made outside of the context of the scientific process. The thesis concludes that Talent Exceptionalism as a philosophy is arguably immoral when evaluated from two to three of the four selected schools of moral philosophy, and further provides recommendations for both researchers, and educators in approaching talent from an interactionist perspective to avoid the pitfalls of the nativist and empiricist leaning perspectives.

Keywords: innate talent; talent exceptionalism; talent; deliberate practice; skill acquisition

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Chapter 1.

Introduction:

In all areas of expertise, from creative writing to sports, there is clear anecdotal and experimental evidence that people differ in their levels of achievement and the likewise differential effort they must exert to reach said achievements. Some people appear to take to an activity 'naturally,' making impressively fast progress with little apparent effort. There may be significant differences even within a family unit, where children share the same upbringing and biological parents. It is a generally accepted truth that people who demonstrate an early level of competency in a given skill. At the same time, these people are more likely to achieve higher levels of competence in that skill than people who do not demonstrate comparable competency at a young age.

It is commonly argued that the differences between individuals, in terms of their ability to acquire or master specific skills, are related to the presence of inborn, biological attributes. These attributes have historically been described as "gifts" or "talents." An example of this is the popular notion that an individual cannot become an accomplished musician unless that person has an innate musical talent. According to Davis (1994), over three-quarters of music instructors who select children for programs of advanced music instruction believe that children will be unable to succeed without the possession of innate talents. This is interesting because the assumptions of the music instructors are arguably made from an intuitive mindset rather than an empirical one, with evidence that they would or could provide being anecdotal as opposed to empirical data. Additionally,

there is an assumption present that experts in a given field can correctly identify innate talent and that they can correctly determine if a child will excel in said field.

It is the intent of this thesis to determine the validity of these talent-based assumptions.

An analysis will be made of the evidence both for and against the argument that biological, innate talent is the determining factor in a person's ability to master a skill successfully. What differentiates this thesis from others that examine talent-based claims is that this thesis approaches the topic from a holistic perspective. Drawing on psychological and biological studies, predominantly in fields such as sports and music, this thesis examines the results through the lens of differing ethical schools of thought. This thesis attempts to offer insights into what innate talent is, and the implications of how we identify and nurture talent, and suggestions for further research and consideration.

The way people think about innate talent, specifically how we identify, label, and treat talented people, has life-altering implications in the context of youth in education systems. Children who are identified as talented have been observed to benefit from being identified as such. Being told that you are talented will typically increase self-confidence and positively affect performance even if no innate talent-based advantages have been identified. For example, increased levels of self-confidence have been shown to act as a predictor for skill growth and future achievements. (Vispoel and Austin, 1993) Furthermore, children who are labeled as talented are more likely to thrive due to the

special opportunities they are granted. These opportunities are also likely to positively affect self-confidence and motivation, thus further contributing to the positive spiral.

However, it is also incredibly important to acknowledge the possible negative effects of belief in innate talent and the use of talent identification systems. Skill development in children is heavily affected by adult expectations. Brophy & Good (1973) demonstrated that negative expectations of a child's success would likely impede their mastery of a skill. A significant issue is that individuals who are not identified as innately talented by such systems are at higher risk of being denied the help and support necessary in order to reach mastery of a skill, simply because a person in an influential position decided that another lacked the innate talents that would warrant the support to help them succeed. Though it must be acknowledged that issues of this nature exist outside of talent identification systems, identification systems that provide support for and select people based on any form of characteristics such as race or income bracket can be similarly harmful.

Determining the validity of using attributes cited in multiple contexts as identifiers of innate talent is a vital step in understanding both human skill acquisition and the relevance of the methods we use to select and train people. Studies that work to determine the existence of innate talent must have their methodology and results scrutinized. Other potential causes for these results that would either confirm or dismiss the relevance of the concept of innate talent must be considered and evaluated for validity. Furthermore, the less widely renowned studies that discuss the benefits and

disadvantages of current popular talent identification systems and the role that cultures and power systems play in individual conceptualizations of talent deserve this same level of discussion.

When discussing the empirical evidence and arguments made both for and against the existence of innate talent, it is important to articulate a clear definition of the term. What makes this difficult is that historically there has been a lack of clarity when the term talent is used in casual settings. While most would agree that talent is something that people possess, 'talent' itself needs defining. When a person is described as talented, this description tends to fail to encapsulate how the traits that a person may possess are being expressed within the medium of a skill. In 1993, a review by Gangé found that the use of the term innate talent in the literature could be classified into five separate categories.

These being:

1. Post-performance definitions explaining adult accomplishment,
2. I.Q. Scores above certain cut-offs,
3. Definitions focused on excelling in a certain skillset,
4. Percentage based definitions emphasizing the exclusivity of an ability or level of skill,
5. Definitions focused on creativity in terms of the production of artistic endeavors.

As innate talent has such differing definitions, it is incredibly difficult to verify or disprove the existence of all of these definitions through a scientific lens. This is especially the case where these depictions could be considered in some ways problematic, and this is particularly the case for the I.Q. based definition of talent as I.Q.

Testing has been demonstrated to be biased in favor of certain racial and socio-economic statuses, with Palmer (2018) particularly demonstrating a significant link between origins of poverty and low I.Q. Test scoring.

Despite the historical vagueness surrounding the definition of innate talent, for the sake of accuracy, it is essential to define innate talent in a manner that best reflects the shared implications between the five categories outlined by Gangé. This thesis adopts the definition outlined by Howe et al., 1998. This definition states that talent has five key features;

1. It is innate as it originates in genetics and trait inheritance, and as a result, (which could be interpreted as meaning that it is likely non-malleable or fixed).
2. That a person's talents are usually exclusive to one or more similar fields
3. Only a minority of people are talented (at least in relation to a single field), to explain differential success,
4. The full benefits of an innate talent in terms of speed of skill acquisition or benefit to performance are not necessarily evident in childhood but have traits that are identifiable by experts, and finally,
5. These traits that have been identified are predictive of future success in the field.

Using this definition is beneficial as it can be applied to any field and is relevant to the implications brought up in the layman's use of the term. This definition further allows for people to be talented in the same field in different ways as some talents may have a more direct impact than others on performance. A theoretical example of this would be a

weight lifter with a genetic predisposition to fast muscle growth. They would arguably receive a greater impact on their performance than a weight lifter with a genetic predisposition for strong bones, which could prevent injury. A further advantage of the definition outlined by Howe is that it has been adopted by many following articles on the subject, allowing for meaningful comparisons of different studies to take place.

While some may argue that an even further specialized definition of talent would be helpful for research in this field, it is simply not appropriate due to a lack of information in both the existing literature and the difficulty of gathering data in a live experiment. This issue likely stems from the lack of study reproductions in the field. Howe et al., 1998, writes at length about how the difficulty imposed by a lack of ability to gather information makes it impossible to check the validity of ideas regarding the identification of traits that an innate talent may display in a youth. For example, how is one to know if a participant has a singular large talent or many smaller talents that cumulatively grant the same or similar levels of advantage? For instance, a genetic propensity for high speeds in neural information transfer (an excellent reaction time) versus multiple individual muscle fibers possessing powerful and fast-twitch responses to stimuli.

Historically across multiple cultures, the search for talent can be found in the practices of education and recruitment systems. The Spartans are remembered for how they bathed newborn infants in wine to determine their strength. Early Han dynasty civil servant interviewees were tested for their ability to memorize nine thousand Chinese characters. While the validity of tests such as the bathing infants in wine is questionable, these

ancient tests share the same spirit as many of the tests used in sports, academia, and elsewhere in modern times, in that they all seek to identify and recruit those who have an innate talent while using tactics that have an arguably opaque link to the specific talent being measured. It is important to note that while our testing systems have become more sophisticated, it is nonetheless still difficult to determine whether modern testing formats successfully identify talent or simply establish a self-fulfilling prophecy.

Interestingly, although the practice of identifying and nurturing talent (some might argue even "glorifying" innate talent) is so broadly accepted and deeply ingrained in our education and recruitment systems, there has been very little written scrutiny of the practice. For the purposes of this thesis, I shall coin the term "Talent Exceptionalism" to refer to this practice of identifying and nurturing talented individuals.

The key features of Talent Exceptionalism are as follows; firstly, it asserts that innate talent as outlined by Howe exists, and secondly, those who possess such innate talents should be sought out, selected, and prioritized in terms of receiving support to achieve mastery over the skills relevant to their talents. As such, Talent Exceptionalism dictates that those who are identified as having innate talent are afforded support and resources. In short, people who are born talented are exceptions from the norm in terms of how they are treated.

What complicates the discussion surrounding innate talent is that other factors can influence performance aside from inborn or innate talent, especially since arguably most

if not all manifestations of a talent require learning some form of skill. This narrows down into a discussion of the interactions between a person's nature and nurture. For example, a physical aspect, such as height, can influence a person's ability to perform at an elite level in certain athletic activities where height is advantageous. While it's easy to assume that height is determined by nature, it has been shown that a person's height is influenced by far more than simply innate genetics. Height heritability has been shown in some populations to have a heritability of as low as 65%, meaning that 35% of a person's height could be explained through environmental factors, particularly nutrition (Li, 2004).

While in the past, the roles of nature and nurture have been presented as a clear dichotomy, more recently, there is a greater appreciation for how nature and nurture interact and influence one another. This interaction is reflected prominently in the growing field of epigenetics. However, while much of the modern scientific community accepts this interactionist approach, the zeitgeist surrounding present-day athletics and music programs demonstrates a far lesser awareness of the interactionist approach. Education and recruitment systems still operate under the framework of Talent Exceptionalism, which can be seen in the testing methods that try to predict future success and identify talent by determining certain traits.

Talent Exceptionalists such as Macnamara et al. (2014) make the case that deliberate practice can only account for a small difference in performance. For these Talent Exceptionalists, a person should identify what their innate talents are and then leverage

their gifts to succeed. According to Macnamara et al., if an individual were to strive for success in a field where they lacked talent, no matter how hard they tried, they would simply be outcompeted by those with the innate talent necessary to succeed who train at similar or even lesser amounts.

On the other side of the nature-nurture debate are empiricists who subscribe to the concept of extreme nurture-based influence being the driving factor in a person's success or failure. The most prominent of which is Ericsson, who since 1993 has been a vocal proponent for the 10-years of deliberate practice hypothesis. Ericsson states that except for physical limitations such as height or the presence of a disability, with or without innate talent, a person would achieve mastery in a skill or field after approximately 10,000 hours of deliberate practice.

As previously mentioned, one of the main purposes of this thesis is to discuss the ethical implications of Talent Exceptionalism and the extent to which innate talent can be said to have a role in achieving elite performance. Since many of the studies reviewed fall under the category of sports studies, it is important to acknowledge that the issue of ethics in sports and sports training is very broad. There has been much media coverage of abuse and other egregiously unethical (and criminal) practices in sports in recent years, such as the U.S.A. Gymnastics sex abuse scandal, which broke in 2017. Those practices are unethical. This thesis aims not to investigate these blatant violations of ethics, nor is it to investigate how the sports training and recruitment systems allowed these violations to come about. Rather, this thesis aims to examine the ethics relating to more subtle issues

that underlie Talent Exceptionalist practices present in training and recruitment.

Specifically, this thesis explores ethical considerations relating to Talent Exceptionalism

from four different ethical perspectives:

1. Utilitarian ethics
2. Duty-based ethics
3. Egoism
4. Social contract morality

In undertaking this investigation, I hope to make a case for revisiting the assumptions inherent in Talent Exceptionalism that all too often are taken for granted. I hope to shine a light on gaps in the existing literature. I hope to encourage further analysis and investigation into what I consider important ethical considerations regarding how society assesses and allocates resources to develop future generations.

Chapter 2.

Literature Review:

The purpose of this literature review section is to analyze studies with different perspectives regarding innate talent. These being studies whose conclusions fall under either the nativist perspective, the empiricist perspective, and the interactionist perspective. In addition to studies, alternative models of understanding talent will be discussed within these perspectives.

Nativist Perspective:

As stated prior, the nativist perspective asserts that innate talent exists and attributes it as the primary or most important reason behind a person's success and expertise in a given field. The first study to be analyzed is fittingly called "Deliberate Practice and Performance in Music, Games, Sports, Education, and Professions: A Meta-Analysis," written by Macnamara, Hambrick, and Oswald and published in 2014. "Deliberate Practice and Performance" serves as a meta-analytical critique of the deliberate practice 10-year hypothesis established by Ericsson. The study makes the argument that deliberate practice is less important than has been previously thought established. In fact, most of a person's relative success in a field should be attributed to their individual differences, which one could assume refers to innate talents. They come to this conclusion through an analysis of the variance in expert performance in multiple fields that would result from deliberate practice. This analysis was performed on 88 studies written in English that had referenced Ericsson's works and measured the relationship between the amount of

activity interpreted as deliberate practice and level of performance. They found that across all studies, deliberate practice could account for 12% of variance found in levels of performance (variance in this context referring to the spread or distribution of levels of performance among participants), and further used three additional meta-analytical models in which variance ranged from 19% to 28% for music and sports studies, with each model being more generous than the last. They concluded that while deliberate practice is important, it is far from the determining factor in success at high levels of performance.

As a meta-analysis, the "Deliberate Practice and Performance" study is valuable. It presents a qualitative appraisal of evidence collected previously in both qualitative and quantitative studies, avoiding the restrictions of cross-sectional and longitudinal studies. Furthermore, the combination of prior studies allows for an increased sample pool, enhancing the statistical power present and possibly increasing the accuracy of results. However, this study suffers from several pitfalls that severely hamper its persuasiveness to an analytical reader. Firstly, Macnamara, Hambrick, and Oswald's analysis uncover a statistically significant amount of heterogeneity in between-study effect size variability. This could potentially be due to the samples taken in the studies analyzed being affected by the W.E.I.R.D. (Western, Educated, Industrialized, Rich, Democratic) phenomenon, the likelihood of this is exacerbated both by their use of solely studies done in English and the exclusion of any talent or deliberate practice-based studies that do not reference Ericsson. This practice has potentially excluded studies based on Ericsson's work that have been conducted in another language and perhaps referenced him in said language.

However, the most problematic aspect of the meta-analysis lies in the unclear usage and lack of definition of deliberate practice. They state they include any studies that measure "activities interpretable as deliberate practice," this is an incredibly opaque definition. If used in bad faith, the authors could have included studies that use highly ineffective practice methods to skew their analysis results.

Another study widely used as evidence in nativist arguments is "The Visual Function of Professional Baseball Players" by Laby et al. (1996). The purpose of which was to determine if there were any trends in the visual function of professional baseball players in terms of their visual acuity, stereo acuity, and contrast sensitivity. This was performed through tests of distance visual acuity, the Random test at both a distance and close-range using multiple types of sight targets, and contrast sensitivity tests such as the Vision Contrast Test System, the Contrast Sensitivity Viewer, and the Binocular Visual Acuity Tester. The study found that of 387 professional baseball players, their mean results for all three tested mechanics of sight were better than the general results of the United States population. Due to this, supporters of Talent Exceptionalism would likely argue that the professional baseball players participating in this study would serve as examples of people possessing an innate talent due to the occupation of being a professional baseball player requiring such talents for success.

As "The Visual Function of Professional Baseball Players" makes use of a cross-sectional study design, with all participants being sampled at a single point in time in their professional careers, the study lends itself well to being used for descriptive analysis,

describing amounts of a trait in a population and possibly inspiring future research paths and hypotheses. However, where this methodology falls short in its use in a Pro-Talent argument is that it completely disregards the possibility of alternative longitudinal explanations other than genetics or innate talent. One such alternative explanation could be that multiple years of baseball training have helped professional players develop their visual function and slowly grow to the necessary level to see the ball moving at high speeds and, therefore, play the game. Furthermore, to those who would argue that visual acuity cannot be improved through training, Deveau, Ozer, & Seitz (2014) developed a training technology through which participants were shown to have improved their visual acuity. Investigating this topic has led this article to uncover a potential research gap in that the majority of genetics-based visual studies are focused on the heritability index of visual impairments, particularly in elderly populations, and there is a lack of heritability index information and studies regarding visual function in adolescents and young adults. Another potential, though admittedly less likely, explanation for such differences in eye acuity in professional baseball players could be that their acuity falls within a normal range; however, the acuity of the general population was oversaturated with people who possessed visual impairments.

A third prominent study that falls in the naturist camp is "You can't teach speed: Sprinters falsify deliberate practice model of expertise," by Lombardo and Deaner (2014). It compiles biographical analysis of 35 Olympic level sprinters and a survey of 64 U.S. collegiate athletes (of which 20 are sprinters) regarding how they compared to peers in their youth in terms of sprinting speed, among other physical qualities. The study found

that of all biographies analyzed, the median amount of time needed to achieve Olympic level performance took them was on the whole far lesser than the proposed 10-years needed to achieve expertise proposed by the deliberate practice model. The majority reportedly only needed to take 7.5 or fewer years to achieve such a level of expertise. Furthermore, the collegiate athletes surveyed reported that sprinters recalled being faster as children than their peers before beginning formal training at 6-10 years old and at 11-15 years old. However, it is unknown if this is due to any relative age difference effects. Additionally, in the case of the 15 collegiate sprinters who began competing in high school with no prior training, recalled performances that were faster than the 95th percentile of age-appropriate performance data taken from high school track meets.

The benefits of this study were the longitudinal and then cross-sectional styles used to approach the topic through analysis of Olympic athlete biographical data and then of collegiate athlete performance. Doing so somewhat avoids the issue present in Laby et al. (1996). Data regarding participants is collected for the establishment of a timeline of change in performance. In such a timeline, Lombardo and Deaner make the case that 85% of their collegiate sprinters obtained a personal best performance in their first season of competition in high school, with only two sprinters having had trained before their first season.

While these findings seem promising at first glance, many complicating factors may have influenced the results, some of which the authors acknowledge and others they neglect to mention. They acknowledge that the low response rate of sprinters (being only 20) is not

necessarily generalizable or representative of larger U.S. collegiate athlete populations. However, They argue that they reduced response bias through constructing survey questions in a neutral context to the deliberate practice model. However, as the study relies largely on recollection, in both the bibliographical analysis and the collegiate athlete survey, the study is exceptionally prone to participant egocentrism bias and self-placement biases in the form of illusory superiority. Another potential issue with the study is Lombardo and Deaner's conceptions of what activities could be considered as relevant training for sprinting and when in a child's development, sprinting becomes an available tool. While they acknowledge that children can develop their sprinting ability through play activities such as tag, they underestimate the age at which children can begin performing these activities. According to the University of Minnesota Amplatz Children's Hospital (2010), a child without any neurological disorders would be capable of breaking into a full run before turning three. As such, in a family that encourages play involving running, it would be understandable for a child to develop their skills for running and subsequently sprinting. As a child ages, play becomes replaced by sports. The training benefits play can provide to children who have immersed themselves could be quite substantial when beginning sprinting as a sport. As such, this creates a research gap that could be filled by a decade-long longitudinal study in children aged three and up.

"Putting practice into perspective: Child prodigies as evidence of innate talent" is a literature assessment of research regarding child prodigies, particularly in the domain of music, and the implications of their existence on the presence of an innate talent as defined by Howe (1998). As stated by the authors Ruthsatz, Ruthsatz, and Ruthsatz-

Stephens (2014), the primary intent in the article is to show that child prodigies serve as powerful evidence for the nativist perspective of innate talent. They argue that as research (Rusthartz and Urbach, 2012) has shown, the skills a child prodigy may possess are primarily dependent on their cognitive profiles in terms of general IQ, working memory, and attention to detail exceptionally high levels compared to their age relevant benchmarks. Furthermore, they argue that a child prodigies' talent in a domain could be predicted through these cognitive profiles, showcasing this through statistically significant I.Q. differences separating math and music prodigies from prodigies in other art forms. This trend also holds in working memory scores, with music prodigies scoring a statistically significant amount higher than prodigies in other art forms. It is also interesting to note that while such an increase of I.Q. is present in those in the maths, sciences, and music side of prodigious academia, the more literature and humanities-based prodigies receive very little recognition in both I.Q. Test scoring and in terms of public recognition.

What complicates the arguments put forward by the Ruthsatzs is the apparent bias towards the nativist position present throughout their article. They make it especially clear that the goal of their study is to criticize empiricist position studies and highlight the importance of innate talent. This could arguably cause them to succumb to cherry-picking bias, the child prodigy studies that they use data and analysis from are by vast majority written by one or multiple of the Ruthsatzs, and even in one case use data from a yet unpublished (Ruthsatz and Ruthsatz) study in their arguments, making it hard to peer-review or assess the validity of their evidence in terms of statistical analyses.

A further issue is present in that their criticism of empiricist position studies as their response to most of Ericsson and Howe's works can be considered fairly surface level in criticism. In that, their rebuttal can be summarized in these two sentences of their own words: "The authors make a strong argument regarding the importance of practice in building talent among musicians. They fail, however, to rule out the possibility that differences in innate talent were also affecting these musicians' ultimate level of achievement." (Ruthsatz et al., 2014) This is somewhat ironic because the factors chosen by the Ruthsatzs in their prodigy studies to best represent a nativist perspective of innate talent are not immune from environmental or training-based influences. A child's brain is a flexible and mysterious thing; childhood is a critical period for neuroplasticity, in which environmental factors and repeated actions have a tremendous developmental effect. Factors of a child's cognitive profile are influenceable through even basic environmental changes such as I.Q. increasing in a statistically significant correlation to improvement in the socio-economic status of adoptees, as shown by Duyme (1999). As such, there are far more unexplored explanations for child prodigies than simply an innate talent or practice, and the Ruthsatzs' seem needlessly hasty in their conclusion that a strong innate talent plays as strong a role as they believe.

Another literature assessment that can help shine a light on child prodigies is "Exceptionally gifted children: Different minds" by Lovecky (1994). While not explicitly focused on seeking out whether empirical or natural influences have the greatest impact on performance, it offers two alternative factors in a cognitive profile that could

reasonably influence the birth or making of a child prodigy. These two traits being a need for precision and an inclination towards immersion in a domain or domains. While it is of note that these traits aren't predictive of any distinct prodigious skill in a specific domain, they can be of use in assessing the general likelihood of a child being a prodigy. They find that children with a need for precision-based in highly logical thinking may be driven to expect precision in both the world around them and from themselves. This, coupled with the non-linear learning styles of children stemming from their immersive tendencies, could arguably lead to obsessive and excessive practice and knowledge-gathering behaviors. This might offer a nurture-based explanation for the expertise a child prodigy may exhibit; however, that further raises the question of what are the causes behind a need for precision and inclinations for immersion and whether these causes are nativist or nurture based.

Empiricist perspective:

It would be remiss to not discuss the study that popularized the nature-nurture debate in modern academia and pioneered the deliberate practice model. "The Role of Deliberate Practice in the Acquisition of Expert Performance" by Ericsson, Krampe, and Tesch-Romer (1993) studied the practice habits, and lifestyles of music professor nominated violinists, these being students sorted as "best" instrumentalists by their professors and matching students were selected for comparison by age and sex from a similarly selected group of "good" instrumentalists. The students and their professors were interviewed for biographical data and asked to log practice and other activities. Part of what aids the validity and persuasiveness of the study was that the procedure was replicated within

itself, with both procedures finding a consistent need for a large amount of time in practice and preparation and deliberate and effective practice methods being necessary to attain high-level performance, the origin of the "10-year hypothesis". They make the claim that the view of heritability estimates being applied to elite performers does not constitute strong evidence as these heritability estimates are originally taken from the general population and not participants from unusual or uncommon environmental conditions such as elite performers who engage in substantial deliberate practice—further arguing that adaptive process to deliberate practice may even be accelerated in children. They conclude with the acknowledgment that a rejection of innate talent in the acquisition of elite performance does not mean that elite performance is attainable by everybody, the difficulties present in acquiring access to training and the commitment to continue said training form a vast wall that prevents many from reaching the peak of any desired domain. These sorts of results are further replicated in Ericsson's multiple subsequent studies (2007, 2005, 2013).

While being the progenitor of much of modern debate regarding nature and nurture, the study is not free from confounding factors that can bring doubt to its conclusions. Firstly, the sample sizes for instrumentalists were small, mainly making use of students of a single music school, which calls into question the generalizability of the results to larger populations or even to just to other musicians. A second issue with the study concerns its brushing over of the idea of multiple interacting and converging potential causal factors for elite performance aside from deliberate practice, and innate talent presents a potential

lack of understanding of human development—for example, factors such as socio-economic status and adequate nutrition.

However, Ericsson's focus on innate talent and deliberate practice as two main factors is not a terrible starting point, Bullock et al. (2008) have outlined an alternative to the deliberate practice model in "Talent identification and deliberate programming in skeleton: Ice novice to Winter Olympian in 14 months". Their proposed model of deliberate programming, of which the deliberate practice model could be considered a subset, argues that elite performance is most effectively achieved through high-quality instruction, practice, technical detail, and the meeting of mental and physical needs through sports science and medicine. They evidenced this model through the attempted conversion of ten Australian athletes with little relevant skill into elite Skeleton athletes, a sport that requires that athletes possess adequate pace, power, and technique in order to launch and steer their sleds downhill at speeds of up to and exceeding 90 miles an hour. Over the course of 14 months, three of the athletes were able to achieve moderate to elite performance through a successful late specialization, which to some extent serves as a counterargument to the "10-year hypothesis". Bullock et al. argue that deliberate practice across multiple sports may serve as a method to achieve expertise in a completely different sporting domain through adherence to deliberate programming.

As with Ericsson's original study, Bullock et al. (2008) also suffers from an incredibly small sample size, with ten athletes being selected for deliberate programming from more than sixty applicants. Furthermore, these ten applicants were selected for being the most

promising as judged by coaches and sports scientists. If these applicants were to have been selected in an equal number of both historically excellent and poor athletes as judged by those same coaches and sports scientists would have served to make a far more informative study as we would be able to obtain comparative effect data of the deliberate programming model in those athletes. However, this was likely to not have been the highest of priorities on the research staff as it seemed their largest goal was to prepare athletes for the at-the-time upcoming winter Olympic games.

"The roles of talent, physical precocity, and practice in the development of soccer expertise" by Helsen et al. (2000) examines how coaches perceive and select for talent in youth team transfers and player selections. They observed through direct observation, youth player biographical data, and coach interview that coaches believed they could perceive talent in youth and that the coaches' primary method for testing for talent was generally weighted in general athletic ability as opposed to technical skill or team play. As such, this leaves the youth selection vulnerable to the physical maturation of some children as opposed to others. Youth soccer has distinctive age categories, and as such, there is an advantage provided to children with birthdays at the beginning of a competitive season in terms of physical maturation. This is reflected in coach perceptions of who is talented, consistently favoring the older children, and staying consistent even through changes when a competitive season begins. They further found that from as young as 12-years old, youth born in the final quartile of a season are most likely to quit. Additionally, when the beginning of a season is changed from summer to spring, there is no significant effect on youth 16-18, this is explained as being due to the originally eldest

youths having already received the benefits of coach selective attention and due to the far lower number of originally youngest youths from a prior season because of their low team retention rate. However, in the following groups of children, spring births were found to have the advantage in maturation, as summer births had previously possessed. Helsen et al. further find a strong positive linear relationship between physically mature individuals and team practice with skill. This relationship is present at all levels analyzed, these being the international level, national level, and provincial level players. This phenomenon that Helsen et al. (2000) has observed has been popularized and widely accepted as the relative age effect and could explain many potential observations of innate talent.

There aren't many criticisms to be had with this study as not only was the sample size of the youth players being 485 and of both sexes, making it for the most part highly generalizable to other sports systems. Furthermore, the ease of collecting birthday, player biographical, and coach perception data makes this study widely replicable as theoretically no in-person aspect is required as this data can be obtained through digital interview and electronic survey. However, what holds this study back overall would be the difficulty of determining the presence of a relative age effect in fields outside of sports where the advantages of relative physical maturation would be less obvious such as in the artistic and academic domains. Which could suggest that there can be no explanation for unifying elite performance across all domains, as different domains have vastly different requirements for achieving success.

Interactionist Perspective and Other Models of Talent:

"Beyond Born vs Made: A New Look at Expertise" by Hambrick et al. (2016) serves as a challenge to not only the deliberate practice model but also to previous approaches laid out by studies of the nativist perspective. While acknowledging the previous dichotomy, it simultaneously attempts to move beyond it. It does so through the intensive review and analysis of both highly impactful studies that affected the academic zeitgeist and meta-analyses that could potentially demonstrate other factors which affect the variance of performance aside from deliberate practice and pure genetics. These other factors are opportunity factors, basic ability factors, personality factors, prior domain-relevant experience factors, developmental factors, and genetic factors. It further advocates a multi-factorial gene-environment interaction model of expertise due to its inclusion of both direct and indirect predictors of expertise and compatibility with the structural equation modeling form of data analysis, which is optimized for interpreting multiple forms of data input. In their analyses of potential variance factors for expertise, they found that deliberate practice, while statistically significant does not account for the majority of variance, basic ability factors (such as base strength, speed, or memorization ability) are capable of predicting expertise with predictions in some domains ranging from successful predictions of moderate expertise to internationally recognized levels of expertise. Personality factors may also predict expertise through influencing the quantity and quality of deliberate practice, and some interpretations of data have been shown to interpret expertise directly. Furthermore, prior domain-relevant experience other than deliberate practice has been shown to be an incredibly strong predictor of expertise and accountable for variance in expertise. Finally, genetic factors are capable of accounting

for some variance in expertise through their influence of both basic ability factors and personality factors.

This study is impactful as few prior studies have engaged with such extended multi-factorial data regarding expertise, making it somewhat unique. Furthermore, the study does not appear to suffer from a selection bias in terms of research discussed; while the works of some researchers are brought up more than others, there does not appear to be an overall focus on a particular group of academics. It could be argued that the study has an anti-deliberate practice model confirmation bias, however as the deliberate practice model has been so dominant a topic of discussion in the literature, it is necessary to address it in full.

The interactionist perspective is further supported through Subotnik, Kubiilius, and Worrell's (2019) "Environmental Factors and Personal Characteristics Interact to Yield High Performance in Domains." This study investigated the interaction of environmental and individual factors on elite performance in varied fields through analysis of pre-existing literature, finding that research regarding development often failed to incorporate contexts beyond personal and immediate environmental factors. Concluding that multi-factorial gene-environment interactions (arguably the most holistic perspective regarding talent and skill acquisition) are the key to high performance in domains, however, the extent to which larger-scale environmental factors such as cultural contexts and governmental policy influence on expertise variance forms a research gap that needs to

be filled in order to provide a full picture of the effects of multi-factorial gene-environment interactions when it comes to high-level performance.

Interestingly while Subotnik, Kubilius, and Worrell (2019) come to a similar conclusion as Hambrick et al. (2016), they do not acknowledge their proposed multi-factorial gene-environment interaction model. The study instead places its focus on placing works within both child and talent developmental framework contexts. Furthermore, while the scope of the study in its discussion of prior literature is far from as broad or detailed as Hambrick et al.'s, its focus on those developmental frameworks makes it more accessible for laymen to apply an understanding of these multi-factorial interactions to their behavior and practices. This accessibility is important as knowledge of these frameworks may provide potential support in child-raising, which in turn may help counteract the harmful effects of socio-economic status biases present in educational systems.

While the modern scientific community is beginning to come to a consensus in adopting an interactionist perspective of expertise and innate talent, "Compromising Talent: Issues in Identifying and Selecting Talent in Sport" by Baker, Schorer, and Wattie (2017) demonstrates that the athletic community is still entrenched in the mindset of an early identifiable fixed-value concept innate talent in line with the nativist perspective. Their literature review outlines how there is still an extremely small evidence base (these being characteristics such as basic demonstrations of strength or speed) that coaches tend to rely on when selecting athletes. Furthermore, it is noted that relative age effect and access to financial resources as well as overall socio-economic status still serve as widely

occurring biasing factors in youth athlete selections. They recommend that coaches do not attempt to select for early signs of innate talent in youth selections since, as far as current research is concerned, it is incredibly unlikely for a coach to be an accurate predictor of future performance. They further argue that the restrictive nature of sports systems which allow for easy dismissal and difficult acceptance of potential athletes and the lack of coach engagement with the literature and sports science on the whole both serve as major barriers to scientific advancement in relation to sports and understanding innate talent and the acquisition of expertise.

While the study provides excellent recommendations for alterations to the current sports paradigm, it is arguable that their argument regarding lack of coach engagement with literature could constitute a cultural bias as lack of engagement may be culturally exclusive. In individualistic cultures, elite coaches are motivated not to engage with the literature in terms of sharing their data and methodology as competing coaches and teams would potentially use it to better themselves. As such, sharing would increase the difficulty of competitions by aiding their rivals. In a collectivist culture, an elite coach may be motivated to engage with the literature to aid coaches and teams who are members of the same cultural in-group.

Coyle (2009), author of "The Talent Code: Greatness isn't Born. It's Grown. Here's How," proposes an alternative understanding of expertise. He proposes a myelin sheath model, in which the thickness and development of myelin sheaths are in some way responsible for and correlate with expertise. For context, a myelin sheath is a substance surrounding

the axon of a nerve cell, insulating the electrical charge within to preserve nervous signals as they travel. Coyle argues that repeated deliberate practice and other relevant experiences lead to myelination and production by oligodendrocytes and astrocytes in relevant neurological and nervous pathways as a response to their frequent use. This myelination will, in turn, better insulate these pathways, thus optimizing their future use. Thus suggesting a mechanism for how talent could be developed.

While at a first look, Coyle's model might seem out of place as an interactionist model and more in line with an empirical model (which is how Coyle presents it), however myelin sheaths just may be the best feature in a human body to demonstrate the interaction effects of genes, practice, and other life experiences. Liu et al. (2018) found that genetic influences have an impact on cortical pathway myelination with a 29%-66% heritability index using M.R.I. scans from the Human Connectome Project as a sample. On the other hand, Bengtsson et al. (2005) found that change in white matter volume, of which myelin is a major component, occurred in pianists who performed long-term practice during critical periods of development. This change was particularly prominent in the neuroplasticity of pyramidal tracts responsible for fine motor control. Bengtsson et al. is further supported by McKenzie et al. (2014), who found that mice who learn a new skill (running on a complex wheel with irregular rungs) have elevated levels of newly born oligodendrocytes. Conversely, mice unable to produce new oligodendrocytes and thus myelination were unable to master the complex wheel. What makes this highly relevant to the debate is that if these lab mice results map directly to humans and that at some point bio-neurological science is able to uncover how to accelerate oligodendrocyte

production and myelination in humans, from an incredibly hypothetical standpoint, we would perhaps discover a way to artificially increase learning efficiency and skill acquisition, and potentially be able to create prodigies on demand.

Chapter 3.

Findings and Discussion:

Implications of Perspective:

The purpose of this section of the thesis shall be an analysis of the implications present in the three perspectives regarding innate talent and an analysis of Talent Exceptionalism from the moral stances described in the introduction. In regards to the nativist and empiricist perspectives of innate talent, as dichotomous views of one another, they possess mirroring problematic qualities. The nativist perspective, which wholeheartedly accepts the concept of innate talent and rejects environmental influences, implies that a person's innate talent is primarily to credit for their achievements and success. This is incredibly demoralizing in that it invalidates any work a person might put into achieving mastery in an expertise. Under this view, by putting in the bare minimum of effort, a genius will match and surpass those who do not possess innate talent and try their hardest when working to achieve expertise in a domain. A nativist who has no innate talent has no reason to attempt anything at least competitively, as all that will occur is being outcompeted by those with the slightest modicum of talent. As shown by Demorest, Kelley, and Pfordresher (2016), many adults who identify as being tone-deaf and as such having no innate talent for music were found to have no significant differences between themselves and the general population in terms of musical ability, their defeatist concept of self hindering their willingness to participate in music as they age.

On the other hand, the empiricist perspective rejects the concept of an innate talent while accepting environmental influences and stimuli such as practice being the attributable

factor to achieving expertise in a domain. Under this view, it is only by putting in the utmost effort that a person can achieve elite-level performance. An empiricist who works longer, harder, and more intelligently in the same exercise as a contemporary will surely outcompete them. This viewpoint becomes damaging because motivated people who put in immense effort and practice failing to achieve elite performance may turn to self-damaging practices to compensate. For example, as shown by Sun et al. (2012), excessive homework is a large predictor of lack of sleep in students as the only way for them to attain the time necessary to complete their work is through sacrificing sleep. Lack of sleep is damaging in multiple ways. The division of sleep medicine at Harvard Medical School (2007) lists lack of sleep to have negative effects on immune function and serves as a risk factor for chronic disease, mood disorders, obesity, and diabetes. These being negative life outcomes occurring in an effort to trade health for success in a domain.

This thesis posits that the interactionist perspective is likely the least damaging in terms of implications, stating that the interplay of both innate talent and environmental effects is what most affects performance and attaining expertise. Under such a view, people need to have beneficial multi-factorial gene-environment interactions in addition to practice and effort to achieve expertise in a field. If a successful nativist is akin to someone winning the lottery, and a successful empiricist is akin to someone with a steady paying job, then a successful interactionist would be someone with access to both or who leverages one to acquire the other. As studies outlining interactionist perspectives are still in the phases of model proposal as seen with the myelin sheath model and the multi-factorial gene-environment interaction model, it is not at the moment possible to a direct

example relative to the interactionist perspective using studies as was done for the prior two perspectives.

Moral Analysis

As stated in the introduction, Talent Exceptionalism advocates for identifying and promoting those with innate talent and the rejection of those without. As multiple studies (both previously outlined throughout the course of this thesis and not) outline the possible harm and lack of scientific backing of practices inspired by Talent Exceptionalism, it draws the moral status of the philosophy itself into question.

The utilitarianist concept of morality at its most simple revolves around maximizing the greatest amount of happiness or utility for the greatest number of people. Talent search practices typically select one or few from among many applicants, such as in applications to join a sports team or academic institution. Those rejected by these searches could succumb to negative expectations of their own success, in the manner of Brophy & Good (1973), thus harming both their happiness and utility, which, as outlined in the doctrine of utilitarianism, is immoral. A rebuttal could be made to this logic in the case of sports and talent shows as fans of these two forms of entertainment gain pleasure from watching. However, that raises the question of whether the utility gained by an audience outweighs the potential for suffering risked by both those who fail to enter and those who do not succeed long term within such talent exceptionalist systems. This thesis takes the stance that the moderate utility offered from the entertainment of the large audiences of these programs do not offset the far greater lack of utility in terms of adverse effects to life

outcomes of those who, through talent exceptionalist entertainment systems, are labeled as talentless.

Duty-based ethics, otherwise known as deontological ethics, operates under the belief that actions in themselves have inherent moral values and that the consequences of these actions are deemed irrelevant to morality. Helpful examples of actions with moral qualities would be that it is morally wrong to lie, while it is morally correct to treat others with fairness and respect. Methods through which acts are determined as morally right or wrong are outlined in Kantian and Russian deontology interpretations. Kant's categorical imperative proposes that people should act in accordance to as if their actions became universal maxims. As such, in order to be a morally upright person, you must act in a manner that you would be willing for everyone else to replicate. On the other hand, Ross proposes that to be moral, and people must act in accordance with as many of his prima facie duties as possible, these duties being fidelity, reparation, gratitude, justice, beneficence, self-improvement, and non-maleficence.

This thesis would argue that from both a Kantian and Russian deontological perspective, the practices stemming from Talent Exceptionalism are immoral. In terms of the categorical imperative, the act of discriminative treatment between people due to innate factors, these being talents or otherwise, is one that should not be universalized.

Furthermore, those who operate these talent exceptionalist systems are likely to treat applicants of these systems as a means to an end rather than as being meaningful ends in and of themselves, as seen in Hobson's (2016) investigation of the money flow of

Olympic committees and its impact on medium to low performing professional athletes. Hobson's work also serves as an example of owners of talent exceptionalist systems not obeying their Russian prima facie duties of fidelity, beneficence, and non-maleficence.

Interestingly there is an ethical theory which both supports and rejects Talent Exceptionalism to the same extent, this being ethical egoism. In its most basic form, ethical egoism states that an individual should do whatever is in the best interest of the said individual. It is important to note that best interest includes long-term benefits as opposed to simply short-term or immediate benefits, which separates ethical egoism from hedonism. As such, an individual in the position of a potential applicant to a Talent Exceptionalist system, unless completely confident of being accepted, should find Talent Exceptionalism immoral as being an applicant is more likely than not going to be a harmful experience due to the low likelihood of being accepted and undergoing the same consequences outlined in the Utilitarian argument. However, for an individual with ownership of or existing stake or role in an existing Talent Exceptionalist system, this person would find Talent Exceptionalism to be moral. Its continued existence, regardless of the consequences to other people, would be beneficial to that individual.

The final form of ethics to be discussed in the context of Talent Exceptionalism is social contract morality. Social contract morality states that a person's moral obligations are based on the contract they have with others or, in some interpretations, the contract we have collectively entered with the state, either explicit or implicit, necessary to form the society in which that person lives. An extremely simple example of this would be in a

society of two people, and they would agree not to murder one another. As such, in this society of two, murder has become immoral. This concept is further developed in Rawlsian social contract morality, which states that these moral contracts should only be decided upon from the original position. The original position being where a person is ignorant of their circumstances, be it wealth, race, sex, or level of innate talent. In such a position, a person must only accept equitable moral contracts; otherwise, they may find that they are on the disadvantaged end of a moral contract when they return from the original position. Under Rawlsian contract theory, it seems apparent that a person in the original position would reject a moral contract regarding Talent Exceptionalism and its practiced systems. They would be unable to tell if they possessed the innate talent that Talent Exceptionalism is supposed to select for and provide support to.

Implications and recommendations for educators and coaches:

Throughout this thesis, multiple studies have been discussed or mentioned, which drew attention to a need for change in current education and recruitment systems. Talent selection practices were shown to be highly vulnerable to selection bias in the form of both the relative age effect and the effect of financial and socio-economic differences in both sport and academic assessments. The relevant studies recommended longitudinal assessments of aptitude as opposed to single-time assessments of ability in order to best counteract this. While from an economic standpoint, this is not practical at the moment in terms of short term profits and quick processing of applicants, it can also be argued that after longitudinal assessments are mass implemented, the data generated over time would allow organizations to make decisions they may not have seen previously in terms of

applicant selection. A longitudinal assessment decreases the likelihood of extenuating factors affecting performance and further best demonstrates an applicant's most consistent or average level of performance, an example of this being the prevention of relative age effect influence on participant selection.

Furthermore, as parental and instructor attitudes towards children's aptitudes were shown to be influential in terms of child perceptions of self and success outcomes, it is important that the multi-factorial gene-environment interaction model and a general interactionist perspective be spread to parents and instructors alike, as future damage to the success outcomes of children can likely be prevented with a switch from the nativist, talent exceptionalist philosophy still parroted today. In accordance with such, this thesis recommends the implementation of consistent and rigorous awareness campaigns for both parents and teachers, and coaches alike as to the power their attitudes and beliefs hold. This could take the form of schooling new parents and teachers through either virtual or in-person formats, how to interact with their children in ways that portray confidence or positive effects towards their children's aptitudes and efforts towards achieving success in learning and skill acquisition.

Additionally, as the acceptance of the interactionist perspective in literature is relatively recent, this thesis recommends the undertaking of additional studies specifically with the goal of providing either additional support or criticism of the multi-factorial gene-environment interaction model and myelin sheath models as so far these types of studies have not been conducted to the extent that this thesis was able to uncover them during

literature research. Longitudinal research comparing the effects of resource investment in entire youth cohorts (a talent normalization strategy) to resource investment on selected members of a cohort (a talent exceptionalist strategy) may offer promising data as an investigation of these interactionist models.

Chapter 4.

Conclusion:

While this thesis is unable to deny the existence of an innate talent, it does find that the improvements in performance due to innate talent account for far less than presented in Talent Exceptionalist rhetoric. A model of expertise generated from the interactive perspective such as the myelin sheath model or the multi-factorial gene-environment interaction model account for far more variance in expertise through combined interacting factors than the nativist or empiricist (deliberate practice) models can account for in their negated biconditional factor analysis, these being innate talent and deliberate practice respectively.

In three of four moral theories, Talent Exceptionalism and its subsequent practices were determined to be largely an unethical practice due to failing in the following respects; to provide the greatest utility, to adhere to the categorical imperative's universal maxim, to enact prima facie duties, and to be acceptable in a moral contract from the perspective of the original position.

This thesis advocates for awareness to be raised for: selection biases (such as the R.A.E.) in education and recruitment systems, the impact of adult attitudes upon children in terms of attitude development and life outcomes, and the need for further longitudinal studies focused on the evaluation of interactionist perspective models as the current literature is sorely lacking in both breadth and depth on the topic.

Bias Acknowledgment:

It must be noted that the author, prior to the full literature review process of the thesis, fell into the empiricist (deliberate practice) camp of understanding performance and, as a result, may have been biased in his analyses in favor of deliberate practice. Another biasing factor affecting the literature review section of this thesis was the in-accessibility to the full texts of many studies regarding innate talent. This was caused by Tufts University not having access to digital copies in specific academic journals, studies to which Tufts University did not have access were omitted from the literature review section.

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