

The New Borderland:

A Mixed-Methods Examination of Teacher
Perceptions of Intelligence, Race, and
Socioeconomic Status in Relation to Behavior
Genetics

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This dissertation is submitted for the degree of Doctor of Philosophy.

Faculty of Education • University of Cambridge

Submitted: September 2018

*We, this people, on a small and lonely planet
Traveling through casual space
Past aloof stars, across the way of indifferent suns
To a destination where all signs tell us
It is possible and imperative that we learn
A brave and startling truth*
Maya Angelou: A Brave and Startling Truth

Declaration of Originality

I hereby declare that my dissertation:

- Is the result of my own work and includes nothing that is the outcome of work done in collaboration except where specifically indicated in the text.
- Is not substantially the same as any that I have submitted, or, is being concurrently submitted for a degree or diploma or other qualification at the University of Cambridge or any other University or similar institution except as specified in the text.
- Does not exceed the prescribed word limit of 80,000 words, excluding these opening pages, reference list, tables, footnotes, and appendices. The word count for this dissertation is 79, 997 words.

I further state that no substantial part of my dissertation has already been submitted, or, is being concurrently submitted for any such degree, diploma or other qualification at the University of Cambridge or any other University or similar institution except as specified in the text.

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Signature:



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Abstract

Behavior genetics argues intelligence and educational attainment are highly heritable (genetically influenced) and polygenic (influenced by many genes) traits. Researchers in this field have moved beyond identifying whether and how much genes influence the manifestation of a given outcome to trying to pinpoint the genetic markers that help predict them. In more recent years, behavior genetics research has attempted to cross-over into the field of education, looking to play a role in the construction of policy and the implementation of curriculum. This dissertation explores American teacher understandings of intelligence, race, and socioeconomic status in relation to genetics. The convergent parallel mixed-methods research design interprets findings from focus groups, interviews, and surveys through the notion of ‘discriminate biopower’—a theoretical framework that combines intersectionality with biopower. Findings from this study suggest that US teachers believe children differ genetically and see genetics playing a role in a student’s ability and race. Furthermore, teachers are open to learning more about the inclusion of genetics research in education policy. At the same time, however, teachers are wary of incorporating behavior genetics findings into education policy within a context where economic and racial segregation continue to dictate who gains access to resource and opportunities.

Keywords: education; genetics; discriminate biopower, teachers, mixed-methods

Acknowledgements

It takes a village to complete a doctoral dissertation. I learned just how vast my support network is through this journey. Many thanks to my supervisors Anna Vignoles and Jo Dillabough and mentor Duana Fullwiley who were immensely supportive of me as I followed both my academic and athletic dreams. They challenged me to do what it takes to produce a work I am proud of. I look to their own accomplishments and take inspiration from it. I hope to reflect the strong, independent, and fierce women who guided me through my doctoral years throughout the rest of my career.

Thank you to Aliandra, Allegra, Fiona, and Sally for being the best team of proof-readers I could ever ask for and for providing such thoughtful reflections and feedback on my work. Thank you to my family for their unwavering support as I moved across the country and then across the Atlantic: Mom, Dad, Diana, Allegra, and Alexandra. Thank you to Ali for supporting me unconditionally these last four years through the good times and the bad and for teaching me to write for multiple audiences. You helped me to make my work more accessible.

I am deeply indebted to all those who replied to my cold emails or phone calls and took the time to hear my research pitch and provide invaluable feedback (and there were so many of you). Thanks to those who sat down for an interview, participated in a focus group, and disseminated or took my survey. None of what I have in the following pages would have been possible without all of you. I am in awe of the dedicated teachers and passionate researchers I had the opportunity to speak with as part of my data collection.

My heart also overflows with gratitude to Magdalene College, the sport of rowing, and Cambridge University Women's Boat Club. Thank you for helping provide me with the opportunity to study and row at the best place in the world. I have been taught 'how to suffer.' I am stronger in mind and body for it. A shout-out to Camp Phoenix for changing my academic trajectory and working to address the urgent need to provide quality educational opportunity to our marginalized youth. **Phoenix clap**

Finally, I am humbled by those who came before me and fought against a system that told them women and people of color were not meant to be educated. Who fought against a system that told them they were less than. This one is for you. May we

continue to learn the “*brave and startling truth(s)*” in the battle for equity and social justice. Now, “*into a daybreak that’s wondrously clear, I rise.*”

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List of Abbreviations

ADHD: Attention-Deficit Hyperactivity Disorder
AFC: American Federation for Children
BGI: Beijing Genetics Institute
Chicago ACTS: Chicago Alliance of Charter Teachers and Staff
CPS: Chicago Public Schools
CRISPR: Clustered Regularly Interspaced Short Palindromic Repeats
CRT: Critical Race Theory
CTU: Chicago Teacher's Union
DST: Differential Susceptibility Theory
EEA: Equal Environment Assumption
ELL: English Language Learner
FAQ: Frequently Asked Question
FRM: Free Reduced Meals
GCTA: Genome-wide Complex-trait Analysis
GINA: Genetic Information Non-discrimination Act
GPA: Grade-point Average
GWAS: Genome-wide Association Study
G x E: Gene-Environment
IEA: Illinois Education Association
IEP: Individualized Education Plan
IRB: Internal Review Board
LatinoJustice PRDEF: LatinoJustice Puerto Rican Defense and Education Fund
LEA: Local Education Authority
MI: Multiple Intelligences
NAACP LDF: National Association for the Advancement of Colored People Legal Defense Fund
NAGC: National Association for Gifted Children
NASA: National Aeronautics and Space Administration
NEA: National Education Association
NYCDOE: New York City Department of Education
NYC: New York City

PPP: Public Private Partnership
PreK: Pre-kindergarten
SES: Socioeconomic status
SHS: Specialized High School
SHSAT: Specialized High Schools Admissions Test
SNP: Single Nucleotide Polymorphism
SSGAC: Social Sciences Genetic Association Consortium
TEDS: Twins Early Development Study
TEE: Teacher Expectation Effects
US: United States
UK: United Kingdom
WPPSI: Wechsler Preschool and Primary Scale of Intelligence
WISC: Wechsler Intelligence Scale for Children

Key Concepts

Behavior Genetics: A branch of scientific research combining psychology with molecular genetics. In this field, differences between individuals are separated into genetic and environmental components. Following the completion of the Human Genome Project in 2003, behavior genetics has moved beyond simply identifying the heritability of human behaviors to searching for the specific genetic variants that help to predict them.

Biopolitics: A concept used to study the mechanisms through which human life is managed and made political under forms of authority that help to regulate knowledge, power, and the processes of subjectivation. Through biopolitics, life and the population become subjects of political and scientific administration (this administration is otherwise known as the biopolitical state).

Biopower: The ways in which biopolitics is carried out in society. A form of regulation that enforces the maxims of ‘letting live’ and ‘making die’ among individuals and populations. A “set of mechanisms through which the basic biological features of the human species became the object of a political strategy” (Foucault, 2007, p. 1). Biopower entails: 1) One or more truth discourses about the ‘vital’ character of living human beings; 2) An array of authorities considered competent to speak that truth; 3) Strategies for intervention upon collective existence in the name of life and health; and 4) Modes of subjectivation, in which individuals work on themselves in the name of individual or collective life or health (Rabinow & Rose, 2006, p. 197).

Convergent Parallel Mixed-Methods: A research design in which quantitative and qualitative strands are conducted concurrently in the same phase of the research process. This design emphasizes both methods equally, analyzes the two components independently, and then converges the different forms of data collection to interpret results together (Creswell & Plano Clark, 2011).

Discriminate Biopower: Originally conceived of by Duana Fullwiley (2004) and defined as “the utter patchiness of what Foucault depicts as ordered ‘interventions and regulatory controls’ ” (p.160). A form of biopower that is “uneven and variable in its

distribution and attention” (Fullwiley, 2004, p. 160). This dissertation uses this term to describe a theoretical framework combining the core elements of intersectionality and biopower. Within the context of this work discriminate biopower is defined as the differential investment and attention provided to individual and collective human bodies on the basis of social divisions such as race, class, gender, citizenship, and (dis)ability.

Gene: A unit of heredity. A sequence of DNA. Genetics is the study of genes and genetic variation.

Heritability: An estimate of the fraction of phenotypic (or observable) variation that is due to genetic differences.

Intelligence: A socially-valued concept most frequently associated with academic performance. In this dissertation, intelligence is synonymous with ‘IQ’, ‘cognitive ability’, ‘g’, and ‘ability.’ Behavior genetics researchers have defined intelligence as “the ability to learn, reason, and solve problems” (Plomin & Stumm, 2018), however, there are various definitions of intelligence in existence.

Intersectionality: An analytic tool that considers how complex social constructions, identity politics, and systems of power interact to inform systems of disadvantage (Crenshaw, 1989). Intersectionality challenges the status quo that operates in dichotomies and argues that the combination of advantageous or disadvantageous socially-influenced categories weave a complex web to shape the everyday experiences of individuals.

Molecularization: A form of description rooted at the molecular level. In this dissertation, molecularization refers to the process of imagining life and characteristics like intelligence as a series of sub-cellular processes controlled by the genome (B. Braun, 2007). This is an individual-centered form of biopolitics.

Normalization and Regularization: The process through which a phenomenon is accepted by and becomes a central part of mainstream society and the individuals who

comprise it. Through normalization/regularization, structural issues and biases are tacitly maintained.

Race: A dynamic social process and construction. A form of classification based on skin-color that ascribes individuals to socially-constructed groups or certain geographic areas (Yudell, Roberts, DeSalle, & Tishkoff, 2016). Race is not to be confused with ancestry. Ancestry is an individual characteristic that is captured in a person's DNA (Yudell, Roberts, DeSalle, & Tishkoff, 2016).

Socioeconomic Status: The social position or 'class' of an individual or group; often determined through a combination of education, income and occupation.

Sociogenomics: The study of "social life in molecular terms" (Robinson, 2005). The field is driven by two desires. The first is to identify the genes and pathways that regulate aspects of development, physiology and behavior that in turn influence sociality. The second is to determine how these genes and pathways themselves are influenced by social life and social evolution. Behavior genetics is a sub-branch of sociogenomics.

Spatialization: A way of narrating space that has been discussed in human geography and borders studies. In this dissertation, spatialization is used to describe both how race, power, wealth, and inequality are geographically concentrated and how individuals locate and understand race, power, wealth, and inequality in relation to place.

Subjectivation: The process through which one becomes a subject. An individual's conduct and personality are shaped by both social processes and the individual's responses to these processes.

Truth Discourse: A manifestation of biopower. A form of knowledge, a technique, or a scientific discussion that shapes and creates value systems that have acquired the status of 'truth.' A truth discourse influences how we understand and organize ourselves and our social world. Truth discourses are disseminated via socially-

identified authorities (Rabinow & Rose, 2006). In this dissertation, behavior genetics generates a truth discourse on the etiology of intelligence.

Vital Life Characteristic: A term used within a biopower framework to describe characteristics that have been deemed necessary for or essential to health and vitality.

PART ONE: BACKGROUND TO RESEARCH

“No other topic in psychology has ever given rise to as much controversy, debate, and downright calumny as the apparently simple and innocuous IQ.”

(Eysenck, 1998, p. 187)

Chapter I. Introduction

Personal Context

In September 1998, my mother walked me the ten minutes from our home in suburban Virginia to Mosby Woods Elementary School, named after the American Confederate Ranger John Singleton Mosby. I was to be enrolled in the first grade. When my parents tell me this story, they talk about my mother's thick Nigerian accent and my grandmother, who spoke no English, and who accompanied us that day. Soon after I was enrolled, I was placed into a remedial reading program. According to my father, who is White, this was without justification: the school assumed I was growing up in a single-parent immigrant household with limited English. After he went to Mosby Woods to ask why I had been identified for special education, I found myself back in the 'regular' classroom.

My experiences with the US education system and my positioning in American society as a biracial woman of color, who is often identified as Black, have shaped and influenced my research interests and how I approach my work. As a researcher, I am interested in the concept of intelligence¹; it is a quality often viewed as necessary for success in virtually all facets of life — social, economic, political, and educational. Rooted in a history deeply tied to eugenic, classist, and racialized discourses, intelligence and its study have long offered scientific ways of making sense of human diversity and of classifying individuals in terms of 'ability.' It is this contested and charged history, as it relates to the American education system, that underpins the nature of my dissertation.

Today, research into intelligence and its etiology continues in the field of behavior genetics. Behavior genetics researchers study the heritability (genetic

¹ Throughout this work I use the terms 'intelligence', 'IQ', and 'cognitive ability' interchangeably, reflecting the flexibility with which they are used in both academic and public domains. To contextualize this, consider an excerpt from an interview I conducted with a behavior genetics researcher (name changed) during my research:

Clive: What concerned us is that a lot of people associate intelligence with all sorts of things that are stigmatizing to specific groups... people basically said "Well, what you do is all perfectly fine but just do not call it intelligence. Just come up with something that's not so loaded." And then we said, "Well ok, so then let's just stick to cognitive performance or general cognitive ability or something like that." It was literally that we sometimes had conversations where we were presenting one analysis, we called it 'intelligence', and people would go berserk and then we just, literally, we replaced 'intelligence' with 'general cognitive ability' and all of a sudden everything was OK. (January 2016)

influence) of intelligence and seek to identify the genetic markers that are predictive of it. The past five years has seen increased calls from the field to consider incorporating findings into education policy and curriculum (Asbury & Plomin, 2013; Kovas, Tikhomirova, Selita, Tosto, & Malykh, 2016; M. S. C. Thomas, Kovas, Meaburn, & Tolmie, 2015). These realities have influenced me to undertake a dissertation examining the relationship between behavior genetics and American educator views. More specifically, I focus on what growing developments in behavior genetics mean and could mean for the American education system by focusing on how it informs and interacts with teacher understandings of intelligence, race, and socioeconomic status (SES). I choose teachers because their perceptions of their students matter (Z. Li, 2016; Peterson, Rubie-Davies, Osborne, & Sibley, 2016; Rubie-Davies, Hattie, & Hamilton, 2006) and often map onto the race of a student; children of color are consistently seen as less capable by their teachers (Blanchard & Muller, 2015; Fish, 2017; Tenenbaum & Ruck, 2007).

I situate my work within the wider context of the United States, which is marked by continued racial disparities in income and economic capital (Florida & Mellander, 2016; Meyer & Sullivan, 2017), incarceration rates and incidents of police brutality (Krieger, 2015; Pettit & Western, 2004; Wakefield & Uggen, 2010), and educational attainment and test-scores (Hanushek & Rivkin, 2006; Ladson-Billings, 2006; Quinn, 2015). The continued peripheral status of communities of color raise the question of whether contemporary research on genetics and intelligence might embed racial inequalities further by appearing to justify or provide scientific explanations for inequities that are actually systemic and structural in nature.

Research Aims and Questions

I am driven by the following overarching research question: **How do teachers conceptualize intelligence, socioeconomic status, and race in relation to genetics?**

I also seek to answer:

- 1. How are intelligence, race, socioeconomic status, and genetics understood and articulated by teachers working in different classroom contexts?**
- 2. Is there any correlation between micro-level factors, like an educator's background characteristics, and their beliefs about the importance of genetics in relation to intelligence, socioeconomic status, and race?**
- 3. What are teacher views on the relevance of genetics for school-based education and views on genetics-informed education policies?**

My research design is descriptive, exploratory, and reflective. The anticipated difficulties of finding teachers willing to talk openly about intelligence, genetics, race, and socioeconomic status, led me to select a research design that would allow me to answer my research questions through multiple entry points. Therefore, I employ a convergent parallel mixed-methods design that works towards triangulation (Creswell & Plano Clark, 2011). My choice for a mixed-methods design stems from an understanding that the work I conduct requires an examination of several disciplines and fields that engage with charged terms. A mixed-methods design provides a more holistic system for addressing my research objectives and answering my research questions than either approach alone².

I use qualitative focus groups to provide a rich description of how US teachers understand and articulate the historically-burdened concepts of intelligence, race, socioeconomic status, and genetics. Through a national survey, I widen the scope of my study and offer practitioners a level of anonymity; I identify which kinds of teachers might be more likely to view intelligence, race, and socioeconomic status in terms of genetics.

I conceptualize my findings by combining the theoretical frameworks of intersectionality (Collins & Bilge, 2016; Crenshaw, 1991) and biopower (Rabinow & Rose, 2003, 2006). Joining these two frameworks is a theoretical advancement as I further Duana Fullwiley's (2004) notion of 'discriminate biopower.' Fullwiley uses 'discriminate biopower' to describe "the utter patchiness of what Foucault depicts as ordered 'interventions and regulatory controls' " (p.160). It is a form of biopower that

² I further detail my justifications for a mixed-methods research design that utilizes the theoretical framework of discriminate biopower in Chapter Five.

is “uneven and variable in its distribution and attention” (Fullwiley, 2004, p. 160). I define discriminate biopower as the differential investment and attention provided to individual and collective human bodies on the basis of social divisions like race, class, gender, citizenship, and (dis)ability. I choose to bridge these two perspectives for a more nuanced examination of how teachers talk about and understand the fraught concepts of intelligence, race, socioeconomic status, and genetics.

Overview of Research Design and Theory

My dissertation brings together two structures embedded in rich and charged histories and cultural systems: the field of behavior genetics and the American education system. I am interested in what the convergence of these two fields might mean for, at a philosophical level, notions of equity, and at a practical level, teachers and schools.

As an interpretivist, I value an acknowledgement of the environmental context, including the historical threads that hold my research sites together and the ways in which individuals construct knowledge and understanding in relation to their surrounding sociocultural, political, and economic geographies and landscapes. Although I recognize and contextualize my research within these historical narratives, I do not enter into this dissertation with pre-conceived answers. Instead, I explore teacher conceptualizations in relation to genetics and the American education system. In doing so, I hope to open up a conversation into what emerging developments in behavior genetics might mean for education systems that are often perceived to be ‘equalizing’ institutions.

My dissertation is divided into ten chapters and two parts. **Part One (Chapters One-Four)** provides the background to my research. Here, I introduce my study (**Chapter One**); provide a historical overview of how intelligence and race have been ‘molecularized’³ (**Chapter Two**); introduce the field of behavior genetics (**Chapter Three**); and conduct a literature review on teacher beliefs (**Chapter Four**). **Part Two (Chapters Five-Ten)** contains the findings portion of my dissertation. **Chapter Five**

³ This is a term I use throughout this dissertation to refer to the process of turning concepts like intelligence and race into a series of physiological and/or genetic processes. The phrase ‘molecularization’ is taken from Rose (2007).

outlines my theoretical framework and provides an overview of my methods. **Chapter Six** details my qualitative methodology and offers justifications for my research site, including why I worked with teachers in private and charter schools in the Chicago area. **Chapters Seven and Eight** cover my qualitative findings from three monthly focus groups held separately at two schools: the Jacobson School and West Elm⁴. **Chapter Nine** includes my quantitative methodology and presents findings from my US national survey of 660 Pre-kindergarten through grade 12 educators and their views on the role of genetics in education policy, intelligence, race, and socioeconomic status. I conclude my dissertation with **Chapter Ten**, which triangulates qualitative and quantitative findings, explores implications (both methodological and theoretical), presents my scholarly contribution, and provides avenues for further research.

⁴ Note that these names have been changed to protect anonymity.

Chapter II. Historical Genealogy of Burdened Concepts

On the Origins of Intelligence

Charles Darwin's half-cousin was born in 1822 in Birmingham, England. Francis Galton was a man of many trades: an unsuccessful medical student, a mathematician and world explorer, a pioneer in the study of human intelligence, and, most notably, the father of eugenics⁵ and behavior genetics. His 1869 work "Hereditary Genius" (Galton, 1869) gave rise to the "Galtonian conception of mental ability," or the idea that intelligence is a heritable (genetically-influenced) and fixed (unchanging) trait (J. White, 2006, p. 121).

As this chapter will demonstrate, throughout the course of history, views like Galton's on intelligence have been used to justify a number of perversions, discouraging the abolition of slavery (Evrie, 1868), resisting desegregation (Mayo, 1913), restricting immigration (Brigham, 1922), and generally validating socioeconomic (Galton, 1869) and racial inequalities (Shockley, 1972), all while reinforcing White supremacist ideologies. The use of genetic language to describe racial and socioeconomic differences in cognitive ability and academic performance was prevalent in the 19th (Galton, 1869; Hunt, 1864) and early 20th centuries (Jenkins, 1939; Jensen, 1968, 1970; Shockley, 1971) and persists today in the 21st (Cummings, 2013; Hunt-Grubbe, 2007; Johnson, 2013; Rushton & Jensen, 2005; Wade, 2014).

The conflation of race and class with genetics and pre-determined levels of intelligence signifies the historical (mis)use of Science, a field that, despite its projected image of objectivity and empiricism, is not neutral. Genetics-informed research⁶ has long been used to validate and carry out violent campaigns against the poor and people of color. This history, in part, explains why the debate on the utility and dangers of behavior genetics research continues today. Understanding and tracing this history is

⁵ Galton defined eugenics as "the study of the agencies under social control that seek to improve or impair the racial qualities of future generations either physically or mentally" (Galton, 1909, p. 81).

⁶ Genetics-informed research refers to the study of the relationship between biology and social and behavioral outcomes. Previously, genetics-informed research was predominantly confined to theoretical discussions on the heritability of social outcomes. For example, Galton defined intelligence as a heritable and innate trait and conducted a pedigree project using surveys and vague notions of genes and heredity to argue that the feature in a human "was a composite function generated by a conserved pattern of ancestral inheritance" (Mukherjee, 2016, p. 68). Nowadays, as Chapter Three discusses, behavior genetics seeks to identify specific biological pathways and genetic markers through advanced methodological techniques like Genome-Wide Association Studies (Bush & Moore, 2012).

the intention behind this chapter. I seek to show the connections between understandings of intelligence, genetics, race, and class. While I place most of my focus in this chapter on showing how intelligence and race have been defined through scientific discourses, I also acknowledge that socioeconomic status works to mediate ideas about ability. The field of intelligence research was created by economically privileged White individuals; it was used to legitimize the peripheral positions of both racially-defined minority and low-income groups and drew upon forms of molecularization. As I will show later in Chapter Four, the historical conflation of race, class, and intelligence is significant because race and class tend to regulate teachers' perceptions of students and their abilities; this in turn inhibits the opportunities certain groups of children are privy to (Z. Li, 2016; Peterson et al., 2016; Rubie-Davies et al., 2006).

There is a far richer history to be shared about the origins of the study of intelligence, the development of the concept of race, and how the two have coalesced around socioeconomic status and genetic ideologies. My aim in this chapter is not to provide this history in detail. Instead, I want to give the reader a *sense* of why race, socioeconomic status, intelligence, and genetics are historically-burdened concepts and offer snapshots of key moments in Western history that speak to why this is the case. The historical context presented in this chapter lays the groundwork for understanding the possible implications of incorporating behavior genetics research into education.

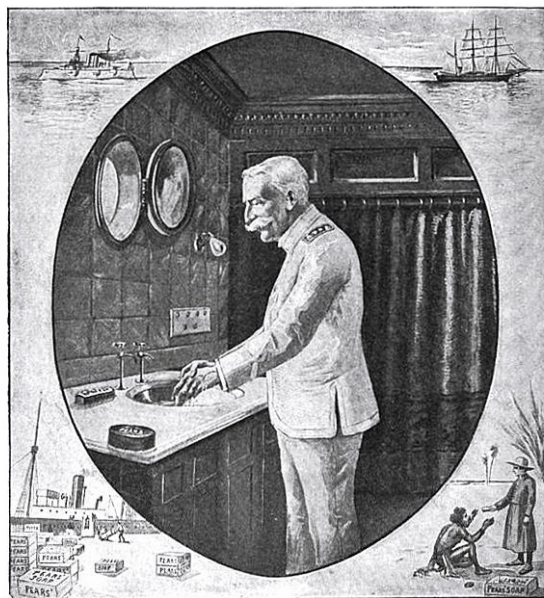
Science and Empire

The birth of eugenics and behavior genetics is preceded by a history connecting Science to Empire. In the sixteenth century, the Atlantic nations of Europe began a project of colonial expansion. The exposure to different peoples and cultures during this era resulted in a need to explain the diversity of humankind. Colonizing nations began using scientific data to generate legitimacy for their actions, creating the “monstrous concept of race” in an effort “to place imperialism within the natural order” (Willinsky, 2000, p. 1224). Many of these ‘scientific’ explanations brought with them a rationalization for colonization and the infrastructure of slavery. Scientific discourses were used to argue that certain groups of people were inherently inferior and as such

suitable for degrading and dehumanizing labor. The ideology of the ‘civilizing mission,’ which gained traction in the nineteenth century, emphasized “the unprecedented superiority that Europeans had attained in science and technology over all other peoples and cultures” (Adas, 2004, p. 31). The “White Man’s Burden” (Kipling, 2008)⁷, as the European colonial movement was called, created the image of a benevolent colonizer who educated, refined, and brought up the lower strata of

humankind. In reality, however, civilizing missions masked violence and Science obscured capitalistic desires to acquire and conquer. The invention of race alongside colonial and imperial projects became a key element of western, industrial modernity (McClintock, 2013).

It is not a coincidence that during a time of heightened globalization and industrialization, the Western anatomy of power was searching for ways to preserve itself and continue its rule over subjugated people whose labor was invaluable to its sustainability. Science would



The first step towards lightening
The White Man's Burden
is through teaching the virtues of cleanliness.
Pears' Soap
is a potent factor in brightening the dark corners of the earth as
civilization advances, while amongst the cultured of all nations
it holds the highest place—it is the ideal toilet soap.

Figure 1 October 1899 McClure's Magazine Pears' Soap Advertisement

continue to provide fodder for racist, classist, and eugenic discourses about the causes of group differences in intelligence.

⁷ Image in this section was also taken from Kipling (2008).

The 'Molecularization' of Intelligence and Race

Intelligence

Understandings of human intelligence gradually shifted from theoretical abstractions that had remained largely speculative in the 16th through 19th centuries (e.g. Galton & Schuster, 1906; Hunt, 1864; Tredgold, 1909) into a concept that was statistically and biologically asserted – a matter of 'genes' and physiology (e.g. Eysenck, 1998; Jensen, 1970; Reed, 1969; Shockley, 1972; Spearman, 1904). In 1904, British statistician Charles Spearman introduced the 'g factor' in a paper titled "General Intelligence, Objectively Determined and Measured" (Spearman, 1904). Using statistics, Spearman analyzed the ratings he had collected from teachers and peers on a child's intelligence both inside and outside of school. He observed a modest positive correlation between his measures which formed a hierarchy explained by a 'Two Factor' theory. This allowed him to argue that a general factor (g) common to all his measures of IQ was present (Sternberg & Kaufman, 2011, p. 6). Throughout the course of history, Spearman's g has been used to legitimize the idea that inequalities between races and social classes are biologically justified (Jensen, 1991). This point is significant when considering behavior genetics today, which still uses g as a statistical measure for cognitive ability (e.g. Butcher, Davis, Craig, & Plomin, 2008; Davies et al., 2011; McGue & Gottesman, 2015).

Race

The word 'race' originally emerged in the field of zoology as a way to differentiate between animal species. It was first used to describe human populations in 1749 by the French naturalist Louis LeClerc Comte de Buffon (Krimsky, Sloan, & Council for Responsible Genetics, 2011). Buffon believed there were clearly demarcated lines between the human 'races' caused by diverse climate environments; he believed that the natural state of humanity was derived from the Europeans (Krimsky et al., 2011, p. 16). What soon developed, in part due to colonialism and imperialism, was the field of 'race science' or 'physical anthropology.' It was a science built on measuring cranial capacity and assigning behavioral traits to certain skin colors. Race science was employed to degrade communities intellectually and physiologically; it falsely legitimized White supremacy through the theory of polygyny – the argument

that a hierarchy of human races created separately from each other defined the natural order (Krimsky et al., 2011, pp. 16–17).

Intelligence and race have been ‘molecularized’ from their beginnings: beginnings rooted in imperialism and colonialism. This ‘molecularization’ has evolved and been repeatedly re-inscribed into public discourses. As the twentieth century progressed, population genetics and evolutionary biology were used to uphold racism in new forms. Biology had for centuries been presented as a cause for racial difference; now genetics was providing a name with which to locate those arguments. The idea that group differences (whether racial or socioeconomic) in appearance or behavior could be attributed to genetics fueled the American eugenics movement.

The (Mis)use of Scientific Empiricism in the United States

One of the most direct consequences of research into the origins of intelligence was the forced sterilization of those identified as ‘feeble-minded’ by their low IQ test scores. More often than not affected individuals were low-income and/or of color.

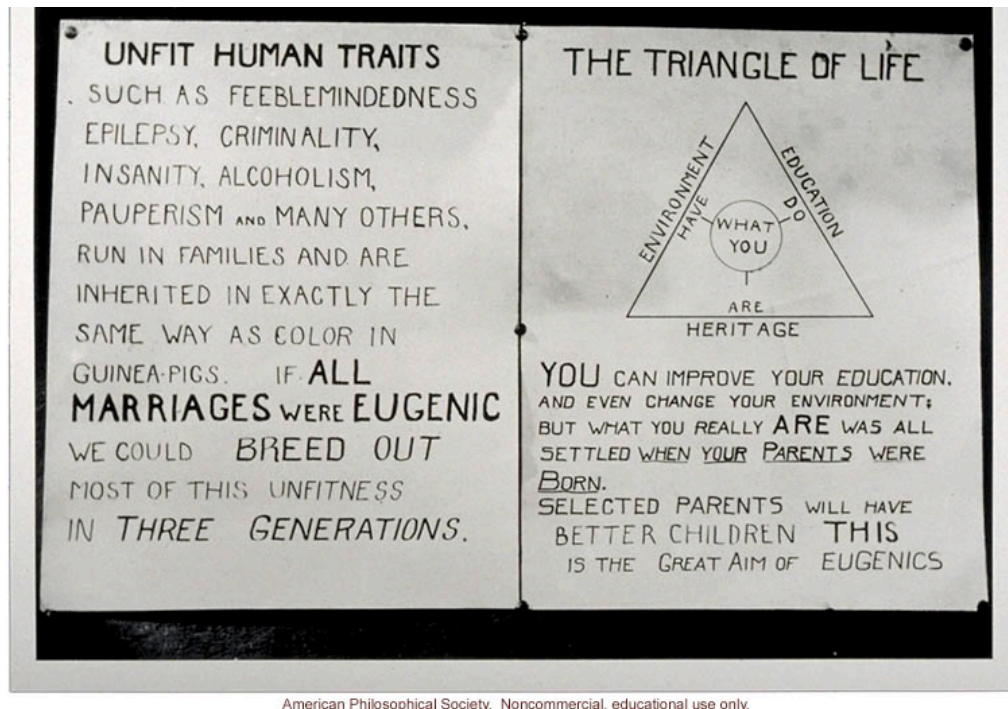


Figure 2 Unfit Human Traits - The Triangle of Life

In an eight to one decision, the 1927 Supreme Court case *Buck v. Bell*⁸ deemed forced sterilization for eugenic purposes legal in the United States – by 1935 all but six states had attempted to introduce legislation permitting it.

The American Eugenics Movement couched racist and classist motives in objective and humanitarian terms. Low-income and racially-defined minority communities were thought to lack appropriate levels of cognitive ability; their sterilization was justified as a way to maintain the genetic integrity of American society. Genetic ideologies around intelligence proved influential for decades, shaping approaches and attitudes towards immigration (Brigham, 1922), the Civil Rights Movement (Dreger & Miller, 1960; Kennedy, 1969; Kennedy, van de Riet, & White, 1963), and public education (Au, 2009). Eugenics became a xenophobic and discriminatory tool for addressing the threats of immigration and desegregation. It worked its way into public education, spurring education reform movements in the 1910s and 20s that affected teacher training, curriculum development, and school organization (Au, 2009, pp. 46–47). Scientific research has influenced the hidden and not-so-hidden curriculums of public education, particularly in relation to race, class, and intelligence.

The Use and Abuse of Intelligence Testing in Education

I do not provide a methodological critique of the concept of cognitive ability in this chapter, though others have done so (Richardson, 2002). Instead, I want to show how scientific research and discourses on cognitive ability have been misused and

⁸ The 1927 *Buck v. Bell* Supreme Court case was named after Carrie Buck and Dr. John Hendren Bell, the physician at the Virginia Colony for the Epileptics trying to have her forcibly sterilized. Carrie was born to Emma Buck in 1906 in Charlottesville, Virginia. As a White single mother, Emma struggled to make ends meet, falling into poverty. As a result, Carrie was taken in by the Dobbs family. At the age of seventeen, she found herself pregnant – allegedly raped by the Dobbs' nephew. Coincidentally (and likely to cover up a family scandal), Carrie was soon thereafter sent to “The Virginia Colony for Epileptics and the Feeble-Minded,” a facility founded in 1910 during the Progressive Era to care for vulnerable populations. Increasingly, the Virginia Colony had become a place for institutionalizing the ‘feeble-minded,’ individuals seen as genetic threats to American society for their alleged low-IQ levels, overactive sex-drives, and moral degeneracy (Tredgold, 1909). In fact, Carrie's mother had been admitted just a few years before. The Virginia Colony was one of many institutions created to quarantine individuals who were predominantly poor or of color from the rest of society. In 1924, the same year Carrie was admitted into the Virginia Colony, the state of Virginia passed legislation permitting involuntary sterilization, joining a host of other states who had already introduced similar laws. Note that the image in this section was taken from the American Philosophical Society (*Chart used...*, 1929).

resulted in harm. For example, IQ tests, which were widely-used in the American education system starting in the twentieth century, have been misinterpreted to assert the inherent superiority of one group over another in educational spaces and society. The results of intelligence tests are often taken for granted as truth. This is a byproduct of the inherited and internalized forms of racism that have been generated through a long history of linking intelligence and empirical measures with discourses on race and class. However, intelligence is a culturally-specific concept of ability; measures of it do not carry across cultures (Greenfield, Ward, & Jacobs, 1997; Sternberg & Grigorenko, 2004). In other words, IQ tests assess contextual knowledge and are not independent of an individual's upbringing, education, or socioeconomic status. The application of IQ tests given their origins and historical misuse becomes problematic considering their cultural effect. IQ tests embody a form of cultural capital that is masked by ideas about their objective capacity for prediction.

Despite this, IQ tests have played a prominent role in the American education system. Between 1890 and 1910, dozens of intelligence tests were developed in Europe and America that claimed to offer robust measures for innate cognitive ability⁹ (Binet, 1913; Terman, 1916). Using IQ tests, ethnocentrists and eugenicists latched onto biosocial claims that intelligence and other social behaviors were biologically determined, arguing that socioeconomic and racial groups were inherently different and that societal hierarchies were part of the natural order. IQ tests were lauded as “color-blind” and “objective estimate[s] of intellectual ability” (Eysenck, 1998, p. 10) while separating Americans along race and class lines¹⁰.

⁹ In many instances today, including at one of the schools I ran focus groups at, IQ tests are still used to identify children for gifted education (J. S. Renzulli & Reis, 2004), a form of advanced academic programming in which racially-defined minority and low-income groups are underrepresented (Grissom & Redding, 2016; National Association for Gifted Children & The Council of State Directors of Programs for the Gifted, 2015).

¹⁰ One of the most wide-scale applications of IQ tests was The US Army Alpha and Beta tests, which screened approximately 1.75 million draftees in World War I (Sternberg & Kaufman, 2011; Yoakum & Yerkes, 1920). These tests were an attempt to evaluate the intellectual and emotional temperament of soldiers and determine not only how capable someone was of serving in the armed forces but also of identifying the job classification or leadership position that would be most suitable for them. Robert Yerkes, President of the American Psychological Association in 1916, was the key figure behind the Alpha and Beta tests. He began his presidential term with a commitment to establishing “an expanded diagnostic role [for measuring intelligence] which would parallel medical practice” (Zenderland, 1999, p. 249). The US Army Alpha and Beta tests garnered widespread publicity and were analyzed by Carl Brigham, a Princeton University psychologist and early founder of psychometrics, in his 1922 book “A Study of American Intelligence” (Brigham, 1922). Brigham applied meticulous statistical analyses to demonstrating that American intelligence was declining and that increased immigration and racial admixture were to blame (Brigham, 1922). The purported differences between immigrant, racial, and

IQ tests were used to paint disparaging images of Blacks, immigrants, and poor White Americans who were then castigated for moral degeneracy and low-intelligence¹¹. IQ tests and scientific language were manipulated to ground the exclusionary practices and policies of groups like the American Eugenics Society¹². The eugenics movement was able to exercise incredible power over American policy, dictating legislative approaches to reproductive health and sterilization, education, and welfare (Dorothy Roberts, 1997) that were crafted at the expense of America's marginalized.

Twentieth-century American leaders in the creation of IQ tests like Howard Goddard (1866-1957) and Lewis Terman (1877-1956) were behind important developments in education and also held eugenic attitudes. For instance, Goddard was director of research at an institution for developmental disabilities known as the Vineland Training School in New Jersey. He brought intelligence testing to American public education and believed in creating separate schools and communities for children identified as mentally deficient¹³ (Zenderland, 1999). Terman¹⁴, a Stanford University educational psychologist, was a founder of gifted education (Lubinski, 2016). He revised Alfred Binet's measurement of intelligence in children (Binet, 1913), creating the Stanford-Binet test (Terman, 1916), a version of which remains in use today. In addition to being a leading educational researcher, Terman argued that "high-grade or border-line deficiency...is very, very common among Spanish-Indian and

socioeconomic groups led to calls for social policies restricting immigration and prohibiting racial admixture (Brigham, 1922).

¹¹ Researchers have used intelligence tests like the Stanford-Binet test to establish racial differences in IQ (Boake, 2002; Derrick, 1920; Philips, 1914; Strong, 1913; Sunne, 1925). The first revised version of the Stanford-Binet test was developed in 1905; its success and popularity rendered it a useful tool for studying intelligence differences across races.

¹² The American Eugenics Society changed its name in 1972 to the Society for the Study of Social Biology. The society's official journal, *Eugenics Quarterly*, whose first volume in 1954 focused heavily on IQ differences between population groups, changed its name to "Social Biology" in 1969 and continues to exist today under the name of "Biodemography and Social Biology", highlighting how genetics-informed science disguised the eugenics movement.

¹³ In 1901 Philadelphia school teacher Francis Burke Brandt addressed the National Education Association with: "How intensely must one be diseased- physically, mentally, or morally- to be educationally quarantined? ...How completely must one be degenerate...to be excluded properly from the training primarily designed for normal children?" (Zenderland, 1999, p. 105). Five years later, Henry Goddard would become director of research at an institution known as the "Vineland Training School For Feeble-minded Boys and Girls" in New Jersey, sparking a movement to identify and isolate individuals with low-IQs who posed an evolutionary threat to society.

¹⁴ I remember during my undergraduate degree spending time cooling off in Terman fountain on campus, unaware of who the name was referencing.

Mexican families of the Southwest and also among Negroes” (Terman, 1916, pp. 91–92). He believed these differences “to be racial, or at least inherent in the family stocks from which they come” (Terman, 1916, pp. 91–92). Like Goddard, he advocated that children be segregated into separate classes.

Using genetics-informed arguments, education researchers challenged universal public education, arguing that education systems failed to recognize that some students have weaker genetic aptitudes that render the idea of equal educational opportunity meaningless (Jensen, 1978, 1991). IQ tests became “ideological weapons” for legitimizing the peripheral status of racial minorities and the poor (Dennis, 1995, p. 245). African Americans were said to suffer from the “Negro IQ Deficit” (Shockley, 1971), making them inherently less able than Whites and therefore best placed in separate classrooms (Dreger & Miller, 1960; Jensen, 1968; Shockley, 1971; Shuey, 1958). The landscape of American legislation and education through the early and latter half of the 20th century was at times tied to the denial of an unjust social order and the acceptance of genetic determinism as an explanation for society’s ills. Perceived biological racial inferiority led teachers to “expect children [of color] to be incapable of learning” and convinced legislators it was “pointless to waste money on programs for children who cannot possibly achieve” (Dorothy Roberts, 1997, p. 20).

Ideas about an ‘innate’ intelligence, or the lack thereof, in relation to race and class are not confined to the past (Hunt-Grubbe, 2007; Kirkegaard & Fuerst, 2016; Wade, 2014). This topic continues to be debated amongst academics today (Kahn et al., 2018; Reich, 2018; Turkheimer, Harden, & Nisbett, 2017). However, the early 20th century, the period leading up to the contemporary popularity of the field of behavior genetics, demonstrates the in-extractible relationship between genetics, intelligence, race, socioeconomic status, and eugenic discourses in the United States. I want to argue that the contested eugenic frameworks of many autocratic colonial nation states and the racialized and molecularized historical threads underpinning the study of intellectual capacity laid the foundation for contemporary research in behavior genetics, a field I introduce more formally in the next chapter.

Chapter III. Behavior Genetics

Although Francis Galton is considered the father of behavior genetics and eugenics, much has changed since the 19th and 20th centuries. Today, behavior genetics argues that intelligence and educational attainment are highly heritable (genetically influenced) and polygenic (influenced by many genes, each with a small effect size) traits (Cesarini & Visscher, 2017; Plomin & Stumm, 2018). Researchers in this field have moved beyond identifying whether and how much genes influence intelligence (Plomin, Haworth, Meaburn, Price, & Davis, 2013), to trying to pinpoint the genetic markers that predict it (Snieder et al., 2017). In this chapter, I discuss behavior genetics findings on educational attainment in addition to intelligence because the former is seen as a proxy for the latter. As one researcher I interviewed mentioned, educational attainment is “a low-hanging fruit,” an easy data point to measure and readily available. A number of studies in behavior genetics have more recently chosen to focus on educational attainment (Belsky et al., 2016; Domingue, Belsky, Conley, Harris, & Boardman, 2015; Okbay et al., 2016; Rietveld et al., 2013; Wedow et al., 2017). It is possible that because educational attainment has less historical baggage than intelligence, it may be more appealing to researchers. Although the purpose of this chapter is to introduce behavior genetics research on the educationally-relevant behaviors of intelligence and educational attainment, I want to acknowledge that behavior genetics research also exists on other education-related behaviors, including learning disabilities like dyslexia (Gialluisi et al., 2018) and ADHD (Verhoef et al., 2018).

I begin this chapter in the period following the completion of the Human Genome Project in 2003, otherwise known as the postgenomic era. Technological advancements significantly reduced costs that previously inhibited behavior genetics’ ability to directly connect genetics to an array of social and behavioral outcomes (National Human Genome Research Institute, 2016). The increased feasibility of conducting large-scale studies has made genetic data more accessible to researchers and the public than ever before.

Heritability and Twin Studies

Since Galton, scientific inquiry in the field of behavioral genetics has focused on the study of heritability. Heritability is an estimate of the fraction of phenotypic (or observable) variation that is due to genetic differences. Twin studies have, since the 1920s (Leahy, 1932), set out to determine the genetic and environmental origins of intelligence differences, allowing the study of intelligence to converse with the early stages of behavior genetics.

Heritability estimates are derived from a comparison of similarities and differences between identical (monozygotic) and fraternal (dizygotic) twins. Identical twins share close to 100% of their DNA, while fraternal twins share around 50%. The premise behind the twin-design method is that if identical twins are more similar with respect to a given outcome (e.g. intelligence) than fraternal twins, the greater similarity is a result of genetics. Twin designs enable an evaluation of the variance of a given outcome in a large group and attempt to estimate how much of this variance is due to heritability (genetics), shared environment (environmental similarities), or a non-shared environment (environmental differences) (Posthuma & Boomsma, 2000).

The bulk of early genetics research into intelligence used twin-design research methods (DeFries & Plomin, 1978; Devlin, Daniels, & Roeder, 1997; Nele Jacobs et al., 2001; Plomin & DeFries, 1981; Plomin, Fulker, Corley, & DeFries, 1997). Twin studies have provided findings on the degree of heritability of cognitive ability and educational attainment. More recent twin studies estimate intelligence and educational attainment to be between 40 and 70 percent heritable, with cognitive ability more heritable than educational attainment (Benyamin et al., 2014; Davies et al., 2011; Okbay et al., 2016; Rietveld et al., 2013). Today, twin studies remain a standard research method in behavior genetics and have consistently shown relatively high estimates of heritability for a host of educationally-relevant behaviors (Polderman et al., 2015), including intelligence (van Leeuwen, van den Berg, & Boomsma, 2008), educational attainment (Schwabe, Janss, & Van Den Berg, 2017), reading ability (Kirkpatrick, Legrand, Iacono, & McGue, 2011) and math ability (Kovas, Harlaar, Petrill, & Plomin, 2005).

However, heritability estimates are not assumption-free. One reason for this is the difficulty of separating genetics from the environment (a point I expand upon later in this chapter). The second is related specifically to twin studies, which rely on the

presumption that identical and fraternal twins both experience similar environments. This is known as the Equal Environment Assumption (EEA) — the idea that environmental differences experienced by twins are either unassociated with the etiology of the outcome in question or are in fact a heritable component associated with the outcome. The EEA includes the supposition that parents raise their children in exactly the same way, creating identical environments for development (Joseph, 2014; Richardson & Norgate, 2005). However, this fails to recognize the potential variability in how parents treat their children, or how twins experience school or function within a larger community. For example, it is possible that identical twins might be treated differently *because* they are identical (e.g. are easily confused for each other by teachers or dressed in the same clothes by their parents) than fraternal twins. Nevertheless, in response to critiques of twin studies, behavior genetics researchers have shown that their results remain robust against potential faults in the EEA (Schwabe et al., 2017).

Genome-Wide Association Studies and Polygenic Scores

Technological advancements following the completion of the Human Genome Project enabled researchers to turn to other methods to supplement previous findings from twin-studies (e.g. Okbay et al., 2016; Selzam et al., 2016; Sniekers et al., 2017). The most recent way to study genetic influences on human behavior is through Genome-Wide Association Studies (GWAS). GWAS test millions of associations at the same time. The result is a much higher level of statistical power (typically a statistical threshold of .0000005%) than twin-studies. GWAS have taken hold as a powerful tool for investigating the genetic architecture of human illness and behavior (Bush & Moore, 2012).

GWAS assess connections between a trait and regions of the genome using large datasets containing individual-level genetic information (Pearson & Manolio, 2008). After collecting DNA from hundreds of thousands of individuals, GWAS attempt to identify single-nucleotide polymorphisms (SNPs) that are more common in people exhibiting a given trait (e.g. high intelligence or ADHD). SNPs, or single-nucleotide polymorphisms, represent “the modern unit of genetic variation” (Bush & Moore, 2012, p. 1). As the most common form of genetic variation in the human genome, SNPs are

often used as markers of a genomic region. In other words, an SNP represents a difference in a single DNA building block (i.e. G, C, A, or T) on a specific stretch of DNA. While all human beings share over 99% of their genetic material, the human genome contains over three billion base pairs, or units comprised of two DNA building blocks (e.g. GC or AT). This means that sometimes there is variation such that one person may have a C at a point while another person may have an A. At this Single Nucleotide, there is a *Polymorphism*, or an SNP.

GWAS was considered revolutionary for “gene hunting” (Plomin et al., 2013, p. 563) when the method was first unveiled. The first GWAS was published in 2005 and sought to identify SNPs responsible for age-related macular degeneration, a common cause of blindness among the elderly (R. J. Klein et al., 2005). Since then, GWAS have been used in a number of behavior genetics studies on intelligence (Benyamin et al., 2014; Davies et al., 2011; Sniekers et al., 2017) and educational attainment (Domingue et al., 2015; Okbay et al., 2016; Rietveld et al., 2013). One of the most recent educational attainment GWAS took DNA samples from over one million individuals and identified more than one thousand genetic loci associated with years of schooling (J. J. Lee et al., 2018). Key GWAS have been able account for up to 11-13% of differences between individuals in educational attainment (J. J. Lee et al., 2018). With regards to intelligence, heritability estimates remain high (just over 50%). At the moment, twenty-percent (20%) of the most recent heritability estimates for intelligence have been linked to specific genetic markers using GWAS (Plomin & Stumm, 2018). Researchers say that intelligence becomes increasingly heritable as an individual progresses through life with most differences between children by the time they exit school coming down to genetic influences (Plomin & Deary, 2014; Selzam et al., 2016). Aggregate or combined effects of common genetic variations (SNPs) have been used to explain between 22-46% of differences between individuals in childhood intelligence (Benyamin et al., 2014).

Similar to twin studies, GWAS are not perfect. GWAS suffers from the ‘missing heritability problem.’ As one of the main results of GWAS¹⁵ has been to show that there

¹⁵ I also want to note that GWAS are typically restricted to individuals of European ancestry who live in economically stable environments. There are two primary reasons for this. The first is that individuals with European ancestry have less ‘genetic noise,’ meaning that a White American living in California is likely to be more genetically similar to a Dane in Denmark than two Nigerians living an hour apart from each other (J. Z. Li et al., 2008; Rosenberg & Kang, 2015). The greater genetic diversity among those

are no genes of large effect size in the population, there is no ‘intelligence gene.’ While GWAS seem to have uncovered the genetic architecture of complex diseases, psychiatric disorders and psychological traits (Visscher, Brown, McCarthy, & Yang, 2012), it has also become clear to researchers that small differences across thousands of genes contribute to the overall heritability of many human traits (Chabris, Lee, Cesarini, Benjamin, & Laibson, 2015). As such, establishing associations between particular SNPs and a complex trait like intelligence has been particularly difficult to detect and replicate; hence why so few genetic markers have been identified for intelligence and educational attainment relative to their heritability estimates. Researchers say this is due to the polygenic nature of the behavior (Plomin et al., 2013, p. 562). Polygenic research has made it possible to combine all the associations derived from a GWAS into a single predictor meant to summarize all the genetic information pertaining to a particular trait. Despite this, the ‘missing heritability problem,’ or the wide gap between heritability estimates for an outcome and the few genetic markers associated with it that have been identified through GWAS (Plomin et al., 2013, p. 562), remains.

Genetics and the Environment

Modern approaches to genetics research offer more malleable interpretations of human behavior, heredity, and biology than the 19th and 20th centuries. The shift towards a more flexible understanding of human behavior has given rise to alternative views on the relationship between the environment and biology. Another reason why heritability estimates are not fool-proof is because there is no fixed link between genotype (one’s genetic profile) and phenotype (the observable physical characteristics

coming with African ancestry, therefore, is seen as a potential confounding factor. The second reason for restricting GWAS population samples to those living in economically stable environments comes from research suggesting that the proportions of IQ variance attributable to genes and environment vary nonlinearly with socioeconomic status within the United States (Tucker-Drob & Bates, 2016; Turkheimer, Haley, Waldron, D’Onofrio, & Gottesman, 2003). For families living in adverse socioeconomic environments, variance in intelligence may be accounted for primarily by the shared environment, meaning that social deprivation trumps any influence genetics might have over an individual’s cognitive ability (Tucker-Drob & Bates, 2016; Turkheimer et al, 2003), interestingly this has not replicated outside of the United States. However, the focus on European ancestry also represents the lack of attention given to communities of color and the mistrust many marginalized communities have of medicine and scientific research (e.g. the aftermath of Tuskegee).

of a trait or behavior)¹⁶. The heritability of a trait is not static (Feldman & Lewontin, 1975). Differences in environmental exposures are often captured in heritability estimates due to what is called gene-environment interplay. This occurs when the phenotype of an individual evokes specific environmental responses or leads them to select a certain environment (Kendler & Baker, 2007). In other words, the complex architecture of an individual's genome combines with environmental stimuli to drive differences in life outcomes (Feldman & Lewontin, 1975). As an example, gene-environment (or GxE) studies have found that IQ appears to be more heritable in higher SES homes than lower SES homes (Turkheimer, Haley, Waldron, D'Onofrio, & Gottesman, 2003) in the US (Tahmasbi, Evans, Turkheimer, & Keller, 2017; Tucker-Drob & Bates, 2016), suggesting that inequality affects heritability. In other words, "heritability is generally higher at greater equality levels, suggesting that inequality stifles the expression of educationally relevant genetic propensities" (Selita & Kovas, 2019). For example, DNA differences explained more than twice the variation between individuals in terms of educational attainment and occupational status in the post-Soviet era of Estonia than in the pre-Soviet era (Rimfeld et al., 2018). In Norway, more liberal social and educational policies reduced the effect of family background on educational attainment and increased the influence of genetic factors (Heath et al, 1985). These studies highlight the key role of the environment and serve as a reminder that when behavior genetics argues that intelligence is roughly 50% heritable (Plomin & Stumm, 2018), these findings may only be applicable to certain populations at a specific point in time¹⁷. Put another way, heritability estimates change depending upon the environmental context (Branigan, McCallum, & Freese, 2013).

Moreover, growing fields like epigenetics explicitly recognize the importance of the environment by studying the changes that occur in the expression of genes (how genes in a particular cell tell the cell what to do or how to 'express' itself) as a result of the environment. Epigenetics highlights the biological differences caused by social environments. Social science researchers seem more open to epigenetics than behavior genetics because of its explicit recognition of the role of the environment in shaping human behavior. For example, education researcher Deborah Youdell sees the

¹⁶ In other words, there is no clear relationship between possessing a genetic trait and how that trait is then expressed or manifests in an observable way.

¹⁷ Note that it also usually means individuals of European ancestry.

possibilities of epigenetics for furthering “social justice-oriented education” (Youdell, 2018, p. 295). If, for example, epigenetics could show the physical ramifications of racism, it might serve as a more convincing way to drive social policy and change¹⁸ (Dorothy Roberts, 2016).

The interaction between genes and the environment through findings in GxE and epigenetics show the implausibility of separating genes from the environment (the most likely explanation for racial or class differences in measured IQ). Genetics cannot on its own reliably explain IQ as it cannot reliably be separated from the environment. Despite this, behavior genetics conducts GWAS and generates polygenic scores for cognitive ability as if genetics can be clearly parsed out from environment and is not a confounding factor.

Genetics and Education

In the 1990s, many behavioral geneticists thought it would soon be possible to predict intellectual capability on the basis of genes alone (Plomin, 1999). In reality, however, “the revolution” anticipated on the eve of the Human Genome Project has yet to arrive (Turkheimer, 2015, p. S32). The science lags behind the expectations researchers once had for it — genetic research into intelligence has thus far offered little in terms of concrete or usable findings.

Despite this, calls to incorporate behavior genetics research into education (Asbury & Plomin, 2013; Kovas et al., 2016) have led to debate over whether this research is of relevance to educators (Asbury, 2015; Panofsky, 2015; Sabatello, 2018; M. S. C. Thomas et al., 2015). Behavior genetics is presented as a way to prevent incorrect assumptions that are made in schools about students and their abilities (Kovas et al., 2016). Research on the heritability of reading, mathematics, science, and general

¹⁸ Research has already begun looking at the epigenetics of cardiovascular health, showing that “socially-imposed racial categories” face disparate levels of maternal stress that cause epigenetic mechanisms to inform today’s adult race-based health disparities in the US (Kuzawa & Sweet, 2009, p. 2). Others build upon epigenetic research on health disparities to argue that the field can show how racially-defined minorities in America “biologically inherit the deleterious effects of white racism” (Sullivan, 2013, p. 190). Note also that researchers, however, have thus far found little evidence that educational attainment has a large effect on the epigenome (the many chemical compounds that tell the genome what to do) (Linnér et al., 2017). With regards to intelligence, epigenetics may play a role in the normal variation in human intelligence (Haggarty et al., 2010) and researchers have established a link between the epigenome and cognitive ability (Marioni et al., 2018).

intelligence is said to demonstrate the importance of considering genetics when identifying solutions for children who may be struggling in classrooms (Asbury, 2015). In an interview I had with one genetics researcher, the possible role of behavior genetics findings in terms of teacher performance emerged:

Kevin: Now there's a big push to want to compensate teachers based on the rate at which their students are learning...but if you wanted to do that really fairly, you'd want to know what the genetic potential of those kids is because you might be rewarding the teacher for just having very talented students and maybe the teacher's not actually a better teacher. (October 2016)

Those advocating for incorporating behavior genetics into education also discuss the impact their research might have on education policy, most notably the ability to personalize education (Asbury & Plomin, 2013) – integrating genetics into education research is seen as a way optimize education (Kovas et al., 2016).

Education personalization is equated to ‘personalized medicine’ or ‘precision medicine’ (Asbury & Plomin, 2013). The argument is that policy-makers, schools, students, and families would benefit from the ability to tailor individualized education plans that consider a child’s genotype and the educational interventions they might be most receptive to. Precision *medicine* is said to promote health and prevent disease (Ashley, 2015; Porche, 2015) – precision *education* treats students as individuals and could maximize their strengths and minimize their weaknesses (Asbury & Plomin, 2013). Researchers have gone as far as to provide concrete policy proposals for the creation of a ‘genetically-sensitive’ school system (Asbury & Plomin, 2013).

In 2013 Kathryn Asbury and Robert Plomin published the book “G is for Genes: The Impact of Genetics on Education and Achievement” (Asbury & Plomin, 2013), calling for the need to pay attention to genetics findings. “G is for Genes” argues that genetic influence does not signify genetic determinism but can shape the nature of educational policy. At the same time, Asbury and Plomin write: “the ability to learn from teachers is, we know [based on findings in behavior genetics], influenced more by genes than by experience” (p. 7). The book introduces a system for personalized education – one in which pedagogical practice will be informed by genetic research (Asbury & Plomin, 2013). The authors provide educators and policy makers with 11

policy points (Table 1) for a ‘genetically-sensitive’ school system, which include training teachers in genetics, tailoring curriculum plans using genetics as a guide, and providing high-quality free preschool to disadvantaged groups¹⁹.

¹⁹ As part of my data collection, I introduced Asbury and Plomin’s policy points to teachers, looking to explore whether they believe genetics has relevance for education policy.

Table 1 "G is for Genes" Policy Points

| 11 Policy Points: | Why should we care? ²⁰ | What do we do? |
|---|---|--|
| 1. Minimize the core curriculum and test basic skills | We are all genetically different. | Mandatory subjects to a minimum, restrict to a Basic Skills examination. |
| 2. Increase choice | Genotype-environment correlation depends on choice. | Increase the range of subject options available to all students and give teachers more freedom in their lessons. |
| 3. Forget about labels | The abnormal is normal. | If a child needs extra help give it, instead of labels and bureaucracy. |
| 4. Teach the child, as well as the class | Genetic continuity and environmental change can be monitored. | Each student has an Individual Education Plan, which should be reviewed and revised each year. Every child should receive a personalized school-leaving certificate at the end of their compulsory education. |
| 5. Teach children how to succeed | IQ and self-confidence may mediate the relationship between the school environment and achievement through a process of genotype-environment correlation. | Introduce a weekly Thinking Skills session for all pupils (no National Curriculum or public examinations for this, but schools will commit to an hour per week on Thinking Skills and implement as they see best). |
| 6. Promote equal opportunities from an early age as a foundation for social mobility in the future | Preschool children are especially susceptible to the effects of shared environment. | Offer free, high-quality preschool education to disadvantaged children from age 2, free, high-quality preschool to all children from age 3 to 4, and extra support to children in low-SES families from birth. |

²⁰ In this column are Asbury and Plomin's justifications for these policy points; these justifications draw upon findings from the field of behavior genetics.

| 11 Policy Points: | Why should we care? | What do we do? |
|--|---|---|
| 7. Equalize extracurricular opportunities at school | Genotype-environment correlations depend on access to choice. | Level the playing field for extracurricular activities by providing extra support to pupils from families with fewer resources. |
| 8. Create a two stage Physical Education program | Shared environmental experiences have a significant impact on fitness for children in primary school, but genes then become more influential. | Set a standardized PE program for all children in primary school and Year 7 and then in Year 8 and above allow them to choose the form of exercise they will undertake. |
| 9. Change the destination (increase the # and range of options available for work- and college-based vocational training) | Realizing genetic potential across a nation requires a variety of opportunity beyond secondary education. | Increase the number and range of options available for work-and college-based vocational training; make apprenticeships more affordable for and attractive to employers; and educate students so they have mastered basic skills, found their true interests, and are more attractive to employers. |
| 10. Train new teachers in genetics and give them the tools to put it into practice | Personalizing education is the best way to realize the potential of individual children who are “naturally” different. | Add a course in the genetics of learning and education for all in teacher training and issue a call for tender for groups and individuals who wish to design and pilot practical approaches to the personalization of education. Successful techniques, training, and resources should subsequently be made available to all schools. |
| 11. Big is beautiful | Genotype-environment interplay and non-shared environmental influence depend on choice. | Size makes choice viable. Make our schools bigger and the links between the different levels of schooling stronger. |

(Absury & Plomin, 2013)

The discussion on incorporating genetics into education policy is growing and entering the public domain (Freese, 2018; Nathan, 2018). After “G is for Genes” was published, Robert Plomin was asked to give five lectures at the British Department of Education to brief civil servants on behavior genetics research findings (Wilby, 2014). In the United States, elite gifted-education programs like Duke University’s Talent Identification Program and the John’s Hopkins Center for Talented Youth have been approached by researchers hoping to genotype ‘gifted’ children and identify specific genes associated with high cognitive ability (Hansen, Gluck, & Shelton, 2015).

Arguments for incorporating genetics research into education and the concept of ‘precision education’ are appealing in part because of the current context of the US system in which ethnic minority and low-income students have low levels of achievement. Furthermore, precision education may not be as novel as it initially appears. For instance, ‘flexible teaching and learning’ (Wanner & Palmer, 2015) and ‘student-centered learning’ (M. Bennett et al., 2018; Lathika, 2016) reflect a growing focus on personalization (albeit without genetic data) in an era of rapid technological progress (Wanner & Palmer, 2015). Alongside this, some in the social sciences have advocated for ‘culturally-relevant pedagogy’, which recognizes that students are different and have different needs that are often ignored in an education system designed to maintain White privilege (Ladson-Billings, 1995; Milner & Ford, 2007; Sleeter, 2001). Within this context, researchers like Asbury and Plomin are tapping into a pre-existing market that says students should be recognized as individuals with different experiences and interests. Those who claim that understanding a child’s genotype might help teachers plan more appropriate curriculum are creating another form of ‘relevant’ and ‘student-centered’ pedagogy – one which argues that inequalities might be reduced by recognizing and catering to a child’s genetic makeup, including their predispositions to learning disabilities or their genetically influenced strengths or weaknesses in the classroom.

Understandably, anxiety over introducing genetics research into education remains despite these arguments. What if precision education does not improve student outcomes? What are the unintended consequences of pursuing lines of inquiry regarding genetics, education, and intelligence? Would this new branch into educational research benefit all students equally or promote equity? If precision education is not able to provide clinical utility, it could be harmful if it distracts from

equity-oriented policies or negatively influences mindsets on student achievement and capability.

In response to some of the concerns about incorporating genetics into education, behavior genetics researchers argue that heritability does not signify determinism. Myopia, for example, is a condition that is primarily genetically influenced (Sangwan, Sharma, Sharma, & Tandon, 2017). Despite this fact, American society does not leave myopic students suffering in classrooms unable to see the blackboard. Schools throughout the United States test children's eyesight at the beginning of each year and recommend glasses for those who need it. Taking this example, the heritability of a trait does not correlate to whether or not something can be done about it (Goldberger, 1979).

Moreover, Kathryn Asbury argues that using genetic information to predict education outcomes already happens. Down syndrome, Williams syndrome, and Prader-Willi syndrome are cases where genetic diagnoses influence educational approaches to a child²¹ (Asbury, 2015, p. S39). Education research suggests that for each of these diagnoses there are different probabilistic learning strengths and difficulties (Asbury, 2015, p. S39). For instance, individuals with Down syndrome may respond better to "visual triggers such as signing" than to verbal input, while children with Williams syndrome seem to exhibit the opposite pattern (Asbury, 2015, p. S39). In presenting findings on extreme developmental disorders that have genetic bases, Asbury argues that genetics-informed education research should not be feared. Instead, once technology allows individuals' genetic aptitudes to become widely identifiable and available²², parents and educators will be given the freedom to choose the educational approach most beneficial for a child.

However, referencing severe disabilities does not necessarily alleviate concerns about applying genetics research to students who lie outside the extremes. While conditions like Down syndrome may result in different learning strengths and difficulties that are best addressed through specific forms of pedagogy, there is nothing in behavior genetics to suggest that genetic variants for something like educational attainment are linked to an individual's responsiveness to a style of teaching or

²¹ Furthermore, it is already common practice for families to conduct genetic testing in-utero to detect disorders like Down syndrome, cystic fibrosis, and Tay-Sachs disease (Péter, 2015). In the western-world rates of Down syndrome have consistently been decreasing as more and more families use prenatal screening to terminate pregnancies of affected fetuses (Natoli, Ackerman, McDermott, & Edwards, 2012).

²² Note that at this point it is unclear if and whether this will happen.

educational intervention. Moreover, there are salient ethical concerns over the equitable application and implementation of genetics research findings, particularly in a context with pronounced racial and socioeconomic inequalities.

Conclusion

As I've shown, there is a lot of uncertainty about what behavior genetics will be able to provide education systems. More certain is the fact that technological developments and a deeper knowledge of the human genome are producing a number of genetics research consortiums²³ and resulting in an increasing number of GWAS publications on education outcomes. Whether using the language of 'educational attainment', 'cognitive ability', or 'general intelligence', behavior genetics research seeks to establish genetic markers for a characteristic that can predict, in essence, life success²⁴.

The perceived links between intelligence and 'success' begs the following question about genetics-informed education research: what kinds of families will utilize the choices researchers like Asbury and Plomin believe will soon be possible? If personalized education using genetic data were to prove actionable (which is far from certain), students from high socioeconomic backgrounds would be the primary beneficiaries – particularly those who underperform in the current system and whose education outcomes would improve through better personalization. A 'genetically-sensitive' education system, from a biopower perspective, could present a new mechanism for regulating life. If personalized education linked to genes were to clash with intersectionalities of disadvantage, particularly those economic in nature, would the result be polarizing outcomes? That is, would the privileged become more privileged and the disadvantaged further marginalized?

Although behavior genetics provides little clinical utility at the moment, I discuss in the next chapter why looking at behavior genetics – and what it says about socially-valued behaviors like intelligence – matters for the current American education

²³ These include the international Social Science Genetic Association Consortium (SSGAC), the Chinese-based Beijing Genetics Institute (now known as BGI), and the UK-based Twin and Early Design Study (TEDS).

²⁴ Here, "life success" is very much focused on western ideals of achievement that consider a certain kind of economic and sociopolitical capital rooted in western pedagogical practice to be most valuable.

system in relation to race, class, and achievement. I focus on the available literature on teacher beliefs, including how educator beliefs are racialized and their effects on student outcomes.

Chapter IV. Literature Review

Introduction

The primary purpose of this chapter is to show how racialization is carried out in schools today via a conversation on race, class, and ability. I connect Chapter Two's historical context and Chapter Three's introduction to behavior genetics research on educationally-relevant behaviors with a literature review on the links between teacher beliefs on ability and underserved students' experiences of minoritization. I focus on teachers because they "represent the front line in education" (Uhlenberg & Brown, 2002, p. 499) and because their perceptions of students have been shown to profoundly impact the lives of children. Teacher perceptions have visible effects on student performance in the classroom (C. E. Bennett, 2017), impacting pupil academic achievement (Hinnant, O'Brien, & Ghazarian, 2009; Peterson et al., 2016; Rubie-Davies et al., 2006; Van den Bergh, Denessen, Hornstra, Voeten, & Holland, 2010) and the educational opportunities children seek or are provided (Blanchard & Muller, 2015; Elhoweris, Mutua, Alsheikh, & Holloway, 2005; Grissom & Redding, 2016). Often, the education outcomes for 'at-risk' children (e.g. racially-defined minority, low-income, disabled) are disproportionately and adversely impacted by teacher perceptions (Cherng, 2017; Irizarry, 2015; Oates, 2003; Tenenbaum & Ruck, 2007). The importance of teacher viewpoints and narratives points to the utility of my own study on teacher perceptions of intelligence, race, socioeconomic status, and genetics²⁵.

²⁵ As an aside, I spoke with a couple of behavior genetics researchers about whether they'd considered the impact their findings might have on teacher expectation effects. Due to word limitations I have chosen not to delve into this further as my focus is on teachers themselves. However, I choose to include two extracts from two different researchers on this matter. The first discusses the possibility that teacher expectations of a student are formed as a result of a child's genotype including the environment the child subsequently "evokes":

"A teacher's expectations are derived from a variety of different cues. Some of those cues might be: 'there's something about Jimmy...' that ends up placing Jimmy in a particular group of students. The teacher will never know. Jimmy's genotype by his genes may 'evoke' a particular environment." (Raymond, December 2015)

The second discusses the possible threat behavior genetics poses to informing and perhaps solidifying teacher expectations:

"I think teacher expectancy effects are a major problem...I think it's a worry for genetic research as well if at some point it's used and you tell somebody that this kid's got the genes to be great at maths or awful at maths. You're going to induce a teacher expectancy effect and figuring out how to get round that, how to communicate so that it doesn't have that effect and disadvantage certain kids, is important." (Kathryn Asbury, September 2016)

I begin this chapter by reviewing the relevant literature on how conceptualizations of ability are racialized. I examine the tacit and overt links between race and ability, including the racialization of education and school practices, before exploring their interplay with genetic ideologies and scientific research. I do this because teachers' everyday ways of thinking are informed by a history that positions discourses on race and ability within an imperial classification system that is taken for granted and which is in the process of being legitimized through new forms of biopower. Put another way, teacher perceptions are byproducts of contextual factors which must be acknowledged. Warikoo and Carter (2009) argue that race and ethnicity ought to be understood contextually, I believe the same understanding is necessary for unpacking teacher perceptions of race and ability. I therefore work to show how "social and cultural functions of schooling" (Carter, 2011) shape teacher perspectives as they relate to conceptions of ability and race.

I want to note that although my dissertation examines the intersections of both race and socioeconomic status, my literature review looks primarily at race as this is the greater focus of my dissertation. However, race and socioeconomic status cannot be understood as standalone concepts and my intersectional perspective encourages me to acknowledge that when I talk about ability, race, and racialization I also recognize that: 1) particular socioeconomic groups are the most likely to be racialized; 2) socioeconomic status plays an important role in student academic achievement; and 3) when ability is racialized, class politics are also at play.

I end this chapter by presenting the research literature on two aspects of teacher perceptions that are most relevant to my work: teachers' views on the role of genetics in student outcomes and on the role of genetics in race and socioeconomic status. I show in these last two sections the limited available research, thus making a case for my dissertation topic and demonstrating how I build upon and advance prior work in the field. Although my empirical work is confined to the United States, my literature review looks internationally.

Racialization and the Education System: Contextualizing Teacher Beliefs

The education system is a site for racialization – most particularly the racialization of 'ability' (Artiles, 2011). Gillborn and Youdell (2001) explain that in the

21st century, the word ‘ability’ has come to replace ‘intelligence’. Although conversation on genetic inferiority and eugenics are decried as pseudo-scientific, Gillborn and Youdell argue that tacit approaches to organizing individuals using biological discourses continue to exert influence over educational policy and practice. Race and ability have an interlocking history – one that has informed educational responses and policy (Artiles, 2011). As an organizing category, race is maintained by “the permanence of racial ideology and White supremacy” and enforces inequality (Picower, 2009, p. 198). Teachers, as key actors in schools, find themselves ‘despite the best intentions’ (Lewis & Diamond, 2015) perpetuating racial inequality through their beliefs and the narratives they construct around ability and race. As such, the material and sociocultural domains of schooling (Carter, 2016) are critical factors in shaping teacher beliefs about their students. Teachers are not independent of a structure that has been designed to privilege upper-income and White communities – their perceptions of students and conceptualizations of ability are informed by the political and social discourses and policies that construct their places of work and living. My aim in this literature review is to move beyond providing the simple empirical findings that show teacher perceptions matter, and towards exploring how teacher perceptions are formed and why they are racialized.

The bulk of research on the racialization of ability in education resides in the field of critical race and critical Whiteness scholarship (e.g. Annamma, Connor, & Ferri, 2013; Gillborn, 2010, 2016; Gillborn & Youdell, 2001; Marx, 2004; Stark, 2014; Zirkel & Pollack, 2016). Much of the research in this area is qualitative in nature. Some of these studies draw upon intersectional frameworks to show how race is made invisible (Rollock, 2012), how it intersects with understandings of (dis)ability (Annamma et al., 2013; Warner & Brown, 2011), how teachers avoid discussions of race (Solomona, Portelli, Daniel, & Campbell, 2005; Young, 2016), and how gender, race, and class intersect to shape the educational experiences of students and families of color (Ball, Rollock, Vincent, & Gillborn, 2013; Gillborn, Rollock, Vincent, & Ball, 2012). Critical race theory (CRT) argues that racism is normal and that Whites have been the primary beneficiaries of the social structure. Education is considered “a culturally specific artifact designed to maintain a White supremacist master script” (Ladson-Billings, 1998, p. 19). Part of what allows education to maintain White privilege is the “conventional belief in the intellectual inferiority of visible racial/ethnic individuals” – the

genetically-based inferiority paradigm has long impacted educational policy and curriculum development (Tate, 1997, p. 199).

Although I do not use a critical race perspective in my dissertation²⁶, work in this field illustrates how race, domination, (in)equity, and socioeconomic status converge with ability and intelligence. CRT has been critiqued for focusing primarily on the experiences of Black individuals – often at the expense of other minority groups and marginalized intersections such as gender, socioeconomic status, and citizenship (Treviño, Harris, & Wallace, 2008). However, the field helpfully contextualizes the structural habitus shaping teacher beliefs. I therefore conduct my literature review drawing upon this area of education research. As I intend to show in this section, work in the field of CRT supports findings in educational psychology that have shown both qualitatively and quantitatively how teachers interact with and perceive students differently depending upon their race (Cherng, 2017; Irizarry, 2015; Muller, 1997; Oates, 2003; Rist, 1970; Tenenbaum & Ruck, 2007). In engaging critical race scholarship with work in educational psychology, I demonstrate how considering qualitative and quantitative data collection in relation to each other leads to a richer understanding of the problem at hand – providing another justification for my mixed-methods dissertation.

Race, racialization, and educational policy should be understood as part of a neoliberal moment (Gulson & Webb, 2016) that includes a growing reliance on testing as a form of surveillance (Bourassa, 2011) and the increased privatization of education (Ball & Youdell, 2007). Conceptualizations of ability, assessment measurements, and discourses on meritocracy are legitimized through testing standards and forms of assessment which hold “echoes of a forgotten past” (Stoskopf, 2002, p. 126) and bear ties to the 20th century IQ testing movement that separated individuals along race and class lines (Selden, 2000).

Today, in the neoliberal era, both students and teachers have become ‘subjects’ made to adhere to rigid understandings of what a good student looks like or how a good teacher teaches. Testing and assessment measures have come to signify a “truth discourse” (Rabinow & Rose, 2003, p.197) that lets nations quantify their competitiveness in the global market and assess the efficacy of teachers and educational

²⁶ I chose an intersectional perspective over critical race theory because I felt it was important to focus on more than race within this dissertation. In particular, I felt that socioeconomic status was a critical factor in how genetic ideologies have been used to harm– *Buck v Bell* (1927) illustrates this.

policies. This ‘truth discourse’ tells teachers what a student’s capabilities are, affecting how practitioners engage with children and impacting how students see themselves. For instance, in the field of educational psychology, Gershenson et al (2016) explain that teachers can influence student self-beliefs through their grading, with additional evidence showing that how teachers in the United States grade exams suffers from gender and racial bias (Burgess & Greaves, 2013). This can have sustained impacts on academic achievement and the courses students select in secondary school (Lavy & Sand, 2015). Applying a biopower perspective, school systems use ability grouping and tracking to identify students who are desirable and efficacious or dangerous and risky. Oftentimes teachers are the primary decision-makers for where students are placed. Critical race scholar Dave Gillborn makes clear that marginalized students in both the US and UK are often tracked into classrooms with restricted curricula, taught by teachers “who see themselves as less effective educators” and who – when asked to assess the “potential, attitude, and/or motivation” of students – disproportionately place students of color in low-ranked groups (Gillborn, 2010, p. 232).

Nevertheless, it is not my intention to argue that prior to testing standards, systems of education were more equitable and less racialized. There is a history from before standardized tests in which students of color and low-income students received poor quality schooling if at all. In the United States, for instance, students of color were initially denied formal education as it was seen as threat to the interests of slave owners (Walters, 2001). After the abolition of slavery, children of color were taught in separate schools, with forms of segregation persisting even after *Brown v Board of Education* in 1954 (Walters, 2001) and continuing into the present (Reardon & Owens, 2014; Ryan, 2004).

Teacher beliefs on ability are rooted in the social structure

I want to note that many sociological and anthropological studies in education are clear to place blame on the system rather than on teachers themselves when it comes to their views of ability and race. I also assert this when presenting my research findings in Chapters Seven through Ten. Teachers are not the source of emergent racialization. The discourses teachers hold can be both intentional and unintentional, educators may

“unwittingly deploy discourses whose historicities²⁷ and/or intersections assert unanticipated meanings” (Youdell, 2006, p. 514). Deborah Youdell references Judith Butler and Michel Foucault’s definitions of subjectivation to show how teachers might subjectivate some students as “particular raced-nationed-religioned subjects” (Youdell, 2006, p. 523); historical discourses have racialized particular bodies whose behaviors and academic achievement are then viewed through that racialization.

Additionally, work by Sherry Marx (2004) found that “the good intentions” of nine White English-only speaking preservice teachers who were working with English Language Learners (ELL) “were consistently undermined by the Whiteness and the racism that influenced their beliefs about and behaviors with the children” (p. 31). Although the study is limited in size, it offers a perspective into the structural nature of teacher beliefs in relation to Whiteness and racism. Marx found that many teachers initially brushed off her attempts to make them aware of their racist commentary but later experienced a form of “disequilibrium” upon realizing the racism residing within society, and more critically within themselves (Marx, 2004, p. 39). Her work is supported by that of Solomona et al. (2005), which found that in a larger and representative sample of 200 Canadian preservice teachers enrolled in a teacher education program, many drew upon a “discourse of denial” to regularize race, racism, and White privilege (p. 147). Solomona et al. maintain that Whiteness and White privilege should be interrogated. However, they also argue this should not be done in a way that creates guilt among teachers. Instead, the authors ask that changing “the ingrained characteristics of white thinking and acting” incorporate interdisciplinary efforts that include teachers and disrupt “liberalist notions of meritocracy” that marginalize efforts to recognize White privilege (Solomona et al., 2005, p. 166).

Recognizing that racialization stems from the social structure and enduring associations between race and ability is valuable because teachers, while critically important, are small pieces in a much bigger system. A strength of the works of Marx and Solomona et al. is their recognition of this. As I look to review more thoroughly the literature on teacher beliefs on ability and race, I bear in mind that the perspectives teachers have been found to hold are consequences of living in a context founded upon the imperial classification systems I made mention of in Chapter Two.

²⁷ Historicity focuses on historical actuality and authenticity. Futurity, on the other hand, is an expression of what may happen.

The racialization of teacher beliefs on student ability

Numerous studies have demonstrated that academic achievement is correlated with social class (Reardon, 2011) and race (Reardon, Kalogrides, & Shores, 2017). However, assessment measures are not necessarily as objective as they seem to be, particularly when these measures involve teacher evaluations of students. Gillborn (2006) asks whether national assessment mechanisms “merely record educational inequity or actually produce it” (p. 335) a question echoed by Artiles (2011). Gillborn shows how in the UK the adoption of a “Foundation Stage Profile,” which relies solely on teachers’ judgements to assess student learning from the age of three until the end of a child’s first year in primary school, shifted the narrative on the achievement of students of color. Gillborn’s data analysis found that Afro-Caribbean youth, upon entrance into school, were the highest group of achievers in data collected by local education authorities (LEAs) on the UK education system. However, after the implementation of the “Foundation Stage Profile,” Black students fell to the lowest tier of achievement. In showing how education policy standards were modified to accommodate White interests, Gillborn discusses the important role teacher perceptions of race and ability play in educational opportunity and equity and how teachers and their beliefs are used to maintain structural racial inequality.

Gillborn’s 2006 analysis uses quantitative data. However, more recent works by critical race scholars stipulate that quantitative research may be potentially reductionist when it comes to racism and mistakenly seen as outside social constructs and politics (Covarrubias et al., 2018; Gillborn, Warmington, & Demack, 2018)²⁸. Therefore, quantitative studies measuring the effects of teachers’ racialized beliefs about ability may be restricted in their capacity to recognize that categories are “neither natural nor given” and that statistical analyses “have no inherent value” (Gillborn et al., 2018, p. 158). I use statistical analyses within this dissertation and disagree with the CRT argument on quantitative data. Quantitative data provides valuable information at a scale that cannot be obtained using qualitative data collection. All forms of data collection have limitations; I do not believe one form of data collection to be superior to another. While a critical race scholar might argue that qualitative data is able to provide richer and more nuanced accounts, I believe that quantitative data can look at

²⁸ Note that I discuss this criticism in relation to my mixed-methods study in the next chapter which is an introduction to my methodologies and theoretical framework.

those accounts at the macro level which brings an additional and equally valuable perspective. My belief in the equal importance of qualitative and quantitative forms of data collection informs my decision to conduct a dissertation that uses a convergent parallel mixed-methods research design.

Empirical research shows that teachers' life experiences influence their understandings of race and difference (Picower, 2009). A qualitative study by Picower (2009) found that American educators hold "hegemonic understandings about race and difference" based upon their life-experiences and rely on "tools of Whiteness" to "protect dominant and stereotypical understandings of race" (p. 197). Although Picower argues that White teachers view students of color and their communities as threatening and blame children for the educational challenges youth face, the study also considers teacher perceptions to be byproducts of "a lifetime of hegemonic reinforcement" in which Whiteness has a negative impact on educators' understandings of children of color and urban schools (Picower, 2009, p. 211). Picower's discussion of the "hegemonic reinforcement" (p. 211) of Whiteness and its negative impact on how teachers perceive students, contextualizes a meta-analysis carried out in the United States by Tenenbaum and Ruck (2007) on teacher expectations of students in accordance with students' race. Expanding upon Picower's work on how children of color are seen as threatening, Tenenbaum and Ruck found that American teachers hold the highest expectations for Asian American students and more positive expectations for European American students than for Latino or African American students (Tenenbaum & Ruck, 2007). These expectations corresponded to the rates at which teachers made positive or negative referrals for students.

Scholars like Gillborn and Picower enrich the work of researchers like Tenenbaum and Ruck by showing how the structural practice of racialization has come to guide policy decisions and teacher beliefs. In order to address inexplicit and explicit forms of racialization among teachers, Picower calls for a disruption of the maintenance of Whiteness through the diversification of the teacher workforce and the implementation of teacher education programs that directly discuss race and racism – I arrive at a similar conclusion in Chapter Ten.

Teacher perspectives on ability and race are also affected by the narrow definitions of success educators only see as attainable by particular groups of students (Rollock, 2007). White interests and the disadvantaging of Black students are key elements of educational policy that shape and are shaped by teachers' views of 'ability'

in the classroom that preclude Black success (Gillborn, 2010). Nicola Rollock (2007) qualitatively studies and comments on the ways in which teachers in a UK inner city secondary school see Black students as “directly at odds with the aims of the school” – educators’ views “minimize [Black students’] likelihood of attaining success” (p. 275). Children of color, especially males, were expected by staff to earn low grades while White children were expected to be academically successful. Rollock writes that the “science of stereotypification” regarding Black males leads teachers to see their behavior in the classroom as a “degenerative anti-school attitude” that results in their lower levels of academic achievement (p. 285). Her work echoes that of Gloria Ladson-Billings who examines how Black males are categorized in American schools – turned from boys into men and seen as criminals by teachers (Ladson-Billings, 2011). In observing teachers in classrooms in the United States, Ladson-Billings evidences the differential treatment Black male children receive and how teacher perceptions and fear of Black students affects the ways in which they engage with and view those students.

The intersectional perspectives and findings of Rollock and Ladson-Billings reinforce quantitative research conducted on teacher expectations in relation to race. A study by Boser, Wilhelm, and Hanna (2014) found that high school teachers in the United States predicted that their high-poverty students were 53% less likely to complete college than more affluent peers. Teachers also believed that Black students were 47% and Hispanic students were 42% less likely to receive a college diploma in comparison to White peers (Boser, Wilhelm, & Hanna, 2014). The US Census Bureau’s data on educational attainment in 2017 found that among individuals age 25 and over, 23.8% of non-Hispanic Whites had obtained bachelor’s degrees in comparison to 15.1% of Blacks, 30.5% of Asians, and 12.2% of Hispanics (US Census Bureau, 2017a). Additionally, a smaller percentage of low-income students obtained a bachelor’s or higher degree within eight years of completing high school in comparison to middle-income students (14 vs. 29 percent) and high-income students (14 vs. 60 percent). In some sense, therefore, teachers are correct to expect that low-income students and Black and Hispanic students are less likely to receive a college diploma as this reflects the unfortunate reality of the United States. This reality, Rollock and Ladson-Billings would argue, is partially informed by social structures and forms of racism that portray marginalized communities as inadequate and incapable of academic success.

The works reviewed in this section draw upon both qualitative and quantitative forms of data collection to signal how the perceptions of education practitioners

influence student outcomes and stem from racialized practices, policies, and discourses. However, much of the critical race scholarship reviewed in this section employs a Black-White binary which excludes the lived experiences of indigenous students and other racially-defined minorities. Similarly, although there is reasonable overlap between race and socioeconomic status, critical race scholarship does not always speak to the narratives of all students living in poverty; this signifies a limitation to the scope of these studies. While race is a large and important part of the picture, it is not the only factor affecting student achievement.

Additionally, the works presented up to this point talk about how ability is racialized but make limited mention of how conceptualizations of ability might be affected by scientific discourses which is important given the history of genetic ideologies being used to frame understandings of ability. Therefore, in the next section I look to unravel how the concept of ability might be understood through biopolitical²⁹ frameworks.

The maintenance of racialization in education through molecularization

In addition to testing standards, racialization is regularized through the molecularization, or ‘medicalization,’ of (dis)ability (Young, 2016) – this idea is central to my dissertation. Work in education that focuses on the molecularization of ability employs biopolitical frameworks that focus on surveillance and regulation. This section covers the existing literature on the molecularization of ability as a form of racialization. Gulson and Webb (2016) argue that neoliberalism has produced new forms of racial biopolitics in which education policy is used to operationalize race – becoming part of technologies of governance. In other words, biopower helps to conceal the modalities of racialization that are now being used for marketization. For example, the formation of a Black-centered alternative school in Toronto was framed by authorities as a form of empowerment (Gulson & Webb, 2016). Yet, Gulson and Webb show how the “culture-specific school” was actually created using “dangerous accusations of biological aggregates” that often result in forms of “othering” and “categorization” when racism is seen as something that occurs outside of policy (p. 166). I consider the

²⁹ Biopolitics refers to the “social, cultural, environmental, economic, and geographical conditions under which humans live, procreate, become ill, maintain health or become healthy, and die” (Dean, 1999, p. 99).

racialization that exists within educational policy to be important and informative of the underachievement of students of color in the US education system.

Moreover, Kathryn Young conducted a mixed-methods study using a questionnaire and interviews with 93 American teachers (Young, 2016). Although the sample was not representative, she found that teachers embody “oppressive discourses of race” through the “medicalization” of (dis)ability, which distracts teachers from the “racialization of disability in school” (Young, 2016, p. 67). For Young, the study, diagnosis, prevention, and treatment of academic and behavioral difficulties as medical problems encourages the identification of students according to the single categories of disability or ability (Young, 2016). In doing so, the racialization of (dis)ability is maintained and normalized inexplicitly as teachers come to see achievement gaps between racial groups or the identification of children for special education as a matter of biology and empiricism rather than a process influenced by racialized discourses and education policy. As I found in my own work, Young’s questionnaires and interviews were potentially limited by individuals’ fear of engaging in a conversation on race³⁰. As a result, her findings may have provided a partial picture of what teachers think. Furthermore, although Young advocates for employing an intersectional framework in education research, she does not look at differences in views between groups of teachers – that is whether teachers from different ethnic backgrounds thought about (dis)ability and race in distinctive ways. That said, her work touches upon an important phenomenon: the medicalization of socially-informed conditions in a way that takes an eye off equity.

In short, “crude and dangerous ideas about the genetic heritability of intelligence, and a supposed biological basis for the Black/White achievement gap, are alive and well” (Gillborn, 2016, p. 1). Genism, or the belief that genes shape human behavior is reemerging in hereditarian writings in the US and UK that adopt a “colorblind façade that presents [behavior genetics research] as new, exciting and full of promise for all of society” (Gillborn, 2016, p. 1). Gillborn’s works on race and racialization within education have more recently evolved to look at how scientific discourses re-inscribe the genetic inferiority paradigm. Through a critical race framework, Gillborn demonstrates the tacit ways racism is maintained, using the term “racial inexplicitness” to signify a “soft” version of hereditarianism that poses an even

³⁰ I discuss this in relation to my qualitative data collection in Chapter Six.

greater danger than previous more explicit forms of racial geneism (Gillborn, 2016). Gillborn also comments on the book “G is for Genes” (Asbury & Plomin, 2013), arguing that it is a manifestation of a new form of genism with inexplicit links to racialization. Contemporary developments in fields like behavior genetics do not explicitly make mention of race – “race has become an absent presence” (Gillborn, 2016, p. 2). However, behavior genetics has become what Omi and Winant would call another “racial project” (Omi & Winant, 2014) – one which feeds into earlier racial projects on “ability” (Stark, 2014). Racial inexplicitness, when it comes to genism, is bound to what Stark (2014) calls “the meritocratic language of ability (p. 397). According to Stark, meritocratic language on ability has resulted in increased tracking and streaming of students and the continued segregation of schools following *Brown v. Board of Education*. As Gillborn explains, the danger is the adoption of “a colorblind, meritocratic and celebratory tone whereby ‘race’ is rarely mentioned at all and the supposed ‘advances’ are hailed as good news for everyone” (Gillborn, 2016, p. 2) within a world where White interests are prioritized in educational policy (Gillborn, 2005).

Gillborn (2016) focused his analyses on publicly available radio interviews, journal articles, and news commentary pieces. However, he did not ask researchers like Robert Plomin (whom he references heavily) questions about structural racism and the role of Science in maintaining harmful discourses. I believe that speaking with genetics researchers and bioethicists to understand their perspectives on these issues is important for providing a more balanced analysis. As such, in my own work, I interviewed genetics researchers on and off the record about their work and some of the ethical questions that surround it. Additionally, Gillborn and other CRT scholars have not focused on more recent methodological advancements in the field of behavior genetics. For instance, Gillborn (2016) focuses primarily on twin studies and the idea of heritability; he does not critique GWAS or polygenic scores, which behavior genetics researchers say address the shortcomings of twin studies. Although he does argue that behavior genetics is presented as “new” and “full of promise” (Gillborn, 2016, p.1), it is important to recognize that behavior genetics appears ‘different’ because of technological and scientific advancements that reinforce the field’s image as robust, fool-proof, and neutral. It is also worthwhile to consider the ways in which we might move past critique and identify actionable solutions to emerging issues. The divide between the biological and social sciences – from my own experiences working on this

dissertation – seems to involve a level of mistrust on both sides and the continued ‘talking past each other’ instead of ‘with each other.’ While scholars like Gillborn, Young, and Ladson-Billings make fair and accurate observations of what is happening ‘on the ground,’ finding ways to address these issues is a worthwhile step forward – one I have tried to make in this dissertation.

In summary, previous scholarship suggests that the racialization of ability is molecularized through scientific research in fields like behavior genetics. I now turn towards exploring research that has directly assessed teacher views on the role of genetics in student ability.

Teachers’ Perceptions of the Role of Genetics in Influencing Student Ability

Since my work looks at teacher perceptions of the role of genetics in cognitive ability, this section focuses on existing research in this area. There have only been three large studies on teacher perceptions of intelligence in relation to genetics (Castéra & Clément, 2014; Crosswaite & Asbury, 2018; Walker & Plomin, 2005). All three of these studies used surveys to assess the extent to which teachers saw intelligence as genetically or environmentally influenced. Walker and Plomin (2005) focused on primary school teachers in the UK, finding that in a survey of 667 teachers, the proportions of teachers who reported genetics to be as least as important as the environment for personality, intelligence, behavior problems, learning difficulties, and mental illness were .87, .94, .43, .94, and .91 respectively. Teacher perceptions of the relatively equal importance of genetic and environmental factors for intelligence roughly reflect current findings in the field of behavior genetics (Polderman et al., 2015).

Walker and Plomin’s study was recently replicated by Crosswaite and Asbury (2018) who expanded their survey to include UK secondary teachers. Their representative sample of 402 UK teachers found that educators continue to see intelligence as equal parts genetic and environmental but also that teachers were more likely to hold a growth-mindset attitudes that see intelligence as a flexible quality (Crosswaite & Asbury, 2018). State school teachers held stronger growth-minded perspectives than independent school teachers (Crosswaite & Asbury, 2018). Additionally, primary teachers were more open to learning about behavior genetics,

though all teachers appeared open to learning more about it despite having limited knowledge of it (Crosswaite & Asbury, 2018).

The alignment between teacher perceptions and behavior genetics findings is important as it shows that teachers hold views that are in accordance with what research has found; teachers are not necessarily misinformed about the role of genetics in student outcomes as it is presented by behavior genetics. Despite this, a question remains as to whether or not the underlying research in behavior genetics and how it is used are problematic with regards to further normalizing socially-constructed forms of inequality.

Finally, the largest survey to date on teachers' perceptions of genetics in relation to intelligence and student ability was conducted by Castéra and Clément (2014). Castéra and Clément (2014) surveyed 8,285 teachers from 23 countries and asked a series of questions to identify whether educators in cross cultural contexts held different views on innatism (genetic determinism). They found that innatism was present among educators in two ways. The first was in relation to individuals (e.g. to justify intellectual similarities between twins) and the second in relation to groups of humans (e.g. to justify the superiority of one ethnic group over another). The researchers found that teachers in African countries and Lebanon held more genetically deterministic views than those in European countries, Brazil, and Australia. Independent of the country, the level of training and knowledge of biology also proved important factors in lowering teachers' levels of innatism (Castéra & Clément, 2014). Furthermore, teachers who held essentialist views in relation to groups of humans had more intolerant attitudes towards gender and homosexuality (Castéra & Clément, 2014). This study was important because it showed that although teachers can see differences between individuals in a genetically deterministic way, those beliefs will not necessarily translate over to their views of group differences (i.e. race, gender, etc.).

These are the only three studies to have been carried out looking at teacher beliefs on the etiology of intelligence, signifying an area that requires further research. None of the existing studies looked at American teachers or chose to employ qualitative methods to help form an understanding of why teachers hold these perceptions. My work fills this gap. By using a mixed-methods design that combines qualitative research with a survey similar to those mentioned here, I contribute to research on teacher perceptions of the role of genetics in influencing student outcomes like intelligence and educational attainment.

Teachers' Perceptions of the Role of Genetics in Influencing SES and Race

Based upon my research, thus far no one has looked at teachers' perceptions of the role of genetics in relation to socioeconomic status and race. My dissertation is the first of its kind to do so. The decision to include socioeconomic status and race in my study was not taken lightly. However, given the history that binds race and socioeconomic status to discourses on genetics and intelligence, it seems reasonable that looking at the first two will deepen understandings of the latter two.

That said, I faced many challenges throughout this dissertation. Americans are hesitant to discuss race or engage in 'race-talk' (Sue, 2016; E. E. Thomas, 2015), especially when it comes to education (Valant & Newark, 2016). For example, a survey by Valant and Newark (2016) found that the American public was more concerned about and supportive of proposals to close wealth-based achievement gaps in education than either Black-White or Hispanic-White gaps. Moreover, individuals more readily explained causes for wealth-based gaps than race-based ones (Valant & Newark, 2016). Findings suggest that many teachers silence or avoid discussions on race (Solomona et al., 2005; Young, 2016). The anxiety over engaging in discussions on race proved a challenge for my data collection. Yet, as this chapter shows, having this conversation is important because teachers hold perceptions of students based on students' race.

There are many possible explanations for why teachers hold different perceptions of students in accordance with race. These include the social context of the United States and the stereotypes that exist within it. It could also be that implicit racial associations inform teacher perceptions of their students (Warikoo, Sinclair, Fei, & Jacoby-Senghor, 2016). Is it possible that perceptions of genetic determinism contribute towards this as well? That is, could the molecularization of ability obscure the racialization of the discourse on intelligence? My dissertation offers a small window into answering this question. I want to suggest that what were once explicit mis-associations between intelligence, genetics, race, and class may now take root as implicit mis-associations, affecting the ways in which teachers interact with and perceive their students. This is what Gillborn (2016) might call the "softly softly approach" to introducing genism to education (p. 2).

Conclusion

Teachers' perceptions and expectations of student ability are representative of forms of racialized embodiment. In this chapter, I have demonstrated that teachers' views are significant in shaping student outcomes. Teachers are important and influential. Nevertheless, I have also shown the ways in which educators' views and beliefs are structurally-informed and feed into dominant hegemonic discourses on ability and worth. Teacher beliefs are tied to the social and historical context and the creation of school policies that cater to the interests of certain groups. From a critical race perspective, teachers' beliefs about their students tend to uphold forms of White supremacy and are born out of a system that privileges White interests. Using biopolitical frameworks, scholars have also shown how the privilege of dominant groups is secured and regularized through forms of molecularization that distract from systemic structural inequality and racism.

Research on teacher perceptions of the role of genetics in shaping intelligence is relatively sparse, despite being an important indicator of how teachers come to form their expectations of students. Additionally, no research thus far has studied teachers' perceptions of the role of genetics in relation to race or socioeconomic status despite the fact that there is an extensive history demonstrating the ways in which these concepts have overlapped with the study of intelligence. The gaps I have identified in the literature serve as the motivation for my dissertation. While the existing literature serves as the basis for continuing research on teacher perceptions of student ability, my dissertation takes the field a step further with inquiry that considers teacher understandings of race, class, and genetics.

I expand upon the work of others (Castéra & Clément, 2014; Crosswaite & Asbury, 2018; Walker & Plomin, 2005) and explore teachers' perceptions of intelligence while also including their views on the etiology and the role of race and class in student outcomes. Additionally, I examine the forms of racialization and hidden dialogues on race that emerged in my conversations with teachers. In sharing my findings on teachers' views of intelligence, race, and socioeconomic status in relation to genetics, I position myself within a unique subset of educational research.

PART TWO: THE RESEARCH

“The idea of innate group inferiority is still on the table, despite all the progress blacks have made in this [American] society...the last great battle over racism will not be fought over access to a lunch counter, or the right to vote, or even the right to occupy the White House; it will be fought in a laboratory, under a microscope, on the battleground of our DNA.”

(Gates, 2008)

Chapter V. Methodology Overview and Theoretical Framework

Introduction

Having covered the ugly history of genetics, intelligence, race, and class in Chapter Two; introduced the field of behavior genetics in Chapter Three; and discussed the importance and racialization of teacher perceptions of student ability, I begin Part Two of this dissertation: my research. In this chapter, I outline the theoretical, conceptual, and analytic tools and frames used to guide my work as well as the methods and methodological choices for examining it. My dissertation looks at how the historically-burdened concepts of race, socioeconomic status, and intelligence intersect with each other, and are informed by genetics research, a form of biopower that regulates and normalizes value-systems shaping human life.

The interdisciplinary nature of my dissertation and its engagement with complex phenomena serve as an incentive for adopting a mixed-methods approach. A convergent parallel mixed-methods design in which qualitative and quantitative data are collected simultaneously, analyzed separately, and then merged, underpins my dissertation.

Two focus groups with Pre-kindergarten through grade 8 teachers working in the Chicago metropolitan area provided an in-depth exploration of educator perspectives on my topics of interest. My survey enriched my qualitative analysis by assessing the relationship between a teacher's background characteristics and their views on the role genetics in race, socioeconomic status, and intelligence. In this approach, survey data tested intersectionality theory, which argues that sociocultural categories intersect to inform systems of disadvantage and inequity. The reason for collecting both quantitative and qualitative data was to converge these two forms of data collection and offer greater insight into the relationship between behavior genetics and teacher views on student ability and achievement.

A mixed-methods approach allowed me to learn about teacher perspectives on student ability and achievement in relation to genetics and to assess whether teachers believe genetically-informed research is relevant for school-based education. In both forms of data collection, I asked: **How do teachers conceptualize intelligence, socioeconomic status, and race in relation to genetics?**

The concurrent timing of the qualitative and quantitative strands and equal emphasis on both means that the primary point of interface between the two forms of data occurs during interpretation (in Chapter Ten), after separate data analysis of the two strands has been completed. During interpretation, comparisons between the two data sets look for convergence, corroboration, and correspondence of the results emerging from different methods. The employment of two different approaches enhances the integrity of findings and provides a comprehensive account of historically-burdened concepts and teachers operating within the US education system.

Philosophical Assumptions and Conceptual Orientation

Mixed-methods interpretivism

In this dissertation, I adopt an interpretivist perspective premised on the idea that all forms of knowledge ultimately demand the practice of interpretation. Analytically, I am iteratively seeking to understand and interpret systems of meaning related to human behavior and social institutions, particularly as they relate to the US education system and the racial and socioeconomic disparities that are inherent within it.

Convergent mixed-methods research designs most often adopt a pragmatist worldview that ontologically believes in singular and multiple realities, epistemologically argues for practicality, and axiologically advocates for multiple stances (Creswell & Plano Clark, 2011). However, the association between a research paradigm and a specific research method is “neither sacrosanct nor necessary” (Johnson & Onwuegbuzie, 2004, p. 15). In this dissertation, I adopt a constructivist epistemology and interpretivist perspective. I base my conceptual position on three fundamental arguments concerning how one seeks to understand the nature of human knowledge:

1. Individuals create reality in relation to the available tools of interpretation. My own understandings, background and values, as well as the existing theoretical work I draw upon, shape what I observe and what I recast as knowledge in the form of interpretation and expressed findings. The interpretive dimension of my work is therefore a re-representation, through interpretation, of what participants narrate in relation to my research

questions and my own position as a researcher, as well as what is assessed and interpreted from the quantitative work. I acknowledge these biases as I enter into this project seeking to find answers to my research questions.

2. Human knowledge and understandings of the world are rooted in, and inextricably linked to social constructions (Chowdhury, 2014; Eliaeson, 2002; McIntosh, 1997). This argument supports constructivist epistemologies which my work employs to examine the ways in which events, realities, and experiences “are the effects of a range of discourses operating within society” (V. Braun & Clarke, 2006, p. 13). I believe social constructions are based on forms of knowledge that reflect wider inequalities in society. These inequalities are inherited and transmitted, albeit differently, across generations and contexts. The qualitative and quantitative strands of this dissertation adhere to this framework because both reveal the knowledge bases and views of participants in relation to their socially constructed backgrounds.
3. Complex social constructions, identity politics, and systems of power interact to inform systems of disadvantage (Crenshaw, 1989). Intersectionality theory supports an interpretivist framework as the intersections of race and socioeconomic status come together to help formulate more holistic interpretations of the views teachers hold on intelligence, particularly as it relates to race and class. I combine intersectionality and my interpretivist lens with biopower, redefining ‘discriminate biopower’ within a world where complex social constructions, identity politics, and systems of power intersect.

These three arguments inform the relationships I examine between genetics, intelligence, socioeconomic status, and race; they help me to learn more about misapprehended forms of inequality that are ultimately inherited and transmitted within collective communities. The positions that I have taken above are further reflected in my chosen research design.

Interpretivist perspectives have been used clearly and directly in mixed-methods research (Gilbert, 2006; Greene, Benjamin, & Goodyear, 2001; Howe, 2011; Mertens & Hesse-Biber, 2012). Although interpretivist perspectives are not usually combined with quantitative data, researchers have argued that the dichotomy between

qualitative and quantitative methods and their respective paradigms is divisive and threatens the advancement of social science research (Onwuegbuzie & Leech, 2005). Quantitative data researchers, like qualitative interpretivists, seek “to provide explanations of their findings” and make “interpretative, narrative conclusions pertaining to the implications of their findings” (Onwuegbuzie & Leech, 2005, p. 379). In short, many of the underlying principles are the same in quantitative and qualitative research and similar paradigmatic elements carry through both, despite the perception that these two forms of data collection stand at opposing ends.

The combination of mixed-methods and an interpretivist lens “emphasizes understanding persons on their own terms” (Denzin, 2010, p. 423). Mixed-methods interpretivism “rests on the assertion that people act in intentional ways and that researchers can capture the complexity of collective intentionality that leads to the construction of social facts when combined with certain knowledge, skills, and dispositions” (Mertens & Hesse-Biber, 2012, p.76). ‘Intentional,’ for the purpose of my dissertation, is “the shaping of human identities and capacities and the performance of actions in accordance with norm-governed practices” (Howe, 2011, p. 169).

In summary, mixed-methods research calls for both quantitative and qualitative data interpretation. An interpretivist approach, therefore, provides a space for me to interpret my different forms of data both independently and in relation to each other. Both findings speak to each other and create a more substantive landscape for interpreting the overall picture of what it is I am examining and assessing. While not comparable forms of measurement³¹, the merging and analysis of these two forms of data collection expand the analytic range of my work. That said, it is important to note that because these two data sets are non-representative, descriptive analysis of quantitative findings cannot be used to attribute causality to qualitative findings or used to generalize to the population of interest: American educators.

³¹ Nor do I believe these forms of measurement ought to be comparable. Examining different kinds of data in relation to my research questions enriches my work.

Theoretical Framework

What is intersectionality?

An intersectional framework encourages multidisciplinary approaches to the examination of identity politics and the ways in which structures intersect to inform oppression and privilege. I consider intersectionality to be “a way of understanding and analyzing the complexity in the world, in people, and in human experiences” (Collins & Bilge, 2016, p. 2).

Intersectionality considers how boxes, categories, labels, and assigned definitions inform social inequality, relationality³², and power. It challenges the status quo that operates in dichotomies: Black or White, Male or Female, Able or Disabled. As a way of looking at the world, intersectionality argues that the combination of advantageous or disadvantageous categories and boxes weave a complex web that in turn shapes the everyday experiences of individuals³³.

Intersectionality “considers multiple methods necessary and sufficient” and is therefore well placed within my mixed-method research design (Hancock, 2007, p. 251). I believe intersectionality offers the best tools for exploring existing and possible relationships and interactions between teacher conceptualizations of intelligence, genetics, race, and socioeconomic status and the field of behavior genetics.

The intersections of race and class in relation to genetics

Intersectionality as an analytic tool provides a clear foundation for rejecting the ideas of race and socioeconomic status as standalone concepts; it disrupts the idea that labels can be understood separately from each other and creates a space for deeper understandings of the positioning of peripheral groups within the US education system. In acknowledging that much of racially-defined minority disadvantage is

³² “Relational thinking rejects either/or binary thinking...The focus of relationality shifts from analyzing what distinguishes entities, for example, the differences between race and gender, to examining their interconnections” (Collins & Bilge, 2016, p. 27).

³³ Intersectionality’s emergence is rooted in the 1960s and 1970s, decades prior to the coining of the term itself by Kimberlé Crenshaw (Crenshaw, 1989). During this time, core ideas of the framework were fleshed out by women of color during a number of American social movements; among them the Civil Rights, Black Power, Chicano liberation, Red Power, and Asian-American movements (Collins & Bilge, 2016, p. 65). Intersectionality was born out of social action and served as a boundary-pushing tool of resistance; it radically changed the ways in which individuals understood disadvantage and inequality. While most researchers credit Kimberle Crenshaw with developing intersectionality, it is important to recognize intersectionality’s paralleled and earlier rise alongside the development of feminism and the increasing focus on marginalized sub groups (see: Volcano & Rogue, 2012; Junn and Brown in Wolbrecht, Beckwith, & Baldez, 2008).

socioeconomic in nature, intersectionality binds economic capital to sociocultural influence. This crossed pattern of inequity extends to conceptualizations of intelligence and, more specifically, racial minority underachievement on standardized tests, underrepresentation in gifted education, and overrepresentation in special education³⁴.

Race and class constructions contribute to ideas of sociocultural, economic, and political capital; the complexities of power in relation to race and capital are such that simple definitions, questions, or answers are impossible. This insight is critical when examining racial and socioeconomic constructs; intersectionality actively engages with human identity politics and recognizes the dynamism and intricacy involved in identity construction as well as the role societal constructs play in this process. However, identity construction exists in a world that largely seeks to avoid complexity, and instead gravitates towards simplicity, often through the process of ‘othering,’ which allows a group to create an identity in opposition to an ‘other’ and is maintained through matrices of power, structural processes, and habitual practices (Douglas, 1966).

As established earlier in this work, intelligence has often been employed as a mechanism through which to maintain an ‘othering’ process and to legitimize the power of the dominant majority through a genetic superiority/inferiority paradigm. For racially-defined minorities in the US education system, the historical legacy of this othering process shapes their underrepresentation in upper-socioeconomic spheres and results in their relative absence in advantageous educational settings, like gifted education programs. It also shapes everyday ways of thinking concerned with how such groups are understood and treated in educational contexts.

My argument for using intersectionality in an examination of how behavior genetics research on educationally-relevant behaviors might engage with teacher views on intelligence, race, and socioeconomic status is two-fold. First, examining the intersectional forces of race and class within the United States education system aids in a deeper understanding of why it is that behavior genetics research may result in dangerous and disadvantageous outcomes; outcomes that impact underprivileged and underrepresented groups not only in the classroom, but more broadly in a society that is heavily saturated with both inexplicit and overt structures of oppression and marginalization. Secondly, in intersectionality, categories such as race, class, gender,

³⁴ Remember, it is established that implicit bias continues to affect teacher perceptions of minority students and their abilities in the classroom (Elhoweris et al, 2005; Ford, 1998; Milner and Ford, 2007).

sexuality³⁵ “constitute interlocking, mutually constructing or intersecting systems of power” (Collins & Bilge, 2016, p. 27). Intersectionality assists in an understanding of the many different forces that have interacted and continue to stand in conversation with each other to shape the field of behavior genetics research on intelligence and the United States education system.

I use intersectionality to argue that behavior genetics research cannot be fully understood without exploring the ways in which it interacts with past and present conceptualizations of intelligence, race and socioeconomic status. Recognizing these links offers a richer context for deciphering the effects and potential effects of the post-genomic era on marginalized groups. To assist in this contextualization, I use the theory of biopower to demonstrate the power genetic ideologies and language can have on identity and more fundamentally on the physical human body. In the next section, I outline the limitations of intersectionality that point to the utility of also employing biopower.

Limitations of intersectionality

A challenge of using intersectionality is its boundary-crossing and, at times, loose and ambiguous nature (McCall, 2005, p. 1772). Intersectionality has been criticized for its lack of a defined methodology (R. S. Chang & Culp, 2002; McCall, 2005; J. C. Nash, 2008), its “semantic slippage” (Hancock, 2007, p. 250), and the use of black women as “quintessential intersectional subjects” (Nash, 2008, p. 1).

Additionally, certain methodologies may support an intersectional framework better than others. Methodologies that are “too simplistic or reductionist” can be rejected by intersectionality (McCall, 2005, p. 1772). As a study of complexity, intersectionality should not have one methodology associated with it. It is a framework that gives the researcher the agency to design a methodology that best addresses the intersections in question – permitting a powerfully reflexive form of transformative inquiry. For these reasons, I selected intersectionality for my dissertation. My examination of historically-burdened concepts and navigation of contentious spaces has been enriched by a theoretical framework that understands that complexity is normalcy

³⁵ Although within this list, I narrow my focus to primarily race and class, I recognize there are many more factors feeding into an individual’s lived experiences.

and which looks to better understand human conditions through an examination of different structures and systems that combine to perpetuate inequality.

Intersectionality has also been critiqued for running on a set of assumptions:

1. Social positions are relational
2. Chosen intersections are equal
3. Power is absolute
4. The human subject is “primarily constituted by systems of domination and marginalization”

(Phoenix & Pattynama, 2006, pp. 187–188).

These assumptions might disqualify “some of the ways in which people choose to identify because it treats identity as predominantly a matter of categorization and naming” (Phoenix & Pattynama, 2006, pp. 187–188). I do not argue that all intersections are equal, nor do I seek to definitively define a particular identity. Intersectionality is not simply a matter of identity politics. Rather, I use intersectionality to argue that the field of behavior genetics extends beyond the research itself and impacts a range of social and economic structures that shape the lived experiences of ethnic minorities in the US education system. Although any theoretical framework carries with it a set of expectations and conformities, the greatest strength of intersectionality is the fact that it brings an understanding of multiple dimensions; it recognizes that categories are multiple but not mutually independent and prioritizes integrative analysis. In the context of my dissertation, I am able to explore teachers’ views while recognizing the intersectionality of their perspectives towards historically-burdened concepts and the different groups of students they teach.

Most importantly, however, is the critique of intersectionality as a descriptive tool for understanding lived experiences and identity rather than a theory for understanding why some individuals in a society find themselves in more marginalized positions than others. Intersectionality may struggle to “contend with whether its theory explains or describes the processes and mechanisms by which subjects mobilize (or choose not to mobilize) particular aspects of their identities in particular circumstances” (J. C. Nash, 2008, p. 11). I recognize that this framework cannot clearly answer why certain individuals are confined to a given segment of society. In order to advance

further, intersectionality needs to be able “to prescribe or imagine points of intervention” (R. S. Chang & Culp, 2002, p. 490).

These insufficiencies support the inclusion of biopower in my dissertation. The convergence of intersectionality and biopower is mutually beneficial. Sociologists, anthropologists, psychologists, and political scientists “interested in the consequences of changes in the biosciences, biomedicine, and biotechnology” have used biopower to study an array of intersections (Raman & Tutton, 2009, p. 2) including race (Bernasconi, 2010; Fiaccadori, 2015; Toom, 2012) and gender (McWhorter, 2004). Biopower can take the intersectional points of race and socioeconomic status and look at how they might be influenced by Science in ways that profoundly shape both life and identity (both individual and collective). In other words, biopower provides a tool for understanding the ramifications of ‘molecularization’ for bodies defined by skin color or economic class. While intersectionality specifies upon whom biopower is enacted, biopower offers a transformative way to think about *how* and *why* axes of power overlap to impact upon human *life* and the value it is given.

What is biopower?

The origins of biopolitics and biopower lie in the works of French philosophical theorist Michel Foucault who defined biopower as: “the set of mechanisms through which the basic biological features of the human species became the object of a political strategy” (Foucault, 2007, p. 1). Foucault’s biopower is closely linked with political power and capital³⁶, or ‘biopolitics’ (Foucault, 1978). Biopower entails:

1. One or more truth discourses about the ‘vital’ character of living human beings.
2. An array of authorities considered competent to speak that truth.
3. Strategies for intervention upon collective existence in the name of life and health.
4. Modes of subjectivation, in which individuals work on themselves in the name of individual or collective life or health.

³⁶ Although Foucault’s discussions of modernity and the power structures associated with it changed throughout his life, his later works, and especially his 1978 publication of “The History of Sexuality Volume One,” gave rise to a system of control known as ‘biopower.’ For Foucault: “A society’s ‘threshold of modernity’ has been reached, when the life of the species is wagered on its own political strategies” (Foucault, 1978, p. 143).

(Rabinow & Rose, 2006, p. 197)

Biopower also captures the maxim of ‘fostering life or disallowing it³⁷,’ otherwise known as ‘making live’ and ‘letting die’ (Nilsson & Wallenstein, 2013; Rabinow & Rose, 2003). These govern human life through established systems of power that value some lives more than others (Rabinow & Rose, 2006). Biopower subjugates human life through subtle regulations, expectations, and norms that are encoded into social practices and human behavior (Foucault, 1978); it operates as a set of events or relations that create institutionalized routines and normalize interventions that optimize a form of valued life against that which is seen as threatening (B. Anderson, 2012; McWhorter, 2004).

Over the course of the twenty-first century, life has increasingly become molecularized through developments in the biological sciences; “life is understood, and acted upon, at the molecular level” (Rose, 2007b, p. 5). In the post-genomic era, the increasing impact of genetics research on institutions, communities, and individuals means that the creation, regulation, governance, and marketing of genetics research results in new strategies and contestations for human vitality that link the molecular, the population, the individual, and the biological sciences together in complex ways.

I use biopower to recast behavior genetics research on educationally-relevant behaviors as a potential strategy for ‘governing’ human life. In a context that has historically used the language of genetics to assert and justify race and class based differences and which today continues to have marked racial and socioeconomic disparities in almost all facets of society, the ‘molecularization’ of life, and especially intelligence and educational attainment, contributes to pre-existing systems of power in a profound way as individuals tend to think of genes and genetics in deterministic and fatalistic terms (Heine, Dar-Nimrod, Cheung, & Proulx, 2017).

In the post-genomic era, technological developments in artificial intelligence and advancements in genetics research and biomedicine, “trace a new cartography of biopowers,” which “put in question the forms of life itself” (Lazzarato, 2002, p. 100). The deluge of genetic information in the form of genetic screening, testing, and research is allowing individuals “to draw on science to articulate their own judgments and

political claims” within a context that “enables them to take greater responsibility for their own vitality” (Raman & Tutton, 2009, p. 6). The articulation of ‘judgements’ and ‘political claims’ is significant in a context where teacher perceptions of their students affect student outcomes.

In this dissertation I do not argue that behavior genetics research is inherently bad or should not be conducted. Instead, I want to note the ethical continuum of genetics research and the historical context that makes some areas of genetics research more contested than others. For example, finding the gene for Huntington’s has ignited little debate; finding a means through which to address this disorder is seen as beneficial for everyone. As far as genetics research’s ethical continuum goes, studies on the mono-genetic Huntington’s disease is ‘good.’ In comparison, identifying the causes of Down syndrome – a case where genetic diagnoses influences educational approaches to a child – has sparked more conversation as the controversial topic of abortion connects to the decreasing rate of Down Syndrome within the global population (Dixon, 2008; Natoli, Ackerman, McDermott, & Edwards, 2012). At the far-end of the spectrum, behavior genetics research into education-related behaviors enters into contested territory. I point out this ethical continuum not only to highlight why behavior genetics research into education-related behaviors remains charged, but also to show why it poses potential threats to notions of equity. The historical (mis)use of intelligence has transformed intelligence into a form of biopower that could regularize multiple intersections of disadvantage through the ‘truth discourse’ of behavior genetics.

Limitations of biopower

Biopower has been used in numerous disciplines to study many different sites, including education (B. M. Baker & Heyning, 2004; Hope, 2016), science and the law (Toom, 2012), medicine (Fullwiley, 2004; Thompson, 2008), and race and gender (McWhorter, 2004). It has also looked at how race operates within society (Bernasconi, 2010; Fiaccadori, 2015). However, the most common critique of biopower is that it does not consider the entire picture and is confined to a relatively niche area (B. Braun, 2007; Cheah, 2007; Fiaccadori, 2015).

Scholars have argued that Foucault’s biopower fails to recognize the lasting importance of neo-colonial and neo-imperial dividing practices at the global scale (Hannah, 2011, pp. 1040–1041). Others say biopower trivializes states’ continued

control over human life and death (Fiaccadori, 2015). Furthermore, while Foucault thought of the relationship between biopower and capitalism as one of *exteriority*, today biopower operates *within* capitalist neoliberal societies (Hannah, 2011). Finally, Foucault has been critiqued for his “Eurocentric assumptions,” which limit biopower’s applicability to the non-western world (Hannah, 2011, p. 1037). These criticisms point to the fact that biopower, in its original form, emerged during a particular set of political and economic transformations (B. Anderson, 2012).

However, biopower has evolved to combat these limitations and has expanded to rethink definitions of ‘life,’ including the roles of affect and desire (B. Anderson, 2012). For example, although Foucault was fairly silent on the topic of race, more recent conceptualizations of biopower have sought to include it as a primary focus (Bernasconi, 2010; Fiaccadori, 2015; Fullwiley, 2004; McWhorter, 2004; Toom, 2012). One of the key biopower theorists in the 21st century, Nikolas Rose, talks about biopower as a form of ethnopoltics, meaning it is connected to the politics of race and ethnicity (Rose, 2001). In the current context, biopower involves technologies that “are making it possible to grasp and to manipulate the imperceptible dynamism of affect” (Clough, 2008, p. 2), thereby expanding understandings of what ‘life’ is and how technology is used to control, maintain, foster, or ‘let die.’

Moreover, biopower evolves as technology develops. Though a way to address the framework’s shortcomings, it can also make it difficult to define concretely. Today in the western world, biopower is less concerned with the physical destruction of the body and more with the degradation of individual identities as some lives are given more capital than others³⁸. ‘Making live’ and ‘letting die,’ or forms of regulation, now take more passive and inexplicit forms. The molecularization of life shifts the focus from the visible body to a vision of life that is constituted at the molecular level (Rose, 2007b).

I believe that similar to intersectionality, a strength of biopower is its ability to recognize when it is self-limiting and to modify and expand in response to a given situation. In addressing a weakness of biopower (inability to see the whole picture) I have maximized on a strength (flexibility) and created a tool for making my use of biopower more effective: discriminate biopower. ‘Discriminate biopower’ is a response

³⁸ Note that biopower remains tied to physical deprivation and destruction, particularly in “developing countries” whose people and land continue to be exploited for the benefit of the West. Take for example the ramifications of oil exploitation in developing countries (Eweje, 2006; Karl, 2004).

to both the shifting boundaries in the politics of life and the context in which I confine my work. In combining intersectionality with molecular biopolitics, I believe the concept of discriminate biopower, which I unpack next, helps contextualize the broader landscape.

Biopower and intersectionality: Discriminate Biopower

Combining biopower with intersectionality offers a potentially powerful way to understand the post-genomics era and how it might affect educators' views on race and socioeconomic status within the US education system. I consider genetics research into socially-valued behavior outcomes like intelligence and educational attainment a form of biopower, albeit a re-representation of a longstanding tradition of dividing people based on cognition through a racial lens. I look to understand whether current genetics research is another manifestation of a pre-existing story – one in which intelligence is used as a form of biopower.

In the post-genomics era, the notion of 'discriminate biopower' (see Figure 3 on p. 62) is an especially persuasive argument. Discriminate biopower offers a lens for understanding how systems of inequality that disadvantage low-income citizens and/or citizens of color in the United States could become further regularized through 'molecularized' sciences like behavior genetics that break the population and the individual up into a series of biological processes. Previous attempts to incorporate biopower into intersectional studies have looked at the common genealogy of race and sex as categories of biopolitical normalization (McWhorter, 2004), allowing for a more complex assessment of how institutions and practices are developed and deployed in normalizing networks of biopower. An intersectional lens that uses biopower can highlight how structures like race, gender, class, and disability traverse at points where people think in terms of 'normality' and 'abnormality.' It also shows how these intersections produce social forms, institutions, routines, beliefs, and self-images that individuals are subjugated by and self-subjugate in response to.

I argue that in the post-genomics era, genetic ideologies have powerfully re-imagined the intersectional points of race and class and transformed intelligence into a node of intersectionality. I posit that the molecularization of intelligence through behavior genetics might normalize, at the level of life itself, views of the White and privileged as the most productive and efficient body, and the colored and low-income

body as dangerous and risky. Discriminate biopower contextualizes the normalized practices resulting from genetics research by examining how they interact to maintain themselves and the systems in which they operate. In other words, it creates a space for observing the effects of genetics research on bodies assigned and ascribed to certain boxes, in this case racial minority and low-income descriptions, and how these effects might become regularized and implicitly accepted.

Through discriminate biopower, genetics research runs the risk of justifying power and privilege by potentially attributing life success to the fatalistic and deterministic realm of the molecular. The introduction of molecular discourses into an environment that historically orders bodies according to color and/or wealth might reinforce racist ideologies and permit the maxim of ‘letting die’ to take root by ‘scientifically’ validating inequalities that are structural in nature. The intersectional overlaps between race, class, and the biological sciences force one to consider “who and what are fixed in place — classified, corralled, and/or coerced — to enable technoscientific development?” (R. Benjamin, 2016).

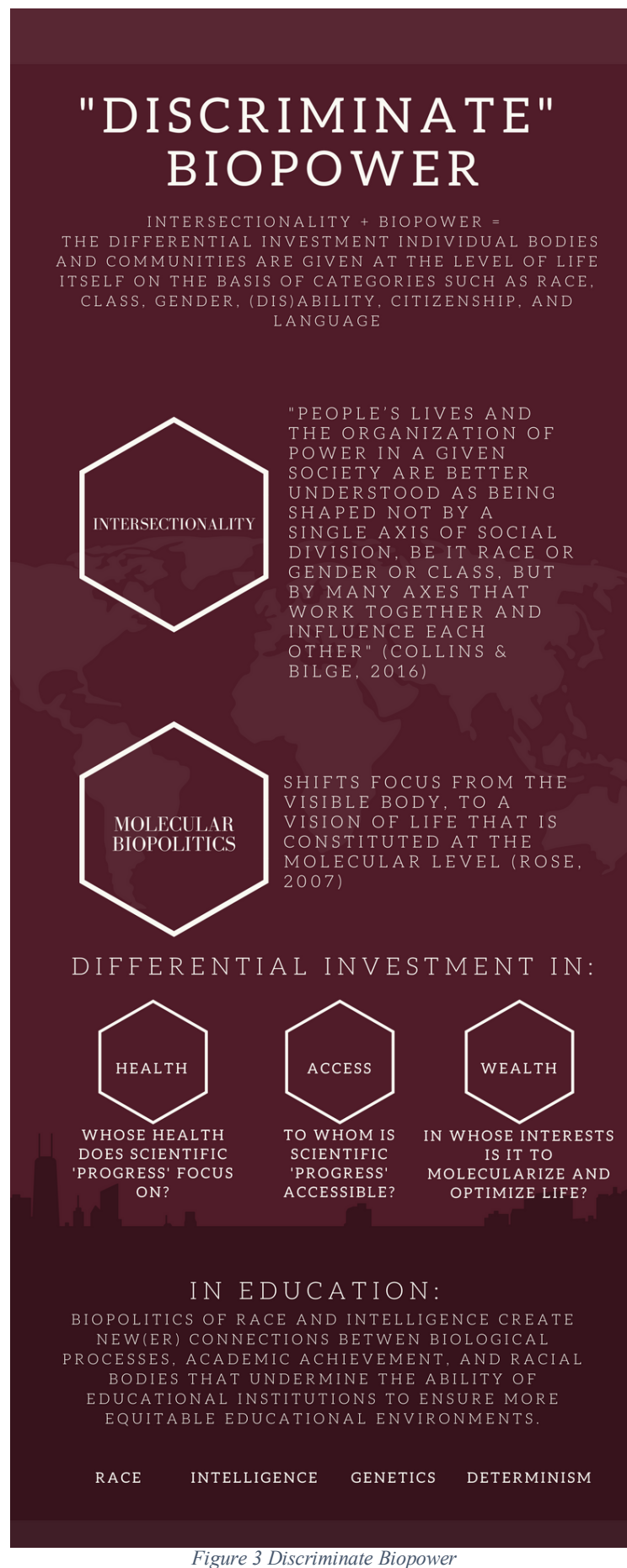


Figure 3 Discriminate Biopower

Mixed-methods, intersectionality, and biopower

Intersectionality theory (Collins & Bilge, 2016; Crenshaw, 1991) in conjunction with the concept of biopower (Rabinow & Rose, 2006; Rose, 2007b) offers the best guiding framework for this dissertation's interdisciplinary mixed-methods approach. Discriminate biopower allows for and requires a level of layering and interpreting regardless of the accompanying conceptual frame.

Human fascination with our genes, coupled with decreasing costs and the greater accessibility of genome-sequencing technologies, speak to the importance of recognizing the power the idea of genes can have on understandings of life and self. Biopower allows for a richer consideration of how genetic ideologies re-imagine race and socioeconomic status. Just as an intersectional mixed-method approach offers a more inclusive perspective on how behavioral genetics research might inform teacher understandings of intelligence, race, and socioeconomic status, discriminate biopower serves as a theoretical tool that recognizes the profound and differential influence genetic ideologies can have on the concepts of race and socioeconomic status.

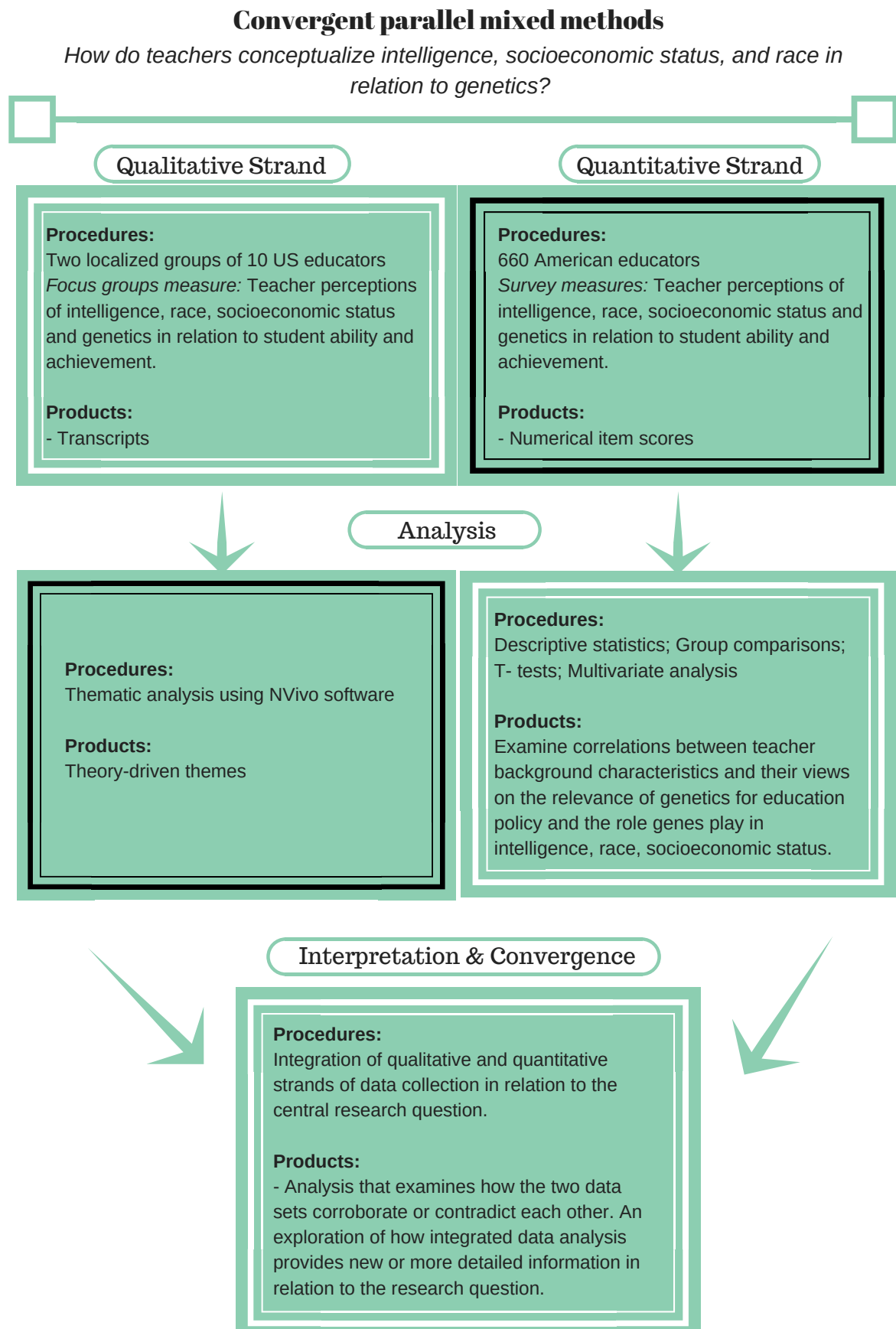
Methods and Interpretation

In this section, I want to provide a brief overview of my research design. I go into greater detail on the methods and limitations of my qualitative and quantitative data collection strands in Chapter Six and Chapter Nine. However, a general picture of my methods and modes of interpretation are outlined in Table 2 and Figure 4. In Table 2, I present my convergent parallel mixed-methods design, outlining my qualitative and quantitative forms of data collection and analysis. In Figure 4, I offer a visual representation of my research design, highlighting the procedures and products of each strand.

Table 2 Research Design Overview

| Research Design Overview | |
|--|---|
| <i>Mixed-methods design type</i> | Convergent Parallel |
| <i>Notation</i> | Quan + Qual = complete understanding |
| <i>Reasons for mixing methods</i> | Need to build a comprehensive picture that uses qualitative methods to identify teacher views on historically-burdened concepts and quantitative methods to assess relationship between a teacher's background and their views. Quantitative measures and qualitative descriptions develop a more holistic picture. |
| <i>Priority of strands</i> | Equal |
| <i>Timing of the strands</i> | Concurrent |
| Qualitative Strand (Chapter 7-8) | |
| N= 10 | |
| <i>Data Collection</i> | Focus groups and entrance and exit questionnaire. Explores teacher philosophies on intelligence, socioeconomic status, and race and the factors that contribute to student performance/success in the classroom. Also examines teacher views on the relevance of genetics in education. |
| <i>Data Analysis</i> | Thematic analysis using NVivo software |
| Quantitative Strand (Chapter 9) | |
| N = 660 | |
| <i>Data Collection</i> | Cross-sectional survey design. Online self-report survey that assesses relationship between a teacher's background characteristics and their views on intelligence, genetics, race, socioeconomic status, and the relevance of genetics in education policy. |
| <i>Data Analysis</i> | Descriptive statistics; group comparisons; correlational analysis; regression analysis. |
| Interpretation (Chapter 10) | |
| <i>Primary points of mixing (point of interface)</i> | Data analysis & interpretation |
| <i>Mixing of the strands</i> | Interpret by discussing comparisons across the two data sets to provide deeper understanding. |

Figure 4 Convergent Parallel Design



Note that merging the qualitative and quantitative strands occurs primarily in Chapter Ten, though I start to bring the two strands into conversation with each other in Chapter Nine. In triangulating these two forms of data collection in Chapter Ten, I work to answer the following additional questions alongside my overarching research question:

- 1. To what extent do the quantitative survey results on teacher philosophies on intelligence, race, socioeconomic status, and genetics converge with the focus group data?**
- 2. What themes of response emerge from comparing the qualitative focus groups with the quantitative survey?**
- 3. How do the chosen theoretical constructs of intersectionality and biopower help us to understand teacher perspectives on intelligence, race, socioeconomic status, and genetics as they relate to each other and to student achievement and education policy?**

The process of interpretation looks for convergence – how the quantitative and qualitative strands relate to and inform each other. Merging my two forms of data collection can be difficult given the unequal sample sizes and non-representativeness of both. By placing quantitative results side by side with qualitative results and relating themes, I attempt to overcome the difficulties of combining data sets that are comprised of different individuals, collected from different sources, made up of different sizes, and non-representative. Both the quantitative and qualitative data sets are limited in different respects due to their non-representativeness and highlight the views and experiences of a particular group of teachers at a particular moment. As such, patterns across the sets that emerge through interpretation only offer insight into potential correlations that should be explored in further research.

Limitations of Research Design

There are many limitations to my dissertation. The convergent parallel mixed-methods design's two-part structure is one of the best-known and commonly used approaches in mixed-methods research (Creswell & Plano Clark, 2011). This design is efficient, direct to implement, and allows readers to clearly delineate between strands. However, it also requires a lot of effort and expertise as equal emphasis is placed on the two strands. Combining two different sets of data that have different sample sizes in a meaningful way is challenging (Morse, 1991). In response to this challenge, I designed my dissertation so that the qualitative and quantitative portions addressed the same concepts. Nevertheless, I am aware that there are consequences to having different samples and different sample sizes that might make interpretation and generalization across sets difficult to do. To assist in the interpretation process, the qualitative and quantitative strands were mixed after initial separate analysis of the two data sets. Combined analysis related the two forms of data collection to each other through discussion.

Additionally, issues of selection and researcher bias are salient concerns. I acknowledge that this kind of research can be exclusionary because it selects a certain set of insights and evidence that the researcher deems most valuable at the exclusion of others (Creswell & Plano Clark, 2011). My qualitative strand contained a purposeful sample of teachers operating in contrasting environments: an urban charter (similar to a UK independent school) and a private (similar to a UK public) gifted-education school. My quantitative strand is comprised of a survey that draws upon an opportunity or convenience sample. Participants in both the qualitative and quantitative forms of data collection were self-selecting; they either responded to a survey sent out to all teachers in their school asking them to indicate their interest in participating in discussions about intelligence, socioeconomic status, race, and genetics (qualitative strand), or responded to a self-report anonymous national survey (quantitative strand).

A voluntary participant-based model creates selection bias because it is likely to include educators who are already more invested in their profession and students; not all targeted individuals will respond. Additionally, as the principle investigator, I was tasked with selecting questions of interest for both the focus groups and surveys, identifying relevant themes and deciding which qualitative and quantitative results to further explore. I recognize that the US education system is vast and I am unlikely to

have captured all interpretations. However, findings offer a glimpse into how teachers may be thinking about complex issues and sheds light on how behavior genetics research on education outcomes and genetics-infused education policies might shape teacher understandings of historically-burdened concepts.

Furthermore, the comparative element in the qualitative portion of my dissertation is key in controlling for background as it delineated between teachers serving different student populations who carry with them different ranges of experiences and frameworks. Within these two differing groups, teachers, though self-selecting, are spread out in terms of the grades and subjects they teach. Nonetheless, I recognize that most behavioral research whether theoretical or applied is based to some extent on non-representative samples; I have strived to minimize potential researcher selection biases (Fern, 2001). I recognize the limits a lack of representativeness means for my dissertation and want to emphasize that emergent patterns highlight correlation and not causation.

Additionally, because of the sensitive topics covered in this work, participants may not have spoken completely naturally and freely, especially in the focus group component. I tried to address this by establishing relationships with all participants and getting them to reflect and think about some of these issues in their own spaces through pre-reading materials sent out prior to the focus group sessions. I attempted to format questions in the qualitative strand in a way that did not appear threatening and which understood that picking up on implicit biases was more likely than overt statements. The quantitative portion complimented the ‘public’ nature of focus group research by allowing views to be expressed confidentially.

With regard to the quantitative strand, I used a larger sample of participants than utilized in the small purposeful sample found in the qualitative strand. Focus group participants did not partake in the national survey to avoid bias, as they were given the opportunity to discuss my topics of interest in depth and ask clarifying questions about behavior genetics and its findings. In analyzing survey results, I remained clear about who respondents were, how they were recruited, and whether any subsets were underrepresented within the sample.

It is my hope that through a clear and systematic explanation of my methods and the forms of data utilized in this study, potential challenges will be better acknowledged and addressed. As the data on racial and socioeconomic disparities suggests, the US education system does not operate as an equalizer of the ‘conditions

of man' and, at times, results in the opposite. Teachers work in a system that, for the most part, does not push back against oppressive sociocultural and economic arrangements or encourage equity. I focused on educators because of their positioning within this complex system and their ability, at both macro and micro levels, to either instill change (through great effort and with great difficulty) or passively continue with a status quo that favors some children more than others. I sought to capture the knowledge landscapes teachers in different educational contexts hold with regards to intelligence, race, socioeconomics, and genetics and the impact current behavior genetics might have on those landscapes. I conducted this work with the intention of shedding light on the implications genetics-informed research may have on education systems.

Chapter VI. Qualitative Methodology

Introduction

The findings portion of my dissertation begins with the qualitative strand. I ran focus groups at two schools in the Chicago area that stand on opposite ends of the socioeconomic ladder. One was a charter school that caters to predominantly African American and low-income students³⁹. The other was a private gifted-education school with a yearly tuition of \$19,000. There was a lot that went into my decision to run focus groups with Chicago teachers over a three-month period. Therefore, I begin this chapter by detailing the challenges I faced in terms of research access that led me to working with teachers in Chicago. I then provide background on private schools and charter schools and offer my justifications for examining these aspects of education. Finally, I introduce the two schools that are the focus of the next two chapters, outlining the methods, procedures, and limitations of the qualitative aspects of my research. Part of my justification for the schools I chose stems from difficulties I faced trying to gain access – challenges I faced in my quantitative strand as well.

Challenges with Research Access

In the American education system, the study of intelligence has historically been used as a classification tool for distinguishing between marginalized racially-defined groups and the dominant White majority. Given this history, it is reasonable to believe that conducting research in the United States on race, genetics, inequity, and education disparities might be difficult to carry out smoothly. My original plan was to conduct research in the New York City Department of Education (NYCDOE). I had chosen this site partly because of its size and diverse demographic composition, but primarily because of its Specialized High School (SHS) system, which solely relies on an entrance exam known as the Specialized High Schools Admissions Test (SHSAT) and which does not use affirmative action (the process of taking into account race to increase ethnic representation) in its selection process (Corcoran & Baker-Smith, 2015). The SHS system is marked by the underrepresentation of Black and Hispanic students,

³⁹ A charter school is a form of public private partnership (PPP). More information on charter schools is provided later in this chapter.

which has sparked legal debate⁴⁰; it was a site of particular interest because of the absence of students of color within an environment that is, in theory, comprised of students with higher intellectual capabilities.

Over the course of six months, I tried gaining access to nine school districts in the United States. Unfortunately for me, several school districts did not allow research on their schools/staff, unless an employee of the school system directed the research project (e.g. Washington, D.C.; Oakland, CA). Other districts required a direct endorsement of the proposed project from someone within a central education department office (e.g. Boston, MA; Fairfax County, VA), and my attempts to reach out to staff in central offices who may have been interested were unsuccessful. There were school districts that never responded to my application to conduct research (e.g. Baltimore Public Schools) or that rejected my proposal altogether – citing the difficulties of administering a project such as this one and the lack of direct benefits to teachers (e.g. Chicago Public Schools). Efforts to reach out to academics in established universities who had conducted education research in American public schools (e.g. Detroit, MI; Redwood City, CA) proved largely ineffective – most were unable to provide me with contacts, pointing to the difficulties they themselves had faced when trying to gain access to the public school system.

Only one public school system accepted my proposal: New York City. However, despite receiving Internal Review Board (IRB) approval⁴¹ from the New York City Department of Education, recruiting schools for the study turned out to be markedly difficult. Initial recruitment was promising — I established a successful partnership with the principal of an SHS. However, her retirement six months after our first conversation proved problematic. The incoming principal was unwilling to continue with the study. Attempts to reach out to other exam-based gifted public schools in New

⁴⁰ The documented underrepresentation of Black and Hispanic students is what compelled a large coalition of New York education and civil rights organizations to seek action against a phenomenon that during the 2012-2013 school year admitted only 19 African American and 32 Latino students out of a class of 967 into Stuyvesant High School, one of the largest and most successful specialized high schools within the city (NAACP LDF, 2012). On November 15th, 2012, the Office for Civil Rights in the US Department of Education launched an official investigation into the NYC Specialized High School complaint and in October of 2014 the New York City Council introduced measures to increase diversity in NYC schools and programs and included “a resolution asking the State to expand access to the City’s Specialized High Schools to all New Yorkers by replacing the law which now mandates a single-test admissions policy” (NAACP LDF, 2014). At the time of writing, the proposed resolution remains just that and the Specialized High Schools continue to use their entrance-exam admissions policy.

⁴¹ A copy of this application is available upon request.

York City (there are eight in total) ended in rejection or silence, and my lack of ‘on the ground’ contacts meant I had no one within the school system to vouch for me. Email circulations of my study to the New York City Teach for America⁴² branch (similar to the UK’s Teach First⁴³) and to alumni of my undergraduate institution (Stanford University) were also futile, forcing me to begin looking elsewhere.

Some of the obstacles I faced when trying to gain access to school districts and to recruit participants were due to the established protocols for conducting research in public schools. However, I also believe that the current global political situation, which is marked by rising austerity and growing populist and xenophobic movements, may have fostered fear over directly engaging with race. The charged topics my dissertation covers pose additional challenges to access and recruitment beyond those limitations that already exist. I believe that the contested and even controversial nature of the topics I cover, and the fear and discomfort that often accompany discussion on these issues, are precisely why conducting research in this area is needed.

The culmination of these challenges led me to look at alternative school options and it is for this reason that my qualitative strand is confined to teachers in private and charter schools; these schools can be reached directly and do not require me to obtain IRB approval from a large overseeing body. In the end, I chose a school district in the Midwest: Chicago. Although Chicago Public Schools (CPS) had rejected my request to conduct focus groups with their teachers, I had a pre-established educator connection and received assistance from university academics who had done work in the geographic area; these resources helped connect me to individuals and aided in participant recruitment for both the qualitative and quantitative components.

Justifications for examining private and charter schools include these aforementioned research limitations. However, my decision to work in these schools was also driven by the fact that American education policy is placing greater emphasis on school choice options like private and charter schools, particularly with the nomination of Betsy DeVos for US Secretary of Education (Kamenetz, 2017). School choice refers to the many options parents can choose for their child’s education. For example, homeschooling, enrolling children in private schools, charter schools, school

⁴² Teach for America “is a national corps of leaders who commit to teaching in low-income schools and work to increase their students’ opportunities in life” (Teach for America, n.d.).

⁴³ Teach First “provides world-class teacher and leadership training for people who are passionate about giving children from the poorest backgrounds a great education” (Teach First UK, n.d.).

voucher programs, and moving to neighborhoods with better public schools are all examples of common school choice options. As former chair of the American Federation for Children (AFC), an advocacy organization for education choice, De Vos has a history of supporting school choice and pushing for charter and private schools. The AFC has devoted much of its time and resources to supporting state-level efforts to provide middle and low-income families with access to publicly funded private-school choice (American Federation for Children, 2017). With a proponent for school choice as the US Secretary of Education, it is likely charter and private schools will continue to become a growing part of the US school sector⁴⁴.

School Choice

Following the 1954 Supreme Court *Brown v. Board of Education* ruling, which mandated an end to racial segregation in public schools, school choice became a tool of resistance for White families, particularly those in the South, who moved their children to private schools that were exempt from public school policies and which required admission fees many Black families could not afford (Ryan, 2004, p. 1637). Although segregation is not dependent upon the existence of choice policies, today inequities stemming from segregationist policies have been normalized in educational spheres and maintained partially through choice policies.

Charter schools

Today, the fastest growing form of school choice in the United States is charter schools. Of the over 98,000 public schools in the United States, a growing number are charter. In the 2013-2014 school year, for example, there were approximately 6,456 charter schools in the US, an increase from the 2,108 in existence during the 2000-2001 school year; this figure is projected to increase in the coming years. (Digest of Education Statistics, 2015).

Charter schools are a movement originating in the notion that the quality of schooling is poor in the poorest areas. School choice supporters argue that if given choice, parents and guardians will choose the best schools for their children and move

⁴⁴ That said, the views I gather from private and charter school teachers are of a select group and not indicative of teachers throughout the American education system.

their children out of schools that offer low-quality education. Using market principles, schools that are ‘bad’ will eventually find their students moving to better performing schools and will be forced to either improve or shut down. Charter schools are publicly funded privately operated schools, free from many of the regulations and restrictions of non-charter public schools. Charter school teachers educate public school children, meaning they work with students who are enrolled in and funded by the public school district. However, the autonomy of charter schools means these schools have considerable freedom when it comes to the critical issues of curriculum, staff, and budget. Since charter schools are not bound by zoning limitations, the students who attend charter schools are placed there by parents or guardians and not assigned by a school district.

Given the use of school choice to push back against *Brown v. Board of Education*, it is perhaps ironic that charter schools have been framed as a solution to education disparities. Despite the argument that charter schools offer a potential solution to education inequities by empowering parents and encouraging choice, the data is mixed. Some research suggests that charter schools may be effective in boosting math achievement in students but have no significant effects on reading achievement (Betts & Tang, 2016). Other studies argue that charter school effectiveness is insignificant or even negative depending on the students enrolled (Angrist, Pathak, & Walters, 2013; Betts & Tang, 2016; Choi, 2017; Hanushek, Kain, Rivkin, & Branch, 2007). In a study on charter schools in 16 states, only 17% of charter schools provided superior quality schooling, in comparison to the more than one-third of charter schools that performed worse than comparable non-charter schools (Center for Research on Education Outcomes, 2009). The same study also found that on average, students in regular public schools had higher achievement levels than their peers in charter schools (Center for Research on Education Outcomes, 2009), though there is data that the direction of this effect varies across the US (Zimmer et al., 2009). Charter schools are often demonized or canonized and data is used to support either side of the argument. It is currently difficult to assess whether charter schools are by and large effective in boosting test scores and providing quality education.

However, there does seem to be a strong case for the argument that charter schools increase racial and socioeconomic segregation (Bifulco & Ladd, 2007; Frankenberg, Siegel-Hawley, & Wang, 2011; Nicholas Jacobs, 2013; Kotok, Frankenberg, Schafft, Mann, & Fuller, 2015). On average, White, Black, and Hispanic

children attend charter schools where they are disproportionately represented (Logan & Burdick-Will, 2016). Black and Hispanic students are more likely to attend high-poverty concentration charter schools with lower test scores than Whites or Asians (Logan & Burdick-Will, 2016). The racial segregation of charter schools has two sides. On the one hand, research suggests that in areas with relative racial integration, charter schools become a “white flight” option, meaning that “as the level of integration increases in a school district, the percent of White students in local charter schools increases as well” (L. A. Renzulli & Evans, 2005, p. 410). Potentially, this means that charter schools are a way for more advantaged or invested parents to ‘leave behind’ disadvantaged students and schools rather than an option all parents regardless of background utilize. On the other hand, there is a high concentration of charter schools in high-minority urban areas (Logan & Burdick-Will, 2016). Given that Black and Hispanic students are disproportionally represented in high-poverty charter schools with lower test scores than charter schools that are disproportionately White and Asian (L. A. Renzulli & Evans, 2005), it is possible that students of color and low-income students are simply ending up in poorer quality charter schools. This continues the cycle of racial disparities in terms of access to quality education. In general, the data suggests that school choice policies like charter schools, which are not explicitly designed to promote racial integration and school diversity, on average produce the contrary and result in greater racial and socioeconomic segregation (Wells & Roda, 2009).

More helpful in understanding how ethnic minority students are affected by school choice is to consider charter schools as a form of neoliberal education. Often contracted out to for-profit education management organizations that receive administrative fees to run schools and education programs, charter schools marketize and commodify education. The US is a capitalist system in which racially-defined minorities and low-income persons are disproportionality placed on the peripheries of economic and education opportunities and social capital. Shifting the paradigm of education away from a public good and towards commodification, as school choice does, has not fostered equity in the US system in the way some charter supporters argued it would.

In light of the current political situation in the United States and the confirmation of Betsy DeVos as Secretary of Education, charter schools are likely to continue to grow in number. This reality serves as just one justification for examining charter school teachers within my dissertation. Even though charter schools are not

standard public schools, I consider them to be a ‘new’ form of public education. I believe that the data collected from the charter school in my dissertation provides insight into a public school environment and could shed light on the state of public education in the United States.

Private schools

In the US private education system, 67% of private schools are elementary-only, 8% are secondary-only, and 25% are combined elementary and secondary schools. The private school included in my qualitative data represents the most common type of private school (elementary only) and is located in the Midwest. The Midwest is second only to the South in terms of the number of private schools (28.3% of all private schools are in the Midwest) and the percentage of privately-enrolled students (25% of all privately-enrolled students are in the Midwest). While most private schools in the US are religiously affiliated (19.9% are considered Catholic and 48.7% are defined as ‘other religious’), I focus on the 31.3% of private schools in the United States that are non-sectarian so as to avoid any influences the confounding factor of religion on curriculum and school culture may have on teacher perspectives on intelligence and understandings of the role of genetics in student ability and achievement⁴⁵. Since I compare teachers in private and charter school environments, ensuring non-secularity in both schools eliminates potential influential variables⁴⁶.

My dissertation focuses on non-secular private schools, which enroll approximately 10% (or 5.2 million) of all US elementary and secondary school students for several reasons. First, private schools in general, are the education environments most likely to begin implementing systems of genetically-sensitive schooling as they are removed from large bureaucratic management and oversight that slow the pace of change. Second, private schools on average have lower teacher to pupil ratios, and older, more experienced, and more qualified teachers (R. Goldring, Gray, & Bitterman, 2013) which would, in theory, make implementing precision education easier. Third, non-secular private schools in particular, spend more money on average per pupil (almost \$15,000) (B. D. Baker, 2009) in comparison to public schools (approximately \$12,000

⁴⁵ Note that the survey did look at the impact of working in a religiously affiliated school on teacher’s conceptions of intelligence, race, and socioeconomic status and did not find that it was correlated with teacher views. Results are outlined in Chapter Nine.

⁴⁶ Data from this paragraph is taken from the National Council for Education Statistics unless stated otherwise (Broughman, Rettig, & Peterson, 2017).

per student) (Digest of Education Statistics, 2014), meaning non-secular private schools would likely have more means and better access to the resources needed to implement a genetically-sensitive education system. Finally, parents who enroll their children in private schools tend to come from higher socioeconomic backgrounds and be more educated (Griffin, 2014). They may choose this school choice option because of the perceived ability to more easily and directly become involved in a child's school experience and communicate with teachers and staff (E. B. Goldring & Phillips, 2008). Parents who enroll their children in private schools not only tend to have more social capital than parents who do not enroll their children in private schools (Burgess, Greaves, Vignoles, & Wilson, 2015; Sikkink & Emerson, 2008), they are also more involved in those schools and their child's education (Feuerstein, 2000; Patricia Baquedano-López, Rebecca Anne Alexander, & Sera J. Hernandez, 2013). In turn, this plays a role in a child's academic achievement (Castro et al., 2015; Topor, Keane, Shelton, & Calkins, 2010). In short, parents with the means, resources, invested involvement, and social capital are the ones most likely to push for education changes that they believe will afford their child every advantage. If genetically-sensitive schooling becomes a system that provides additional benefits to children outside of traditional public education, the parents who are most likely to enroll their children in private schools are the ones most likely to fight to get their child into one of a limited number of genetically-sensitive pilot schools.

Qualitative Focus Groups

My dissertation engages in qualitative research in two PreK-8 schools in the Chicagoland area. The city of Chicago is 31.7% White, 32.9% Black, 28.9% Hispanic, and 5.5% Asian (US Census Bureau, 2017b) and heavily segregated by race (see next page).

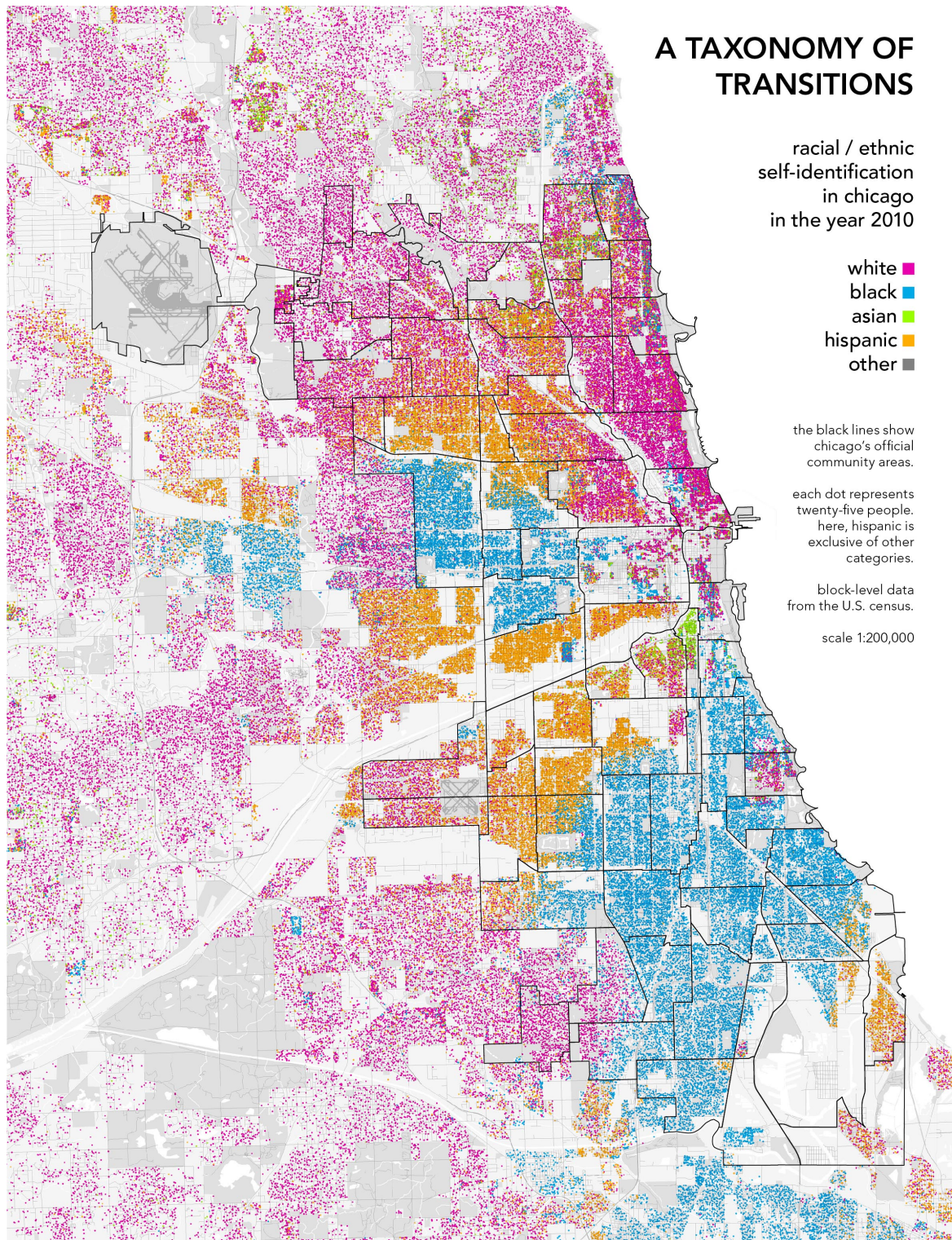


Figure 5 Racial/Ethnic Self-identification in Chicago 2010

(Rankin, 2009)

I met teachers at both schools in the autumn of 2016 and was given the opportunity to tour the facilities with an administrator. I sat in on classes, had the opportunity to ask questions about the schools, and talked with teachers who had registered their interest in participating in my focus groups⁴⁷. I began email correspondence with teachers in December 2016, asking them to fill out a preliminary questionnaire to gather their demographic information. The first focus group for both schools was held in January 2017, the second in February 2017, and the third was held in March 2017 for West Elm and April 2017 for the Jacobson School⁴⁸. I ran the focus groups at the two schools separately, in part due to logistics. While it would have been interesting to have teachers working with different groups of students discuss these sensitive topics together, it is possible that teachers would have felt less comfortable sharing their views in the presence of practitioners they did not know.

At the end of the focus groups, I asked teachers to participate in an exit-questionnaire to capture their reflections on the experience and to anonymously assess their views on the relevance and role of genetics for intelligence, socioeconomic status, race, and the US education system⁴⁹. I bring a discussion of the exit-questionnaire results into Chapter Nine alongside the larger-scale national survey of American teachers.

I acknowledge that the topics covered in my dissertation may attract certain kinds of teachers who are more willing to engage in difficult conversations. I cannot claim that the ten teachers who took part in these focus groups are representative of the US teacher workforce. In general, however, the participants in these two groups reflect national teacher demographics — most are female and White, reflecting the fact that 82.7% of teachers nationwide are White and 76.1% are female (R. Goldring et al., 2013). The teachers in the private school (The Jacobson School) were on average older (42.9% were between 45 and 54 years of age) and had been teaching for longer (57.1% had been teaching for 11-15 years) than the charter school teachers in West Elm (60% were between 25 and 34 years of age and 40% had been teaching 6-10 years). As such, the average years of teaching experience and the average age of the teachers in West Elm

⁴⁷ Note that teachers registered their interest by responding to a survey sent out by the school. Initially five teachers registered interest at West Elm and seven at the Jacobson School. Once focus groups started, however, a teacher from each school declined to participate due to time constraints.

⁴⁸ The final focus group at the Jacobson School was originally scheduled for the end of March 2017 but had to be rescheduled to early April due to a scheduling conflict at the school.

⁴⁹ A copy of the exit-questionnaire is in Appendix A.

and the Jacobson School roughly align with national data. Nationwide, charter school teachers on average have 8.7 years of teaching experience in comparison to 14.2 years for private school teachers (R. Goldring et al., 2013). The average age of charter school teachers nationwide is 37.4 years in comparison to 43.8 years for private school teachers (R. Goldring et al., 2013).

Charter school: West Elm

Within Chicago, West Elm is located in a neighborhood that is 91.2% Black, 5.7% Hispanic, 1.9% White, and 0.2% Asian⁵⁰. West Elm has approximately 513 students. 96.7% of its students are Black, 2.7% Hispanic, 0.2% Asian, and 0% White. 91.1% of students are low-income. This means that the demographics of the student body at West Elm roughly represents the demographics of the neighborhood in which it is located, although the neighborhood itself has a higher concentration of Blacks and a lower concentration of all other racial groups than in Chicago Public Schools and Chicago as a whole.

Four teachers from the PreK-8 charter school took part in my three monthly hour-long focus groups. Of the four participants, all were female. Two identified as White, one as Asian, and one identified as biracial (Hispanic/White)⁵¹.

Private-gifted school: The Jacobson School

The suburb the Jacobson School is located in is 67.5% White, 2.7% Black, 18.0% Hispanic, and 10.3% Asian. District-wide, 45.6% of students enrolled in K-12 public schools in this area are White, 4.4% Black, 32.7% Hispanic, and 14.7% Asian. With regard to private schools in this area, 82.7% of children enrolled in K-12 private schools in this suburb are White, 1.9% Black, 5.6% Hispanic, and 7.2% Asian⁵².

Jacobson itself has around 270 students who are 59.1% White, 0.37% Black, 1.4% Hispanic, and 31.9% Asian. Asian students are overrepresented at Jacobson in

⁵⁰ To preserve the anonymity of the area of Chicago, I have chosen not to provide the exact source for this data other than to mention it was taken from the US Census Bureau.

⁵¹ 76.3% of public school teachers are female, 23.7% male. 81.9% of public school teachers (including charter teachers) are White in comparison to the 6.8% of teachers who are Black, the 7.8% who are Hispanic, and the 1.8% who are Asian. In the charter school subpopulation, 74.9% of teachers are female and 25.1% male. Of charter school teachers, 69.9% are White, 13.1% Hispanic, 11.8% Black, and 2.8% Asian. (R. Goldring, Gray, & Bitterman, 2013)

⁵² To preserve the anonymity of the area of Chicago, I have chosen not to provide the exact source for this data other than to mention it was taken from the US Census Bureau.

comparison to their representation in public or private schools. White students at Jacobson are overrepresented in comparison to their representation in public schools in this suburb, but do not comprise as high a percentage as they do in private schools in general. Both Black and Hispanic students are underrepresented in comparison to their representation in both public and private schools. As a gifted-education-only school, all Jacobson students have been tested, observed, and identified as ‘gifted’ before gaining admittance. Six teachers took part in this study, two were male and four were female. All teachers identified as White except for one who identified as Asian⁵³.

Focus group protocols

I conducted three hour-long focus group discussions, each around a set topic. Focus group sessions were flexible and organic, using open-ended questions to cover three specific areas. Participants were provided reading materials prior to the meetings in order to familiarize themselves with some of the stakeholders, ideas, and research that frame the questions I sought to answer⁵⁴.

Session One

The first session was centered on intelligence and student achievement. I presented a wide-array of definitions of intelligence. In doing so, I demonstrated how a single term takes many different forms – ranging from ‘nurture,’ or environment-based definitions, to ‘nature,’ or biological-based definitions. As an example, I juxtaposed Carol Dweck’s Growth Mindset theory (Dweck, 1986, 2012), which argues that children who are taught intelligence is a flexible trait that can be changed perform better in schools, with GWAS studies that discuss the influence of genes on cognitive ability (Plomin et al, 2013). Presenting the variation in definitions for intelligence was designed to elicit conversations on whether a child’s intellectual capabilities are fixed or flexible and the role that genetics may play in this observed behavior. I ended the first session with an activity that asked teachers to stand in the corner of the classroom that reflected how they felt (agree, disagree, undecided, abstain) about a series of

⁵³ In the private school subpopulation, 74.8% of teachers are female and 25.2% are male. 88.3% of private school teachers are White in comparison to 3.6% Black, 5.2% Hispanic, and 1.8% Asian (R. Goldring et al., 2013).

⁵⁴ Copies of these pre-reading materials can be found in Appendix A.

statements I read aloud that dealt with intelligence, race, socioeconomic status, and genetics⁵⁵.

Session Two

The second session discussed socioeconomic and racial disparities in the US education system that border conceptualizations of intelligence and student achievement. Specifically, I challenged participants to think about the historical associations between race and conceptualizations of intelligence and asked them to reflect upon their working experiences in relation to data on US inequalities in education. I wanted them to identify the intersectional factors they believe contribute to a student's ability and academic success. Teachers spent this session discussing IQ tests, the historical associations made between race and ability, and quantitative data on education disparities and achievement gaps in the US education system.

Session Three

The final focus group discussion built off of the first two sessions and formally introduced behavior genetics. I looked at how teachers interpreted both behavior genetics findings and the theoretical possibility of it being brought into education. I asked for initial perceptions of behavior genetics' relevance for education after showing video clips of two researchers talking about the benefits of genetics-informed research for education. The first video was of Ben Domingue (Stanford University Center for Education Policy Analysis, 2015a), a researcher at the Stanford Graduate School of Education who is interested in the genetics of educational attainment. The second video was of Robert Plomin and was aimed towards teachers; in it, Plomin talks about what behavior genetics can bring to education and educators (TES Resources, 2015). After discussing these videos, the focus group moved on to a more detailed and structured discussion of Asbury and Plomin's policy points for genetically-sensitive schooling. I gathered teacher perspectives on whether the policy points should and could be implemented and asked them to identify the potential benefits and/or concerns of implementing this system⁵⁶.

⁵⁵ Refer to Appendix A, Focus Group Session One for the list of questions.

⁵⁶ Full copies of focus group protocols for these three sessions can be found in Appendix A. I do not go into great detail on the structure of each focus group section outside of providing the topics covered for the sake of brevity—please refer to my protocols for an outline of how each discussion was run and the activities that took place. That said, I note that my focus group protocol questions are not exhaustive.

Thematic Analysis

To make sense of my qualitative data, its ambiguities and interpretative challenges, I employed thematic analysis. Thematic analysis is a research tool for identifying patterns, or ‘themes’ across a data set (V. Braun & Clarke, 2006; Clarke & Braun, 2014). Braun and Clark present six-steps for carrying out qualitative thematic analysis: 1) familiarize yourself with the data; 2) generate initial codes; 3) search for themes among those codes to help with synthesis; 4) review themes; 5) define and name themes; 6) begin write-up (V. Braun & Clarke, 2006).

I approached my qualitative analysis with an understanding that themes “reside in our heads from our thinking about our data and creating links as we understand them” (Anzul, Downing, Ely, & Vinz, 1997, pp. 205–206). I played an active role in identifying themes and choosing which ones to present to my readers. Most of my themes were defined deductively and were driven by my theoretical interests in biopower and intersectionality. All focused on how four key terms were understood by teachers: genetics, intelligence, race, and socioeconomic status. However, the second theme presented in Chapter Seven and third theme in Chapter Eight emerged inductively from the responses of participants. After ‘discovering’ inductive themes, I used theory to help guide my analysis, at times needing to draw upon theorists like Bourdieu who stand outside the confines of intersectionality and biopower.

My themes reside at the ‘latent’ level, meaning I go beyond the semantic content of my focus group transcriptions to “identify or examine the underlying ideas, assumptions, and conceptualizations – and ideologies – that are theorized as shaping or informing the semantic content of the data” (V. Braun & Clarke, 2006, p. 13). This form of thematic analysis requires rich interpretative work and fits into my interpretivist framework.

I want to stress that the themes revealed in the next two chapters are embodied functions of systemic structures and colonial projects whose legacies continue. Referring back to my literature review in Chapter Four, I want to reiterate that teachers are not the source of emergent concerns that arise in my qualitative interpretation. As Bourdieu might argue in a discussion of how beliefs are produced (Bourdieu & Nice, 1980), the teachers whose stories are shared in the next two chapters are actors in a field

There were probe questions, follow-up questions, and unplanned questions all of which could not have been captured beforehand, but which served as valuable sources for enriching responses and data analysis. A sample of a focus group transcript is also included in Appendix A.

that has inherited a racist system that regulates their conduct and practice. Throughout my dissertation, I want to convey a narrative of responsibility that falls upon a system that has shaped the micro-level accounts of teachers in schools. In doing so, I feed back into the three arguments concerning how one seeks to understand the nature of human knowledge⁵⁷ that I presented in Chapter Five and hold within my constructivist epistemology and interpretivist theoretical perspective. I follow Braun and Clarke (2006) in seeking “to theorise the socio-cultural contexts and structural conditions that enable the individual accounts that are provided” within my dissertation (p. 14).

Analytic caveats: The challenges of ‘race-talk’

There are analytic caveats to my qualitative interpretation, one of which is how difficult it is to both talk about race and analyze the emotional conversation that does happen around it. As Christine Sleeter demonstrates in her work, racist ideologies are established and difficult to shift; the intergenerational practice of making the ‘other’ a spectacle has wedded affective understandings of race into individuals’ mindsets (Sleeter, 1992). From race, we make inferences about an individual’s characteristics, moving from skin color and hair texture to intelligence and aptitude, qualities that carry heavy historical and social baggage and remain highly valued in our society. Our past provides evidence of the use of genetic ideologies to establish and legitimize racial boundaries. Even in the post-genomic era, when many thought the completion of the Human Genome Project signaled an end to arguments about genetic differences between racial groups (GenomeTV, 2012), researchers are finding that race is being re-inscribed through the language of biological determinism (Bliss, 2011, 2012; Krinsky et al., 2011).

Although the idea behind my dissertation in part stemmed from a desire to understand how subtle perspectives on race might be affected by emerging genetic discourses, genetic research itself has been impacted by how we think about and approach race. The murky relationship between race and genetics surfaces in the

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1. Individuals create reality in relation to the available tools of interpretation.
2. Human knowledge and understandings of the world are rooted in, and inextricably linked to social constructions (Chowdhury, 2014; Eliaeson, 2002; McIntosh, 1997).
3. Complex social constructions, identity politics, and systems of power interact to inform systems of disadvantage (Crenshaw, 1989).

following chapters. While I seek to draw out themes that emerged through the focus groups with the teachers at the Jacobson School and West Elm, there are inherent challenges to qualitative interpretation that stem from the unpredictability and intricacies of humankind.

A key methodological dilemma posed a caveat to my qualitative data analysis: that of interpreting the degrees of uncertainty and ambivalence and the contradictions many of the teachers expressed. What might be behind the ‘fence-sitting’ practiced by many of the teachers over the course of the next two chapters? It could be anxiety over talking about charged concepts like intelligence or race. Maybe it was a lack of clarity about the purpose of Science and its place in educators’ lives in relation to race, class, and genetics. The difficulties of engaging in ‘race talk’ may have played a role in the accounts and perspectives teachers chose to share or not to share.

Fundamentally, this work highlights the deep complexity surrounding interpretation when conversations touch upon race⁵⁸. “Ambivalence, confusion, misunderstanding, conflict, and intensely powerful feelings” go hand in hand with societal perceptions of race, affecting how race is talked about (Sue, 2016, p. 5). Ebony Thomas (2015) points out the “problematic conversations” and “disconnections” that result from the challenges of “race talk” in schools (p. 154). My difficulties in accessing a research site and finding willing participants, speak to the social anxiety surrounding race itself. School districts employ a defense mechanism structure that inhibits researchers from accessing the public education system.

The dilemmas of conducting research on race means that identifying a single ‘truth’ about how individuals think about race and racism is unlikely – this is not the intention behind my dissertation. In reality, there are likely multiple ‘truths’ that each individual contains within themselves, as evidenced by the inconsistencies in some of the accounts brought forth in my qualitative interpretation. Qualitative interpretation demands an understanding of the sociocultural and political threads weaving through a

⁵⁸ The accounts presented in the next two chapters are not dissimilar to previous qualitative works associated with race in education. For instance, Amanda Lewis explores the “hidden” and not-so-hidden curriculum of race in schools, examining racial discourses, understandings, and behaviors (Lewis, 2001). Louise Archer analyzes the discourses of teachers and students in British Secondary Schools on the “ideal pupils,” finding they often exclude ethnic minority students from the picture (Archer, 2008). Dillabough and Yoon look at the impact of urban social divisions and shifting race relations on the experiences of disadvantaged youth, trying to draw out the perceptions marginalized youth have of social conflict and race in schools (Dillabough & Yoon, 2017). All these works show how race serves as an affective mode of being “that recognize[s] the historically specific assemblages which are practiced in schools and the society” (Zembylas, 2014).

research site. These same expectations extend to race and racism, which are contingent upon an array of factors established by the historicity and futurities⁵⁹ of a place. I have worked to frame my qualitative analysis around the social context, using an understanding of the role of history and present reality to guide my interpretation. With these qualitative limitations in mind, I now turn towards the Jacobson School.

⁵⁹ A reminder from Chapter Four: historicity focuses on historical actuality and authenticity. Futurity, on the other hand, is an expression of what may happen—possible happenings.

Chapter VII. The Jacobson School

Introduction

It is quiet. As I walk from the train station, I pass family homes with well-manicured lawns. I see hardly any cars until I arrive and find a wide main road cutting through the greenery, enclosing the Jacobson School on one side. In comparison to the hustle and bustle of Chicago, it is peaceful.

Although still in Cook County, the Jacobson School is located thirty miles from downtown Chicago. The building is surrounded by suburban homes, a main road, and grassy fields, one of which houses the Jacobson's sports fields and community garden. The Jacobson School shares a parking lot with a spa and studio salon and its teachers work primarily with privilege and affluence: families are willing to spend over \$19,000 a year on tuition.

In early-October 2016, I arrived at the Jacobson School in unseasonably warm weather. I was greeted by an African American administrator, named Cecile⁶⁰, who was surprised to meet a young Black woman with the name Daphne Martschenko. She told me she had facilitated 'The Name Game' with her teachers just a couple weeks earlier. Asking each participant to share the story of where their name came from and what it meant was designed to build intercultural respect and understanding; it was an ice-breaker for one of their diversity-training professional development sessions. In turn, she asked me about my own name and how I had come to receive it.

Walking through the hallways with Cecile, I peered into colorful classrooms and saw a wall display on the growth mindset. She told me about the class trips to Costa Rica and the outdoor education trips to Wisconsin as she introduced me to teachers and their classes. Designated students who had been assigned to welcome guests and update them on the class's current work told me about their preparations for a debate on the US constitution and a project to build a weight-bearing structure. Finally, Cecile ushered me into her office where a young White boy who had been caught arguing with another student sat meekly waiting: "You're gifted. You're not supposed to act like that," she told him. He apologized, adding that he'd just vomited because of feelings of stress.

⁶⁰ Names of all administrators and teachers have been changed. Where noted, the names of interviewed behavior genetics researchers have also been changed.



Figure 6 Student artwork in one of the hallways

...

The Jacobson School is gifted-education only. All of its students have been administered the Wechsler Preschool and Primary Scale of Intelligence (WPPSI) or Wechsler Intelligence Scale for Children (WISC) depending on their age. A registered psychologist that the school brings in on Wednesdays comes to administer the tests, though parents are allowed to examine their children privately. The school requires a minimum IQ of 125 for consideration. The application process involves a questionnaire asking parents to describe their child's interests and talents and includes teacher observation.

As Cecile explained to me, parents commute from neighboring suburbs and from the north of Chicago to bring their children to the school. As a private gifted-education school, teachers at Jacobson work primarily with families from higher socioeconomic backgrounds. More advantaged families have stronger preferences for sending their children to schools with higher levels of academic performance (Burgess et al., 2015), helping to explain why a private gifted-education school may be appealing to families with higher levels of socioeconomic status. Private schools like Jacobson are likely to be some of the first to implement a 'precision education' model. Regardless of whether or not genetics are involved, resource limitations suggest that the notion of precision education is unlikely to happen in the public education system. Private schools typically have greater resources and less bureaucracy than public schools and have parent bodies with higher levels of involvement and financial capital. Higher

capital parents are more likely to learn about developments in behavior genetics and use these findings (should they prove to have clinical utility) to help their children; this includes the possibility of approaching school administrations to inquire about education interventions based on their child's genotype. As a possible site for genetically-sensitive schooling, I believe that understanding how teachers think about intelligence, genetics, socioeconomic status, and race could shed light on how genetics-informed education policies might reinforce or go against teacher attitudes and approaches to the education of their students.

In this chapter, I document three ways in which teachers talked about intelligence and student achievement at the Jacobson School: 1) through the lens of determinism; 2) in relation to culture and class in a way that enacted a hidden dialogue on race; and 3) with an awareness of geographic, racial, and sociocultural borders. As counterevidence, I also document aspects of teachers' experiences and statements that challenge these themes. The purpose of this chapter and the next is to use qualitative thematic analysis to outline patterns by referring back to the central research question: **How do teachers conceptualize intelligence, socioeconomic status, and race in relation to genetics?**

Themes

Despite the interpretive difficulties outlined in Chapter Six, substantive patterns across all three focus groups emerged dealing with how Jacobson teachers conceptualized intelligence, race, socioeconomic status, and genetics. The first theme, **Projecting Determinism: Intelligence as Biopower**, came from applying a biopower theoretical perspective to the focus group discussions; this is a theoretical or 'deductive' theme (V. Braun & Clarke, 2006). Chapter Two and Chapter Four examined the interlocking history of intelligence and race which has impacted teacher beliefs and educational reform and policies; this history and its relationship to molecularization inform the appearance of this theme.

Unlike the first theme, the second theme **The Politics of Culture and Undermining of Race in Discussions of Student Achievement** originated from patterns emerging from the focus groups that were initially unconnected to theory; this is an 'inductive' theme (V. Braun & Clarke, 2006). I noticed that teachers seemed to be thinking about and talking about (or in this case, not talking about) race in a particular way. It was only after identifying this phenomenon that I was able to unpack it using my theoretical framework. The emergence of this theme is supported by prior qualitative research that has also found discourses of denial and hidden dialogues on race among teachers (Marx, 2004; Solomona et al., 2005).

Finally, discriminate biopower (Fullwiley, 2004) provided strong guidance for the final theme: **Embodying Borders: Geographies of Race and Power**. This theme is supported by existing literature on the geographic concentration of race and wealth in the United States (Bischoff & Reardon, 2013; Massey, 2016). It is also a ‘deductive’ theme (V. Braun & Clarke, 2006)

While the first and third themes also emerged in the accounts of teachers at West Elm (Chapter Eight), the second theme in this chapter is specific to the Jacobson School. I want to note that the strength of a theme is not determined by the frequency with which it emerges (V. Braun & Clarke, 2006).

Participants

In total, six participants – four females and two males (Petra, Bridget, Richard, Jacqueline, Erin, and Henry⁶¹) – participated in three focus groups held between January and April 2017⁶². Teachers who registered their interest via an online questionnaire sent out by Cecile were invited to a lunch when I visited in October. We sat down to talk in more detail about what participation entailed and to confirm whether those who had expressed interest could commit the time. Of the seven teachers who attended the meeting, six were able to partake in these focus group discussions. All those who partook identified as White except for one who identified as Asian.

Teachers at the Jacobson School seemed more empowered in their curriculum, classroom activities, and ability to introduce change to the school community than the teachers I met at West Elm. This was reflected in the time they could commit to having these monthly conversations, which often ran ten to fifteen minutes longer than at West Elm. The Jacobson teachers I worked with were passionate about encouraging creativity among their students and teaching resilience. They believed in challenging their students to become the best versions of themselves academically, but more importantly, socioemotionally. Jacobson teachers also appeared to have closer ties to their school’s family community and knew the student body intimately – a likely combination of the smaller school size and an actively engaged parent body. In our focus group conversations, it became apparent that teachers knew students and families, even if they did not teach them or interact with them on a daily basis. These are

⁶¹ Note these are pseudonyms.

⁶² Note that Henry was unable to attend the final focus group due to a pre-scheduled outdoor education trip with the third-grade. Also, the final focus group had to be rescheduled to April instead of March due to an all-staff professional development session that had been double-booked.

privileges – ones which the Jacobson teachers I had the privilege of speaking with realize their workplace affords them. Their experiences are in many ways different from those of public school teachers:

Erin: The public-school system has all kinds of paperwork and documentation. Public school teachers will tell you they're drowning in the paper work and they can't actually plan anything to address the children because of the paperwork. (April 2017)

Teachers at both the Jacobson School and West Elm were astute about the social realities of their students' lives and neighborhoods while also holding their own set of realities on these topics. At times, these realities stood in contrast to each other and led to contradictions; I note these within my analyses. On the whole, the qualitative components of my research helped me to understand the working experiences of teachers in very different school environments and answer: **How are intelligence, race, socioeconomic status, and genetics understood and articulated by teachers working in different classroom contexts?**

Projecting Determinism: Intelligence as Biopower

From the end of the 19th century through to the present, biological discourses on intelligence have found a place in research and society. This legacy has shaped people's perspectives about the links between genetic influences and particular human behaviors and prompted my decision to pursue a dissertation examining teacher perspectives on intelligence, socioeconomic status, and race in the postgenomic era.

Today, behavior genetics research seeks to acquire "a deeper understanding of the structures, systems, and subsystems underlying human intelligence and cognition" (Lubinski, 2016, p. 35). The search for the genetic architecture of intelligence is further shaped by the fact that humans remain conflicted over political matters related to race and other social markers of difference. This context contributed to how intelligence was discussed by teachers at the Jacobson School over the course of three focus groups.

In my qualitative analyses, I found that teachers spoke of intelligence through the language of determinism, drawing upon a molecularized vocabulary. Their gravitation towards biological language is supported by both a historical narrative and current techno-scientific advancements. The conversation on the genetics of human behavior is growing, with some

researchers arguing that it is time to acknowledge the role genes play in a host of education-related outcomes (e.g. Asbury & Plomin, 2013; Kovas, Tikhomirova, Selita, Tosto, & Malykh, 2016). As one sociogenomics researcher I spoke with put it: “there’s an elephant in the room and that’s genetic inheritance. We know that obviously that’s part of what’s at play [for social outcomes]” (Clive, November 2015). To help make sense of how research into the genetics of cognitive ability has gained traction, Ken Richardson, a biochemist who became a critic of behavior genetics research on IQ explained to me:

Ken Richardson: Behavioral geneticists of IQ are incredibly energetic in putting their cases across, [but] ...it’s about the ideology. If [what behavior genetics researchers say about intelligence] matches common experience – and we do live in class-structured societies where there’s gender bias and ethnic bias –...people find them [research findings] more acceptable or are likely to find them more acceptable. (November 2016)

Jacobson teacher accounts were produced by and fit within a larger narrative connecting biology to education. A narrative in which there is the potential to develop “a very nuanced cognitive profile for somebody based on the genes” that might allow schools to say: “this kid really could do with more interaction in their learning process, or no this is a kid who just needs to be left alone in a library to read” (Kevin⁶³, October 2016). When teachers employed the language of genetics to describe student ability and achievement, they were informed by their own realities. In other words, by working in a ‘gifted’ school founded on the belief that some students have higher capabilities than others, Jacobson teachers understandably saw some students as more ‘gifted’ than others.

I draw upon the concept of biopower to contextualize how views of intelligence might converge with understandings of life and the identities of individuals who are seen to either possess this “vital life characteristic” (Rabinow & Rose, 2003) or lack it. In calling intelligence a ‘vital life characteristic,’ I refer to the social value placed on intelligence, which has positioned IQ as necessary for success in life. This reflects arguments coming from the field of behavior genetics itself, which says intelligence “predicts important educational, occupational and health outcomes better than any other trait” (Plomin & Stumm, 2018, p. 1).

In this theme, I consider how intelligence, as a vital life characteristic, transforms the body into a commodity whose “marketization...remakes social relations and cultural

⁶³ Name changed.

meanings” (Scheper-Hughes & Wacquant, 2002). I note that the “long-term imbrication of race and biology, painful memories, systemic marginalization, historical practices of genocide and extinction...change ‘the future’ imagined or mapped” (Gulson & Baker, 2018, p. 166). The historical (mis)use of Science to further agendas about race are in part why discussions often emerged in these focus groups that cast intelligence as a form of biopower. As I seek to demonstrate, the theme of ‘determinism’ emerged when talking with teachers through a number of different avenues, but most prominently: 1) through ‘molecularization’; and 2) as a way to benefit the biopolitical state. To be more specific, teachers implicitly and explicitly used biological language to describe the origins of intelligence, or ‘ability’ through words like ‘horsepower’ and ‘inherited different capacities.’ Additionally, whilst they drew upon Howard Gardner’s notion of ‘multiple intelligences’ in an attempt to expand the definition of intelligence, they identified academic ability as the most coveted form of intelligence in American society. In doing so, Jacobson teachers hierarchically ordered the multiple intelligences they spoke of. Using biopower, I argue that the concept of multiple intelligences works in the interests of the biopolitical state by allowing the tacit ordering of individual bodies in terms of their value to society. This is further compounded when looking at the historical processes that have linked academic ability to race.

In the following pages, I provide evidence to support my argument that teachers at the Jacobson School held views about intelligence that symbolize a historically-informed genetics narrative where Science was either misused or misapprehended⁶⁴, particularly in relation to linking race and intelligence. I do this while also acknowledging that teachers do not see intelligence as a static or singular concept. For example, one can have an “innate drive for music,” as Petra pointed out, or can have “gifts in some areas but not as much in others” as Richard explained.

To promote clarity, I have divided this section into two sub-sections to highlight prevailing sub-themes that fall under the umbrella of determinism. The first deals with teacher narratives that employ genetic discourses and forms of molecularization (*The Vital Life Characteristic of Intelligence: “Some People Are Ahead in the Game”*). The second covers accounts of the many forms intelligence might take and how discussion of multiple

⁶⁴ As a caveat to this theme, I refer back to Chapter Three, in which I discussed the role of the environment on the heritability of a trait or outcome. Remember that behavioral genetics has found that in environments with higher levels of social inequality, genetic influences play a lesser role (Selita & Kovas, 2019). Therefore, the historically-informed genetics narrative discussed in this theme proves problematic precisely because of the context in which it emerges: a country in which racial and socioeconomic disparities persist.

intelligences benefits the biopolitical state (*'Diversifying' Intelligence Benefits the Biopolitical State*).

Intelligence as a 'Vital Life Characteristic': "Some people are ahead in the game"

In the first focus group, I asked teachers to share their perspectives on intelligence. My central aim was to explore the different factors teachers identified as impacting upon a student's ability and achievement in the classroom and to ascertain how these factors exposed or revealed matters of race. I had teachers reflect on pre-reading materials⁶⁵ that presented an array of definitions of intelligence. They were asked the extent to which they agreed or disagreed with statements like: "a student's genetics plays an important role in their success in the classroom"⁶⁶. I found that throughout this conversation, teachers gravitated towards deterministic understandings of intelligence, although not without ambivalence and contradiction.

For example, when Richard asked: "are some babies born more intelligent in terms of that sort of horsepower?" and replied with: "I think so," he tacitly referenced biological discourses on IQ, picking up on a dominant form of power. His use of the word "horsepower" signifies a raw capacity that one is either born with or without, pointing to a belief in an underlying molecular foundation for intelligence. "Horsepower," was depicted as desirable, becoming a form of human vitality rooted in the body itself (Rabinow & Rose, 2006). Biopower incorporates vital characteristics of human existence that include the life, health, and wealth of both the individual and the population (Rabinow & Rose, 2006). I argue that the use of deterministic language among teachers to describe intelligence evidences its position as a vital characteristic. As I will show later, this determinism then maps onto race and class due to the historical interconnections between the complex social understandings of race, socioeconomic status, and intelligence.

Richard believes "you got to have the horsepower" and that "some people have those great genes" (January 2017). However, he also recognizes that the environment can play a role in a student's achievement when he differentiates between intelligence and student achievement. He questions what causes children with the "exact same IQ" to perform differently in the classroom, and attributes those differences to "socioemotional" factors and the "environment":

⁶⁵ Pre-reading materials for all three focus groups are in Appendix A.

⁶⁶ For a full list of the statements teachers were asked please refer to Appendix A, Focus Group Session One.

Richard: You hear IQ is the determiner of the possible — success or advancements — I still don't know if I believe, can your IQ change, is it going to be the same in kindergarten as it's going to be in 10th grade? Well some people say yes, and some people say no. Well, can you practice those kinds of things? ...Look, are some babies born more intelligent in terms of that sort of horsepower? I think so. But, I [also] think elements of environment is not a sole indicator, but I think it's a help. You look at kids in our population. We can have ten kids who have the exact same IQ, some kids are just rocking it out of the world while some people are struggling big time. And that's the socioemotional with it too. So, what is it that has this one student that when you assign something it's always top-notch, over the top, all those kinds of things, great stuff, whereas someone who's got the same IQ is producing this level or not producing at all...So there's got to be some environment in that, right...But there's also — you got to have the horsepower too. So, I do think that genes have a part and I do think environment has a part to do with it and it's sort of setting the standard, you know. I think some people are ahead in the game, some people have those great great genes.

(January 2017)

The distinction Richard makes between intelligence and student achievement in the above is shaped by the landscapes of the Jacobson School itself, in which all children have been IQ tested and presumably have similar scores. For a teacher like Richard, the differences he sees between students in his classrooms may not be a matter of intelligence or 'horsepower' (e.g., "we can have ten kids who have the exact same IQ"). Rather, differences in performance may result from differences in the environment and the role of parents in encouraging and developing non-cognitive skills like "quality, effort, [and] determination."

At first glance, I felt Richard's acknowledgement that "there's got to be some environment in it" was like a challenge to determinism. However, I came to realize that his consideration of the role of the environment was made only in relation to student performance and not to intelligence itself. The molecularization of IQ remained. By arguing that "some people are ahead in the game" and "some people have those great great genes", it is possible to see biopower in action as individuals are subjectified in both a figurative and physical sense. The idea, that one is born "more intelligent in terms of that sort of horsepower" and is then able to reach their potential based upon the environment, situates intelligence as a fixed platform that is inherited. In this particular instance, when Richard said, "some people are ahead in the game," he highlighted the power of the language of genetics to shape his view of ability; he

has assumed that we can witness such forms of “horsepower” from birth. When Richard talked about “the game,” I interpreted this as a metaphor for life; life gives a competitive edge to those who are “more intelligent in terms of that sort of horsepower.”

Richard was not alone in his molecularization of intelligence. As teachers reflected on the pre-reading materials, they seemed to align most frequently with definitions in which genetics was involved. Take for instance, a conversation in the first focus group in which Erin agreed with physicist and eugenicist William Shockley’s view of intelligence. Note that like Richard, she also qualified her position by distinguishing between intelligence, success, and achievement:

Erin: I would agree with what Shockley said, “intelligence is largely determined by the genes.” I don’t know how largely he means by that...So those little, those little infants that are empty slates, empty vessels, they have inherited different capacities, let’s just say, or different, or I don’t know tendencies or something, and I do think there is that inherited quality to intelligence there. Whether it’s a, well it goes back to Shockley, whether that’s a bigger determiner of what their ultimate intelligence will be – because you don’t even want to say success or achievement or what they produce [is largely determined by the genes] because what about unrealized potential? What about thwarted intelligence? (January 2017)

As Erin spoke of “different inherited capacities” and “different tendencies,” she tacitly pointed to social markers of difference that humans are often wary of talking about, particularly with regard to race. When she said, “I would agree with what Shockley said: “intelligence is largely determined by the genes,” she enacted biopower; molecularizing a socially-influential concept. Erin’s view that “there is that inherited quality to intelligence” is a projection of determinism because she has associated the concept of inheritance with notions of fixedness and permanence. Although she did not see intelligence as completely synonymous with success, Erin molecularized intelligence and attributed environmental factors to the manifestation of “success or achievement or what they [students] produce.”

When reading over an interview I conducted with a behavior genetics researcher, I found myself drawing parallels between Erin and Richard’s views, which discuss the varying factors affecting student achievement, and Kevin’s⁶⁷:

⁶⁷ Name has been changed.

Kevin: We all know people who are really smart but they're super lazy and we know people who maybe aren't that bright but they're very organized and they do well in school. So, you can see that the grade-point average or how far you get in school, it depends on multiple factors, not just your raw intelligence. So...generally you're measuring some combination of things – your raw cognitive ability but also like your conscientiousness or your organizational skills. But it may turn out that for predicting success in life all of those factors [not just “raw cognitive ability”] are important too.

(October 2016)

I saw similarities between how teachers like Erin or Richard thought about intelligence and student achievement and how Kevin did. For Erin and Richard, intelligence was considered to be biologically influenced (through words like “horsepower”; “inherited quality”; “raw”). Student achievement, on the other hand, was thought to be affected by other factors like “quality, effort, determination,” as Richard discussed or “conscientiousness” or “organizational skills,” as Kevin mentioned.

Similar to Erin and Richard, Bridget also touched upon the idea that not everyone is “born with the same intelligence”:

Bridget: ...so did everyone in that time [Galton's time] believe that you were born with the same intelligence? That everybody was born the same? And I just find that fascinating because you would think their own observations and experience would've told them something different. (January 2017)

Bridget reiterated this viewpoint in more nuanced ways when later in the first focus group she reflected:

Bridget: ...Those kids that we have that are extremely intelligent, and then you meet the father and you're going: 'oh yeah, I see exactly where he gets this from.' That it's a kind of a quirky guy but you can tell he's very into – whatever, physics or something – and I swear those kids get that right from their parents. It's not just a nurture thing. (January 2017)

In the above, Bridget quietly employs genetic discourses around intelligence through a discussion of familial inheritance and academic preferences. She does not believe “everybody was born the same.” Furthermore, the similar academic interests she sees her students and their parents holding tell her that genetics plays a role in a child’s intelligence. In another instance later in the first focus group, Jacqueline was asked the extent to which she agreed or disagreed with the statement “all children are blank slates, born into the world with equal abilities that are then affected by the environment.” In explaining her reasons for disagreeing she said: “they’re [children are] not born equal and there are some that have possibly higher IQs or are exposed to different environments that cause them to be smarter.” Not unlike Richard whose statement “there’s got to be environment in it” initially seemed to be a challenge to determinism, Jacqueline also mentioned the impact exposure to different environments could have on a child. At the same time, however, she began with the idea that children are “not born equal” and “there are some that have possibly higher IQs.” In doing so, she connected the possession of higher IQs to birth, once again depicting intelligence as a ‘vital life characteristic’.

These extracts from the focus groups uphold work done by Walker and Plomin (2005), which found that “teachers view nature to be at least as important as nurture” (p.515). They illustrate the understandings teachers hold about the role of biology in student ability prior to a formal introduction to contemporary research in behavior genetics. These views are markers of a persistent historical narrative about the origins of intelligence which today are upheld by behavior genetics. What current behavior genetics does not address, but which remains tied to these enduring historical traces, is the role of race and how intelligence has been racialized (as discussed in Chapter Four). The racialization of intelligence is indicative of its biopower, which extends beyond the depths of consciousness and into the body.

Biopower’s all-encompassing nature contributes to the subtle relation between “letting die” and “making live,” or “strategies for the governing of life” (Rabinow & Rose, 2006, p.195). ‘Letting die’ and ‘making live’ do not necessarily involve life and death itself. Rather, the biopolitical state tacitly casts some bodies as risky and threatening and others as valued through forms of subjectivation administered by society and the self: ‘bright’ children are valued while children who struggle academically are made out to be problems. These maxims help us to understand the symbolic weightiness of views like Shockley’s and Erin’s, particularly when it comes to race in the United States. Imagined links between biology and intelligence are historically grounded in both eugenics and a colonial discourse of legitimacy and further linked to ideologies of race that are hidden. As I mentioned in Chapter Four,

teachers are more likely to view children of color negatively and less likely to view these same group of students as highly capable – these beliefs are strongly shaped by the social structure and the racialized discourses that construct it.

‘Diversifying’ intelligence benefits the biopolitical state

What is intelligence, according to the teachers of the Jacobson School? As I’ve worked to establish, the deployment of genetic discourses to define IQ seemed to take root in the habitus of Jacobson teachers – a byproduct of the inherited cultural matrices embodied by these educators. However, teachers also raised the idea of multiple intelligences, drawing upon the work of Howard Gardner, the education researcher who developed the Theory of Multiple Intelligences (MI) (Gardner, 2011). I argue that by using the ideas of MI, teachers are ‘diversifying’ their understandings of what intelligence is. Although teachers saw intelligence as taking many different forms, it was my sense that they considered academic intelligence to be the most highly regarded form of ability within society. I believe the prioritization of academic intelligence within society represents an underlying social force – as language – that maintains the reproduction of inequality. Through the accounts presented in this sub-theme, a narrative unfolds as to how the diversification of intelligence serves the interests of the biopolitical state and solidifies intelligence as a form of biopower.

The American education system, and gifted education in particular, are sites in which expertise and evidence are valued. Biopower argues that expertise only guides the actions of individuals instead of making demands. In this regime of biopower: “power no longer operates through a violence imposed upon subjects from above, but through a normalizing regulation” (Nilsson & Wallenstein, 2013, p. 85). The concept of normalization is central to recognizing the impact of deterministic views on the lived experiences of students – the legitimacy of intelligence as a language of description hides other forms of inequality. In making this argument, I refer back to Young (2016), who found that the medicalization of disability distracted teachers from its racialization.

As an example of how intelligence was ‘diversified’, teachers brought up music as an example of an ability that is genetically influenced in the first focus group. Erin asked the group: “is there really a sort of innate drive or compulsion to fulfill this inner intelligence that they [individuals] have about music?” Petra, who was in the process of learning to play a musical instrument, was finding the experience difficult. The challenges of learning to play a musical instrument led Petra to respond to Erin’s question with: “I think that there is an innate

drive for music.” She took this deterministic language a step farther by bringing genetics directly into the conversation:

Petra: I don't have the – if it was this 'g', you know Spearman's 'g'– I don't have the gene...I think some people do and I think they would find it no matter how, if they had to make instruments out of whatever was there... I can go with Dweck for a certain amount of time, but I think sometimes people are inherently good at things and some people will never achieve and I don't think I'm ever going to be even good at what you two [Erin and Richard] call a good musician. (January 2017)

This discussion evokes similar conclusions to those of Evans, Bickel, and Pendarvis (2000), which found that teachers attributed musical talent to innate ability and hard work. Although the conversation started with a discussion of musical talent, Petra moved beyond it. When she argued, “I think sometimes people are inherently good at things and some people will never achieve,” she normalized the molecularization of ability. She connected determinism to being “good at things,” a broad encompassing expression. The molecularization of “being good” or “gifted” is synonymous with “intelligence;” it is what Foucault might call a “movement of biopower” (Fullwiley, 2004, p. 159). “Movements of biopower” examine how policies have focused nations’ attentions towards “making the bodies that constituted its citizenry live in health” (Fullwiley, 2004, p. 159). Possessing talent, which can be understood through multiple avenues (i.e. music, academic performance, athletic prowess), is indicative of a body living ‘in health.’ While diversifying intelligence appears to expand the spaces intelligence occupies and seems to argue that each individual can meaningfully contribute in their unique and novel way, different talents are differentially weighted as is evident in the creation of Gifted and Talented programs for ‘academically intelligent’ children.

Petra’s excerpt was taken from a larger conversation she had with Erin and Richard. Within this conversation, Richard spoke of how an individual “could still be a very good musician” but “would never necessarily be one of the greats” unless they had the “gene” for music. Having “that ‘g’ gene,” Richard thought, might help musical talent “come easier” and allow individuals to “be at that sort of higher level”:

Erin: –You know you look at Gardner's multiple intelligences – musical, that one has always stuck with me as being kind of different from all the rest. Is the person who's

musical in pioneer America the one who happened to have a grandpa who made him a banjo or something – I’m making this up – or is there really a sort of innate drive or compulsion to fulfill this inner intelligence that they have about music?

Petra: I think there is an innate drive for music because I’ve been trying to learn how to play music and I don’t have the, if it was this ‘g’, you know Spearman’s ‘g,’ I don’t have the gene or I don’t have the, you know, and I think some people do and I think they would find it no matter how, if they had to make instruments out of whatever was there.

Richard: Yeah but is that though that some people have that ‘g’ gene, that music is going to come easier to them and they’re going to be at that sort of higher level? You could still be a very good musician, it’s just you would never necessarily be one of the greats.

(January 2017)

Petra, in response to Richard, referenced Carol Dweck’s research on the growth mindset, explaining that it was carried out on those with “severely low IQs” who with the growth mindset developed “higher IQs, but didn’t become geniuses”:

Petra: Well I disagree because you know I can go with Dweck for a certain amount of time, but I think sometimes people are inherently good at things and some people will never achieve and I don’t think I’m ever going to be even good at what you two call a ‘good musician’... I’ve very good at things, I know what it means to be good at something and to understand something, it’s not me with music. So, I can go with her – you know the people that she also studied, they had severely low IQs and she brought them higher IQs but they didn’t become geniuses – they didn’t – you know what I mean?

(January 2017)

In reflecting on this conversation, I believe the idea of multiple intelligences helps mask the ‘hierarchy’ of intelligence that exists within American society. The idea of multiple intelligences gives the impression of being broad and encompassing yet exists within a context that marks success via high GPAs, SAT scores, and admission to elite institutions. From a biopower perspective, bodies deemed valuable to the biopolitical state are invested in and

supervised through a series of interventions and regulatory controls at higher rates – this is discriminate biopower. In the US education system, this is reflected in the reality that some students will receive better educational opportunities, resources, and services than others, an example of which is the creation of gifted education programs to nurture and maximize the potential of highly cognitively able students like those educated at the Jacobson School.

Through biopower, academic ability is presented as “desirable, legitimate, or efficacious” (Rabinow & Rose, 2006, p. 197), more so than the other forms of intelligence Jacobson teachers identified. Spaces of privilege and power are created via gifted education, which reduces the mobility of groups of students who are seen as ordinary instead of extraordinary – or, more significantly, who are seen as in need of special assistance and placed in remedial education programs. Ideas about who is worthy and who is unworthy are systemic, structural, and normalized within US society. As journalist Ezra Klein wrote in response to a podcast featuring Charles Murray, author of “The Bell Curve: Intelligence and Class Structure in American Life”:

Black children grow up in a country that, over and over again, signals that it expects less of them, believes less in them, and fears more from them. This is, in part, the result of deep-seated racism in American life — a racism that often manifests less through hatred than through underestimation and dismissal; a racism that draws on centuries of belief in black inferiority. (E. Klein, 2018)

I argue that the US education system structurally expects less from its students of color yet talks about ‘multiple intelligences’ as if each student brings an equal albeit different value to society. Gifted and Talented programs in the United States cater to children the biopolitical state sees as exceptional and who are predominantly upper-income, White, and Asian. African American, Hispanic, and indigenous communities of children, on the other hand, have historically been seen as less than, an inferiority paradigm which manifests in their relegation to spaces for discipline.

In short, the marked underrepresentation of racially-defined minority and low-income children in gifted education programming (National Association for Gifted Children & The Council of State Directors of Programs for the Gifted, 2015) speaks to a longstanding historical narrative that equates race with ability. In this way, intelligence seen as biopower can also be manifested within wider conceptualizations of race. The second focus group, for example, focused on how intelligence has been discussed historically in relation to race. As we sat around

a table eating granola bars on a grey day in February, I asked teachers to comment on the drivers of data showing marked racial and socioeconomic disparities in the US education system. During this meeting, Jacqueline reflected on a section of the pre-reading material that was an excerpt from Loring Brace's "An Anthropological Perspective on "Race" and Intelligence: The Non-Clinical Nature of Human Cognitive Capabilities":

...There is no valid reason to expect that there should be average differences in intellectual ability among living human populations... Where such tests show different "racial" averages in test scores, this should be taken as an index of the continuing effects of "race" prejudice and not of inherent differences in capability. (Brace, 1999, p. 245)

Jacqueline said she felt the above quote was the "most positive and differing opinion of the others [in the pre-reading]," calling it "very optimistic." She went on to paraphrase a portion of the quote and reflect on it: "there's no reason to expect that there are any differences in their intellectual abilities based off of race' ...I wonder if that's, a little too optimistic to think that way. I think ideally you would hope that would be the case, but I don't think it is" (February 2017).

In calling Brace's argument "optimistic," I believe Jacqueline is saying she does not think it is the case that differences between racial groups are purely a matter of prejudice or bias. Her statement reflects a historical legacy that has used genetic ideologies to affect understandings of race and class and which has sought to normalize the social order through cultural reproduction. This too is biopower in play – the legitimation of a system that constrains certain students by removing the focus on, and by extension the blame, from society – and placing it instead on the body. I argue that in shifting blame away from society and onto the biological, the biopolitical state practices a form of preservation. Diversifying intelligence veils these tactics and better permits the continued reproduction of inequality.

Applying biopower to the accounts shared under this theme, genomic and molecular discourses on intelligence become biopolitical – a "truth discourse...about the 'vital' character of living human beings" (Rabinow & Rose, 2003, p. 3). Behavior genetics researchers become "authorities considered competent to speak that truth" (Rabinow & Rose, 2003, p. 3). Rabinow and Rose are clear in pointing out that these truth discourses do not have to be purely biological in nature and can "hybridize biological and demographic or even sociological styles of thought" (Rabinow & Rose, 2003, p. 4), supporting teacher views that incorporate the theory of multiple

intelligences or acknowledge the environment. In the first and second focus groups, teachers were not explicitly introduced to behavior genetics or the arguments genetics researchers are making about the utility of their findings for education. Despite this, they tended to refer to definitions of intelligence that incorporated genetics and biology. The molecularization of intelligence creates a point of study within the body itself. When teachers were eventually presented with the core arguments of contemporary behavior genetics research in the third focus group, many reactions were positive, possibly because they were reinforcing pre-established beliefs about student ability. Take, for instance, a moment in the third focus group when Richard and Jacqueline diversified intelligence and used it to talk about some of the benefits of implementing Asbury and Plomin's proposals for 'precision education.' Richard spoke of students who "hated school" but "became these great actors." He thought they might have benefited from a system capable of predicting that they would be "predisposed to be in the arts." Jacqueline built upon Richard's points by talking about how individualized education plans "based on their [students'] genetic makeup" might help ensure that "no child gets left behind" and that "every student is able to apply themselves":

Richard: Well, I think choice [Asbury and Plomin policy #2⁶⁸] means something too because if – I'll watch talk shows where actors, singers, performers, will be on one of the late night shows or Howard Stern or something like that and how many of them were awful students? Like 'oh I hated school, I just couldn't wait to get out of it.' So, they were C and D students or they even flunked out, but they're these great actors, so even though they did horribly in school, hated school, they became these great actors in spite of that. So, could that be something? Look we can tell or something you're predisposed to be in the arts, so could be an actor-type thing or something like that? And, could you individualize that person – that you're not going to worry about you know math 101, math 8, pre-algebra, that kind of stuff. You're not going to worry about it because we know you're going to go toward whatever it is, rocketry or whatever. So, I think that whole idea of those kids who hate school, why do they hate it? Because it's sort of, 'everybody does the same thing, everybody does the same thing.' I think there is something to, if you could really individualize: 'look we know you really don't like school,' so we're going to really help you do this [something else].

⁶⁸ Refer to Table 1 pp. 24-25 in Chapter Three, Table 13 on page 211 in Chapter Nine, or Appendix A pp. 20 – 21 for the full list of policy points.

Jacqueline: And I think that's why having that [individualized education plans] – I do think to get them [students] to have those kind of individualized education plans, so we make sure that no child gets left behind – not purposefully using that – but, that they [educators] were making sure that every student is able to apply themselves based on, in this case, based on their genetic makeup, but in other ways as well.

(April 2017)

The idea that bringing genetics into education might better identify multiple intelligences seemed to be a positive for teachers like Richard and Jacqueline. However, implementing individualized education plans based on an individual's genetic make-up within a context that tends to prioritize academic intelligence, introduces the possibility of scientifically solidifying the hierarchical categorization of types of intelligence. This could tacitly maintain the biopolitical state's decision to apply discriminate biopower to bodies marked by racial and economic othering.

In projecting determinism, teachers exhibited a form of genetic essentialism, which the field of psychology finds is a common understanding of genetics (Dar-Nimrod & Heine, 2011; Heine et al., 2017). However, in the education context, essentialist viewpoints could further restrict those students who are already positioned at the bottom of the social capital ladder and often confined to low income and/or racially-defined minority communities. I found it interesting that even though Carol Dweck's work on the growth mindset highlights the impact both practitioner and student fixed-mindsets can have on academic performance (Dweck, 1986, 2012), teachers like Petra and Florence (who is introduced in next chapter), only seemed able to follow Dweck, as Petra put it: "for a certain amount of time" (January 2017).

I want to argue that viewing intelligence through a molecularized lens allows society to emphasize academic intelligence's role in "the welfare of the population, the improvement of its condition, the increase of its wealth, longevity, health, etc." (Foucault in Inda, 2002, p. 99). If the molecularization of intelligence serves as a form of biopower, behavior genetics findings may entrench this disciplinary power's hold over the body.

The Politics of Culture and the Hidden Dialogue on Race in Discussions on Student Achievement

The United States is comprised of racialized social structures that posit its citizenry as racial subjects: “we live in a racial history” (Omi & Winant, 2008, p. 1570). As I mentioned in the previous chapter, talking about race can be uncomfortable and difficult. The historically unequal distribution of resources has built-in mechanisms for maintaining inequality and injustice today, making racial formation prevalent and systemic. These realities gave rise to the quietly emerging theme that I outline in this section: the politicization of culture and maintenance of a hidden dialogue on race. While bioethically-concerned social scientists and theorists argue that race is being biologically re-inscribed through contemporary scientific research and the molecularization of human life and behavior (Bliss, 2011; Bonham, Sellers, & Woolford, 2014; Rabinow & Rose, 2006; Yudell, Roberts, DeSalle, & Tishkoff, 2016), there remains a hesitancy to directly discuss race in American society. In educational spaces, fear about openly engaging in conversations on race is not uncommon (see Marx, 2004; Solomona et al., 2005; Sue, 2016; Thomas, 2015; Valant & Newark, 2016). The United States has been said to suffer from the “pervasiveness of color-blind racial ideology⁶⁹” that exists alongside “the persistence of structural racism” (Omi & Winant, 2008, p. 1565). I want to argue that Jacobson teachers are part of a larger system in which individuals politicize culture to reject the significance of race while simultaneously normalizing racial hierarchy (Winant, 1998). It is due to this system that a hidden discourse on race in discussions of student achievement developed. There are no sub-themes for this section. I feel that the overlaps between class, culture, and race, and my call for an intersectional perspective that recognizes how race functions as racism, are better served by a discussion of these topics in relation to each other rather than separate from each other.

Omi and Winant write that “when social, political, or economic institutions allocate resources along racial lines, they necessarily assign individuals and groups to racial categories. They are “ ‘signifying’ race – even when denying that they’re doing so” (Omi & Winant, 2008, p. 1567). The politicization of the sociocultural is “an issue that links the micro and macro levels of racial formation. Race always operates at the crossroads of identity and social structure” (Omi & Winant, 2008, p. 1565). I reason that culture helps to shape one’s ‘identity’

⁶⁹ Intersectional feminist Kimberle Crenshaw argues that the politics of color-blindness is the idea that “to eliminate race, you have to eliminate all discourses, including efforts to acknowledge racial structures and hierarchies and address them” (Eddo-Lodge, 2017, p. 85). For more on color-blind racial attitudes see: (Bonilla-Silva, 2014; Constance-Huggins & Davis, 2017; Gallagher, 2003; Hughey, 2012).

and to view social class as a ‘social structure.’ Therefore, the politicization of culture, engages with racial formation, racial signification, and a racialized social structure (Omi & Winant, 2008, p. 1567). In the accounts provided in this section, teachers politicized culture and revealed a tacit dialogue on race to create what Alexander Weheliye would call biopolitical ‘sets’ of humans (Weheliye, 2014). For Weheliye, individuals are increasingly othered in a more tacit manner via the creation of “sets” of humans (e.g. criminals, dissidents, immigrants) who “are...classified as deviating from full (socialist) humans according to a pre-established pecking order” (Weheliye, 2014, p. 60). ‘Sets’ ascribe to physical bodies labels like ‘immigrant,’ ‘educated,’ or ‘in poverty;’ labels historically associated with certain skin-colors that receive different “modes of [biopolitical] investment” (Foucault & Senellart, 2008, p. 77). In speaking with teachers at the Jacobson School, I found that they most often redirected conversations on race-based differences in intelligence towards culture and/or socioeconomics, often creating ‘sets’ of humans in the process. For example, circumventing ‘race-talk’ occurred in the second focus group, which focused on racial disparities in academic achievement, when Erin shared her desire “to see much more studies about poverty and solutions to poverty” (February 2017). Within this theme, I explore the mechanisms in place for undermining a dialogue about race and the hidden racialized discourses that were carried forth.

However, before continuing, I want to point out that there is a caveat to this theme. Teachers at the Jacobson School may have avoided directly discussing race in these focus groups because they did not want it to be conflated with intelligence; this silencing could be out of fear or anxiety about being labeled ‘racist.’ My difficulties in accessing schools and teachers for this dissertation demonstrates this possibility. It is also possible that because I am a woman of color, the majority-White focus groups in both schools may have felt more uncomfortable discussing perspectives on race than with a White moderator. Furthermore, I acknowledge that in the United States race and class are correlated and, in many ways, cannot be talked about separately. Socioeconomic status matters in a material way and can help us better understand the ramifications of racially-defined minority status and racism. For instance, research in the United Kingdom demonstrates the substantial inequality in higher education participation (Marcenaro-Gutierrez, Galindo-Rueda, & Vignoles, 2007). Low income and racially-defined minority groups’ access to higher education is further constrained by the geographical distance between parental home and a university, as students from these communities often stay closer to home “for financial and cultural reasons” (Gibbons & Vignoles, 2012, p. 98). These studies reveal the role of class in perpetuating social inequality; “class is integral to how we understand our own position in society” (Eddo-Lodge, 2017, p.

189). They also allow for a clearer understanding of how race compounds disadvantage. I am not arguing that socioeconomic status should be eliminated from discussions. I relate to the sentiment that it is easier to talk about class than race. However, as Carter, Skiba, Arredondo, and Pollock's exploration of racial disparities in school discipline argues: "you can't fix what you don't look at" (Carter, Skiba, Arredondo, & Pollock, 2017, p. 207). Put another way: "to effectively address inequity, the role of race must be explicitly acknowledged" (Carter et al., 2017, p. 207). Therefore, I want to challenge the "reductions of race to class" as such actions are forms of racialization that live through culture (Omi & Winant, 2008, p. 1567).

As an example of how the conversation on racial disparities in the US education system was redirected, consider this moment in the second focus group with Petra, Erin, and Richard:

Petra: I would also add historical context [to making sense of education disparities] ...it might mean culture, but like the immigration patterns for different races is very different and the level of education immigrants obtained before they immigrated to the United States and the conditions with which they came to the United States.

Erin: Yeah that's a good point too.

Richard: Well I think too – it's like is it environment and schooling? – where the exposure to reading, the amount of books that they can read, how emphasized is it to read – depending on if someone's working on three jobs they're not going to have time to read to their kids or say, 'hey are you reading,' that kind of stuff – Is that part of this too? I think my kids aren't as strong of readers as they could be because I haven't been as active and say 'hey we're going to read and you're going to like reading. I'm going to read to you!' I think that some of these numbers [on racial disparities in education] are reflected in that whole idea, you know, what makes some of our students read seventy books in a month, well what makes some students read three? Is that exposure, is that I'm showing you my love of reading...so is the environment in terms of exposure, the amount of resources, the amount of books that they can get to at the library or whatever, is that a factor in those numbers too.

(February 2017)

In the above, Petra referenced culture and the historical context to explain racial differences in academic achievement in the United States. She racialized culture by connecting it to immigrants – a ‘set of humans’ that deviate from the ‘norm.’ In response to Petra, Richard referred to the environment and exposure to reading at home to explain “some of these numbers.” The factors Petra and Richard highlighted likely do contribute to a child’s performance in the classroom, however, a degree of racialization remains in their politicization of culture that speaks to a hidden dialogue on race. This racialization acts through the subtle and unintentional avenues they have employed. The “environment in terms of exposure, the amount of resources,” “the immigration patterns for different races,” these are part of what Nayak calls a “silent choreography through which an idea of race becomes intelligible” (Nayak, 2011, p. 555).

When I asked teachers to reflect on the statement “a student’s race plays an important role in their performance in the classroom” in the first focus group, Henry chose to stand in the ‘undecided’ corner and justified his position:

Henry: The word ‘race’ is a problem because...it also depends on what the definition of success is. If my kids went to a school on the south or west side of Chicago, they would not be successful at all, they’re very successful here. Is that because of their race? Probably not. It’s probably more because of their life experiences to this point... I don’t think race really has anything to do with it, it’s more culture, and it depends on what the classroom looks like and it depends on what you call success. (January 2017)

By calling the word ‘race’ a problem, Henry highlighted how history has rendered it socio-culturally and socio-politically taboo. He, in some ways, echoed the ideas of Howard Winant who wrote: “the concept of race is problematic...the meaning of race is socially constructed and politically contested” (Winant, 1998). Henry expanded upon his problematizations of race in the second focus group when I asked teachers to identify the factors they felt contributed to racial and socioeconomic disparities in the United States education system. Henry presented to the group four possible explanations for the data on the state of the American education system:

Henry: The first one could be actual racial differences. If we believe that DNA...maybe your ancestry, the physical make-up of your cells, does effect on average where you’ll be. I don’t particularly believe that, but it’s possible. Then cultural, which is just what

is valued in that culture. When I was living in New Orleans we talked a lot about how verbal language is more important in the Black community in New Orleans than written language. Stories are passed down verbally, which doesn't mean the kids aren't as intelligent. There were some studies, and I wish I could point to what they were, where the Black kids had stronger abilities in verbal language, although it wasn't White English. But their ability to communicate in a language that they knew, ...they actually had higher skills in verbal than the White kids. So that's the second one, cultural—what's valued in the culture. Third one is SES, which we already pretty much covered, which is so huge. And then the other one is testing bias...just the fact that you're using a test to assess somebody. Going back to what I was saying [before] about verbal...there was a study done, and again I can't point to it now, where they gave the test verbally to the kids and then they gave the same test written and the scores weren't the same because they [the Black children] have different ways of thinking and different things are valued in their culture. So just the fact that...if it is a test, how that test is written and how the test is given, and how the test is scored because you have bias on the part of the assessor. Whoever is looking, whoever is observing: 'oh, I know that kid's from this culture.' (February 2017)

I see Henry enacting a form of racialization in the above excerpt. Of the four possible explanations Henry proposes (biology, culture, socioeconomic status, and testing bias), he identified culture and socioeconomic status as most important. Yet, while talking about his experiences working in New Orleans in the African American community, Henry converged race with culture by arguing that Black children in New Orleans have “different ways of thinking” and “different things are valued in their culture.” Henry avoided race while simultaneously creating a divide between Black and White students in terms of their “ways of thinking” and cultural values. Henry unwittingly enacted a form of racialization that forms “the survival strategy of systemic power” (Eddo-Lodge, 2017, p. 65). His reflections are indicative of an environment in which race continues to be an organizing factor albeit in less overt terms.

Attributing student performance to the realm of culture and the family hierarchically structures culture. This follows a similar pattern to the discussion of multiple intelligences in the last theme. As an example of how some cultures are seen as ‘better’ than others, consider the following example in which Bridget looked over data on racial and socioeconomic disparities in the US education system in the second focus group:

Bridget: It's a good thing to ask about cultural differences, because when I had kids, everybody went to pre-school, everybody sent their kids to pre-school and you're going, wow half the people [from looking at the data] don't send their kids to preschool."
(February 2017)

In the above, Bridget moved away from race and suggested that culture influences one's academic success. Here, valuing a culture depends upon how well it prepares children for academic achievement (e.g. by encouraging parents to send them to pre-school). Bourdieu says that culture is framed by capital (Bourdieu, 2011). In turn, capital defines and influences life itself. I stipulate that cultural capital is framed by dominant hegemonic discourses and expectations that privilege White and upper-income society.

My argument is further developed at another point in the second focus group. Similar to Bridget, Richard began to politicize culture:

Richard: Does race play a part in terms of the environment they're growing up in? Whether it's in poverty or affluence? Race in terms of how they do things, whatever as a family? My, some of my family members have kids and I'm worried about their success because there's just no emphasis on the idea that education's important. They don't read... it's not emphasized...so I think that's a big thing. Race with that is definitely a factor, but in my family, that's a factor too.

Petra: But that's not really race, you know?

Richard: That's what I'm saying

Bridget: And I think it also depends on the family environment, like Richard said. I mean I've got relatives like that too... people don't do anything.

(February 2017)

At first, Richard stipulated that "race with that [the valuing of education] is definitely a factor." However, later he said: "but in my [White] family, that's a factor too," turning disparities in student performance into an issue of culture instead of race, which Petra pointed out directly ("But that's not really race"). When Richard said: "there's just no emphasis on the idea that education's important," he placed blame on the family, prioritizing its role in

facilitating educational interest and achievement. Not valuing education is depicted as a deviation from dominant social expectations; this becomes racialized when it is associated with particular communities.

As further evidence, in the first focus group Bridget also turned towards cultural explanations, referencing the experiences of a cousin who taught in “inner-city schools.” Some of the Jacobson teachers had themselves taught in public education. Henry had taught in a public school in New Orleans. Jacqueline had taught in Chicago Public Schools during her teacher training program. Their experiences have shaped the narratives they are creating. In this instance, Bridget recounted the experiences of her cousin in urban public education:

Bridget: I had a cousin that taught in inner city schools and she said: ‘I taught kindergarten and I’d have kids who couldn’t count to ten, didn’t know what their real name was – they just knew it was ‘bubba,’ you know, things like that, didn’t know their colors before they got to kindergarten’ and that’s an environmental thing. You never had that opportunity, never had that exposure. (January 2017)

Bridget avoided bringing race into the conversation, though her mention of “inner city schools” is an example of a “conventional geography of race⁷⁰” (Delaney, 2002, p. 6) and part of a “broader repertoire of race thinking and race-making devices” (J. A. Burgess in Nayak & Jeffrey, 2013, p. 77). Talking in terms of “opportunity” and “exposure,” Bridget not only associated Chicago with family environments where “you’re not read to...or had the opportunity to learn,” she also described “inner city schools” as spaces with children “who couldn’t count to ten, didn’t know what their real name is.” The spatial cartographies she alludes to are likely predominantly racially-defined minority and low-income, yet the conversation was phrased in terms of family environment. Bridget is enacting a hidden dialogue on race and echoing how both geography and culture are used to conceal a race narrative.

Additionally, family values and community expectations were used to explain racial disparities in student performance. In one instance, Erin referenced a reading she had done elsewhere on the AIDS epidemic in Africa to illustrate the impact that death can have on “knowledge and culture:”

⁷⁰ Alludes to the next theme.

Erin: [Quoting from the pre-reading] “Of Africa, there’s no reason to anticipate capacities in geographically separated areas evolve the same.” I’ve read something that says the widespread killing off of generations over there because of AIDS is meaning that they don’t even, the orphans and the children don’t even have the benefit of the nurture environment because they’re missing a whole generation of parents and that people have predicted how many generations it will take for them to reacquire the same basic level of knowledge and culture and you could consider that intelligence if you were testing it that way. (February 2017)

Erin attributed differences between racial groups in IQ to the AIDS epidemic and the “widespread killing off of generations.” While I agree that the AIDS epidemic has deeply affected African nations, it must also be acknowledged that a lack of investment and attention, and high levels of exploitation have allowed this epidemic to persist in Africa in a way that it has not in the United States. Erin focused primarily on the biological implications of the AIDS epidemic (i.e. death and the ramifications of this death for future generations), as many nations and world health organizations do, instead of acknowledging the existence of a system which positions the colored and impoverished body at the bottom of the social ladder and sees them as less worthy of investment – she is molecularizing instead of acknowledging forms of racialization (Young, 2016). Life and death map onto the acquisition of “knowledge and culture,” which in turn shapes intelligence “if you were testing it that way.” Although Erin at no point explicitly mentioned race, I want to argue that she is enacting a form of racialization that lives through culture.

I examine Erin’s statement in relation to Weheliye’s discussion of the “ethnaclass of Man,” which establishes “natural differences between the selected and dysselected” (Weheliye, 2014, p. 28). According to Weheliye, the “dysselected” include “the poor, the jobless, the homeless, the incarcerated, the disabled, and the transgendered” (Weheliye, 2014, p. 28); in this case, it includes communities affected by the “widespread killing off of generations.” Although these categories are transracial, they are “subjected to racializing assemblages that establish “natural” differences” (Weheliye, 2014, p. 28) through the language of the ‘other.’ For Weheliye, “black, Latino, poor, incarcerated, indigenous, and so forth populations become real objects via the conduit of evolutionarily justified discourses, which, as a consequence, authorizes Man to view himself as naturally ordained to inhabit the space of full humanity” (Weheliye, 2014, p. 28). Here, Erin unintentionally evokes an “evolutionarily justified discourse” (i.e. “the widespread killing off of generations over there because of AIDS”) to

make sense of the Black-White test score gap and arguments asserting that race-based differences in intelligence are genetic in origin. She is influenced by the enduring social practice of ‘racializing assemblages’ – the creation and categorization of individuals through the tacit conjuring of race (Weheliye, 2014). Racializing assemblages functions primarily as a way to “create and maintain distinctions between different members” of society – it forms a global color line (Weheliye, 2014, p. 28). I also saw this kind of racialization occurring in Henry’s earlier discussion of the cultural differences between Black and White children. Hidden racialized discourses in conversations on ability removes individuals of color from the “genre of the human represented by western Man” (Weheliye, 2014, p. 27).

Nonetheless, at a fundamental level, these teachers are identifying real social conditions in which children are living. Jacqueline, for example, found that when tutoring for Chicago Public Schools during her teacher training program, “we were supposed to teach or work with the students based off this one set of books that were so outdated and not interesting whatsoever because they don’t have real authentic books” (February 2017). This is a valid representation of inequitable access to quality education born out of segregationist and choice policies. Jacqueline points to the evacuation of public spaces in education as public schools are regarded as places of disengagement and few resources. When Erin said: “I get that there’s a huge overlap there between all kinds of other factors in school success but if you don’t attend a school that has any books, how do you get proficient in reading? If you don’t have a family with a car to take you to a public library that exists that is well funded?” (February 2017), she is noting the fundamental organizing principles, or intersections, operating within society to determine who’s ‘in’ and who’s ‘out.’

These teachers are making valid observations. Individuals who are perceived to be outside the dominant culture (i.e. White middle and upper-class) receive less social capital and are privy to fewer opportunities. Consider the experience I opened this dissertation with. I was perceived to be outside the dominant culture because my mother is a Nigerian immigrant. I was placed in remedial reading accordingly. Jacobson teachers bore witness to the dominance of White culture and the problems therein (e.g. Petra: “There’s, I think a lot of bias on the curriculum and on standardized tests and things like that” (February 2017)). However, they also argued that different cultural expectations when it comes to education (e.g. not encouraging children to love to learn) affect student performance. Culture is in turn racialized when practices that are not considered part of the dominant culture are problematized and associated with disempowered communities, a finding supported by prior research (Omi & Winant, 2014).

Instead of problematizing communities that do not adhere to mainstream society, I stipulate that the dominant culture should be recognized as the enforcer behind understandings of what is ‘right’ and what is ‘wrong.’ Colonial and imperial practices have dictated what curriculum is taught in schools, by whom it is taught, and for whom it is taught. Marginalized communities are often faulted for not adhering to the dominant culture, but the conversation should be switched to problematize the narrow confines of acceptable behavior and lifestyle in American society. I contextualize this argument using Christine Sleeter’s 1994 study, which looked at the implementation of multicultural education within an environment where White female teachers comprised the bulk of the teacher workforce. Sleeter highlighted the “tendency of Whites to deflect attention from racism” and the possible harm this poses to effectively providing culturally-relevant pedagogy to an increasingly diverse student body (Sleeter, 1994, p. 5). Re-directing conversations away from race, shows “our collective inability to confront racial realities in their everyday manifestation” and does a disservice to schools and communities trying to provide “all children with the ability to honestly and accurately assess their worlds” (Lewis, 2001, p. 805). During my time at the Jacobson School, I felt that teachers were navigating a fine line that allowed them talk about race without actually engaging in ‘race-talk.’ The structuring of the US education system, including teacher training programs, is a root cause of this; the education system fails to acknowledge and address what Burant calls “the dominant, racist epistemology in the United States” (Burant, 1999, p. 216).

That said, I want to highlight an instance in which I felt teachers were trying to engage more openly with race while simultaneously attempting to negate its significance:

Henry: It would be interesting to do – we could actually analyze the data that we have [on the Jacobson School] and find out...we could look at culture or race without SES coming into it because most, but not all, most of our families are within a narrow SES. So, then you could look at that and say well if we found out that all the Indian kids were scoring this way and all the White kids were scoring this way and the very few African American kids we have score this way, then you could – it would be interesting because you might be able to see a narrow SES and that might provide further information about what these numbers might mean.

Erin: Like controlling for all the factors before we draw a conclusion on one.

Henry: Yeah exactly, you kind of have to control for SES a little bit.

Petra: Right, that's interesting. That's a good point. I think it would be hard to study anything besides Asian and White though because I think the subset is too small and it would skew your data.

Henry: Yeah, we only have one Hispanic family, two Hispanic families. It isn't enough.

Petra: But it would be interesting to look and ask them [minority students and their families], their motivation for being here in such a – being such a minority in such an unusual circumstance. You know, what conditions brought them here that could maybe help us attract more.

(February 2017)

I found this moment in the second focus group to be particularly interesting as the teachers were trying to think of ways to study the students within their own school and to identify factors that impacted student test scores. They highlighted the fact that racial diversity is not a defining feature of their school (i.e. “the very few African American kids we have” or “we only have one Hispanic family”) while also seeking to look at “culture or race without SES coming into it.” First, I felt Henry was conflating culture and race as he had done previously in the conversation and in the first focus group (i.e. “we could look at culture or race”). However, I realized that Henry, Petra, and Erin were also practicing a form of intersectionality – raising the possibility that socioeconomic status was driving differences between students of different ethnic backgrounds and that class needed to be controlled for in order to identify the root cause of variance in test scores. I was struck by Petra’s idea to “ask them [minority students and their families] their motivation for being here [at the Jacobson School] ...being such a minority in such an unusual circumstance.” Petra is pointing to the fact that being a student of color within a gifted education and private school environment like Jacobson is “unusual.” Families of color need to have a “motivation” to attend the Jacobson School. This reveals a hidden dialogue on race that holds certain expectations of particular communities. This example is informed by the societal expectations of students of color: racially-defined minorities are not expected to be in high ability classrooms. As Rollock (2007) showed, teacher perspectives of ability and race are shaped by the narrow definitions of success teachers only see as attainable by particular groups of students – these narrow definitions are created by dominant societal discourses on who the ideal student is.

Jacobson teachers have good intentions in wanting to look at class and remove race as a problem, particularly in a possible move to avoid conflating race with IQ. The hidden dialogues they enacted come from the limited space that is available for critical and rich discussions on race and racism in education. As Ryan Crowley discusses, there are tensions that come with White people's knowledge of race and racism (Crowley, 2016). Christine Sleeter (2016) says that teachers ought to explicitly acknowledge culture and race and recognize racism in students' lives but that training them to do so is difficult, costly, and fundamentally requires a restructuring of the education system. Christina Berchini demonstrates how curriculum taught in schools screens out discussions of racism and creates contexts in which teachers are "structured to minimize and dismiss broader discussions of institutionalized and systemic oppression and violence" (Berchini, 2016, p. 1030). Prior research tells us that directly acknowledging the "color complex" (Monroe, 2016) is necessary for delivering truly equitable and multiculturally responsive education (Au, 2009; Lentin, 2005, 2014; Sleeter, 1992, 2001). As a leader in the movement for culturally-relevant pedagogy, Gloria Ladson-Billings refutes the "culture of poverty" discourse in urban schooling that assumes 'inner-city' children do not succeed because of their cultural background. She points to the many structural barriers that impede access to quality education and calls for teachers to "think critically about the ways race and class delimit what students can and cannot do" (Ladson-Billings, 2017, p. 89). The reality, however, is that it is markedly difficult to explicitly discuss race in an environment where it invokes anxiety.

Within this theme, I have tried to assert that intersectional approaches to understanding the marginalization of certain students in the American education system necessitate an exploration of not only culture and class, but also race, gender, language, citizenship, and (dis)ability, among others. I sought to show how using culture or class to explain inequality creates 'sets' of humans that are racialized – forming a hidden dialogue on race. The politicization of culture and class may be indicative of color-blind perspectives or may signify a move away from the topics of race and racism. Without caution, culture and class could be misused to maintain socially-constructed markers of difference. Understanding contextual intersectionalities better locates biopower within the context of modern humanity.

Embodying Borders: Geographies of Race & Power

According to French philosopher Étienne Balibar, individuals are situated within multiple borders, having to navigate political and cultural spaces and geographies of “memberships and representations; of constituencies and locations (or sites) of power; of unified and isolated territories” (Balibar, 2009, p. 191). Borders order our lives, “determining the extent to which [we] are included, or excluded” (Newman, 2006, p. 143). They are geographic, linguistic, racial, gender and class-based; they exist in the past, the present, and the future. Borders are historically influenced, and politically, culturally, or economically formed. As a bi-racial woman, I have often found myself stuck between borders – seen as neither White nor Black. As a graduate student abroad, I have encountered the borders constructed around those assigned the label of ‘foreigner.’ When I began school, my placement in remedial reading constructed a border between me and the children who were identified as gifted and talented. I have come to embody these borders in my affective register.

Borders, whether geographies of race or of privilege, construct biopolitical spaces within educational sites. Delaney (2002) says that “space works to condition the operation of power and the constitution of relational identities” (p. 6). Segregation – the act by which someone or something is set apart from others – remains a prominent feature of how space operates in relation to both power and race. Segregationist policies and discourses have created borders that regulate conceptualizations of race and privilege, impacting upon education. Segregation is a form of border control that has shaped individuals in terms of life and death. Today, the historical legacies of segregationist and colonial practices are manifest in geographic, racial, and economic segregation – forms of categorization that are inextricably tied together – a demonstration of intersectionality. I found that Jacobson teachers identified these geographies of power by associating spaces with privilege and race.

Previous scholarship carried out by human geographers has explored the relevance of biopower “to the rich array of historical and geographical circumstances within which biopolitical techniques have been deployed and resisted” (Hannah, 2011, p. 1037). Other works have used biopower to unpack the molecularization of racism in relation to segregationist policies in an attempt to better understand the history of racism (Bernasconi, 2010). National and linguistic borders have the power to “relegate black subjects to the status of western modernity’s nonhuman other” (Weheliye, 2014, p. 31).

However, it is difficult to delineate between race, social class, and the labor market when looking at systems of disadvantage. Although, I note that socioeconomic status plays a

particularly significant role in academic achievement regardless of race and ethnicity, I also know that a history of slavery and marginalization has disproportionately placed people of color in economically challenging situations. Poor students of color remain more likely to underperform in comparison to White children from the same financial background (Quinn, 2015). The current situation for many youth of color extends beyond current systems of economic segregation and inequitable access to quality schooling; it is rooted in power dynamics whose influences are still felt today and are born out of segregationist policies.

Policies and practices resulting in geographic segregation have upheld and advanced the centuries-old argument that bodies of color are inherently inferior and the practice of concentrating power in the hands of the select. Within this context, I found that Jacobson teachers conceptualized borders in two ways: 1) in terms of privilege; and 2) by spatializing race. My first sub-theme explores the role space plays in people's possession of cultural capital (*Spatializing Privilege: Cultural Capital is Geographically Concentrated*). In the second sub-theme (*Spatializing Race: The Intersections of Segregationist Policies*), I provide evidence of how understandings of race seem to be spatially applied by Jacobson teachers. I argue that space still functions as a segregationist way to understand race, as apparent in the connections teachers make between a geographic location and the skin-color of the bodies that constitute it.

I use discriminate biopower to analyze racial and socioeconomic disparities in terms of access to quality schooling, which is geographically determined. In the slave setting for instance, education was prohibited for Blacks – cast as a threat to White privilege. Despite the formal termination of slavery, social and cultural power dynamics and the market-based power relations associated with them have been normalized through spatial segregation. This maintenance is not an active form of racism – it is what Rabinow and Rose (2006) call “letting die” (p. 14). The bridge I have created between biopower and intersectionality allows for new forms of analysis that link together policy, geography, race, and power in relation to American society's understandings of intelligence and skin color.

Spatializing Privilege: Cultural capital is geographically concentrated

For teachers working in a privileged environment like the Jacobson School, discourses of poverty and particular notions of the family carry substantial symbolic weight. The Jacobson School not only recruits students with social capital and resources, it also increases these privileges through access to educational opportunity. Certain kinds of students, namely low-income and Black and Hispanic children, are underrepresented in the Jacobson School.

Jacobson teachers see a class effect within their own school, as high tuition costs and geographical location restrict access to their school. The geographies of power become apparent to teachers through the social context of their working environment:

Petra: I feel like anyone who is eligible for a school lunch program would never apply to our school because they probably wouldn't have the resources to even apply or be able to do the research to find out about it. They would have to get transportation here somewhere, I mean in Calverston⁷¹ I know there are students that get free lunch, but it would require a whole lot of things they probably couldn't get, but I think we would welcome them if we could figure out – we're [Petra and Henry] on the diversity committee, so we're trying to figure that out. (February 2017)

Petra highlights the fact that low-income children are largely absent from the Jacobson School for two reasons. The first stems from a lack of access and the resources that go hand in hand with one's socioeconomic status. The second is premised on the geographies of access: low-income students do not live near the Jacobson School and to attend would require transportation. Here Petra points directly to the effects of the spatial concentration of class-privilege on the demographics of her classroom.

Similar to Petra, Erin is also aware of the geographical division of socioeconomic status. In the third focus group, teachers discussed the relevance of behavior genetics research for education. Erin began her reflections on the topic by acknowledging that some children go unrecognized in the educational system: "let's say there's somebody that we would've called in the past disadvantaged, they have the cognitive ability, nobody knew it, or nobody recognized it, but they were in an environment that didn't provide the spot for them to move forward" (April 2017). In a scenario in which genetic information on intelligence and other characteristics associated with education outcomes are readily available, Erin fears that the geographic concentration of privilege would only further exacerbate certain children's access to educational opportunities: "unless their parents have the money to pay, the only way we're ever going to find out about these [genetic] markers is if there's some sort of all-encompassing federal program and every kid gets their markers done" (April 2017). An all-encompassing federal program for precision education would be costly. While it could address Erin's concerns about equitable access, other issues remain: "and then, what're we going to do about

⁷¹ Name of suburb has been changed.

the other inequalities in our current school system? They're still in a school system that has no books, they're still in an area that would be – I mean they live in some–” Her spatialization of privilege reflects the realities of the United States context where inequalities are maintained through access to quality schooling – an opportunity many students are not privy to because of the neighborhoods they tend to be ‘segregated’ into as a result of economic inequality. The residential segregation Erin and Petra identified is critical for understanding the systemic difficulties low-income students and students of color encounter that inhibit access to quality education⁷². As Bourdieu suggests, inequality is inherited across time; the challenges faced by racially-defined minority and low-income students today have been accumulated – inherited and borne out of sociohistorical policy and practice (Bourdieu & Passeron, 1990, 1979).

Hannah writes that “the control all people have over our own futures is premised upon some minimal secure access to resources” (Hannah, 2011, p. 1049). The geographic segregation of resources and privilege has life and death consequences. Hannah might consider this to be a representation of the biopolitical “gap between the potential to support human life and the systematic failure to do so” (Hannah, 2011, p. 1052). For those who find themselves relegated to poor neighborhoods, where, as Henry pointed out “there’s no grocery store within two miles, and it takes 7 bus rides to get there,” educational opportunity is even more sparse than finding quality food. As Erin pointed out, in situations such as these: “you’ve got other, more basic concerns on Maslow’s Hierarchy of Needs.” I believe these teachers are picking up on the “border controls” that politicize human life (Raman & Tutton, 2009, p. 13).

Furthermore, using geography as a short hand for socioeconomic status illustrates the relationship between a lack of privilege and individuals’ knowledge landscapes. Jacobson teachers revealed that the education system has been designed for students with certain experiences, living in particular communities, with certain levels of socioeconomic status. The geographic location of a student informs not only their access to resources, but also the kinds of knowledge they have and can acquire:

Petra: I would just say there’s, I think a lot of bias on the curriculum and on standardized tests and things like that.

⁷² School-funding policies impact the inequitable distribution of school quality and resulted in the geographic concentration of privilege and race. Although the United States, to an extent, has a compensating system of finance meant to address economic discrepancies, most funding to American schools is determined by local property taxes, meaning that a poor area by definition has poorly funded schools. However, there is more recent research to suggest that the US education system is more compensatory for historically marginalized students (i.e. poor and racially-defined minority) than previously thought (Ejdemyr, 2017) .

Erin: That's what I meant about conditions in the classroom, that's what I'm talking about too.

Bridget: Yeah, when I've read certain questions I've thought: 'ok people that are living in this area or that area are not necessarily going to know that.'

(January 2017)

These teachers are identifying how society is ordered and structured both culturally and physically. The social conditions of environments near the Jacobson School, in an urban center like Chicago, impact teachers' views on the factors that inhibit a child from achieving in the classroom. In these focus groups, teachers were grasping at the concept of cultural capital, in which adhering to the dominant culture is a form of capital that is unequally distributed through the class structure (Bourdieu, 2011). Cultural capital is economically and spatially segregated. Evidence of this emerged in the second focus group when teachers talked about "the impact of poverty" on a student's educational experiences:

Erin: Well the impact of poverty is just huge and it's necessarily, I don't know, I personally would love to see much more studies about poverty and solutions to poverty, and I get that there's a huge overlap there between all kinds of other factors in school success but if you don't attend a school that has any books, how do you get proficient in reading? If you don't have a family with a car to take you to a public library that exists that is well funded, you know—

Henry: If you can't get breakfast because there's no grocery store within two miles, and it takes 7 bus rides to get there.

Bridget: Or when you get there the box of Cheerios is \$7 and you can't afford it or something.

Erin: Right, and if you're not well fed, if you're suffering from poverty then you've got other, more basic concerns on Maslow's Hierarchy of Needs

Bridget: —Right, [rather] than learning how to read.

(February 2017)

A theorist like Bourdieu would argue that the above conversation signifies the role of education in perpetuating inequality as the educational attainment of social groups is connected to the amount of cultural capital they possess. Therefore upper-middle class children, such as those represented in the student body of Jacobson, have higher rates of success than working-class students, when compared to those at West Elm, in part because upper-middle class families are predominantly represented in the parent community. The conversations carried out at Jacobson demonstrate the utility of an intersectional framework, which understands that different structures combine to establish multiple inequalities (Walby, Armstrong, & Strid, 2012). An intersectional theorist like Kimberlé Crenshaw advances Bourdieu's arguments on cultural reproduction by contextualizing the dominant culture, showing how race and class compound positions of marginality. This enriched intersectional analysis of culture and capital helps to explain why biopower operates differently (or discriminately) in different locations.

To demonstrate this, it is important to consider how geography – when coupled with cultural capital – represents a double intersection of disadvantage. For example, when Henry said: “if you can’t get breakfast because there’s no grocery store within two miles, and it takes 7 bus rides to get there,” and Bridget replied with: “or when you get there the box of Cheerios is \$7 and you can’t afford it or something,” they bear witness to the withdrawal of cultural capital from certain geographic landscapes. Moreover, when Erin explained that “if you’re not well fed, if you’re suffering from poverty then you’ve got other, more basic concerns on Maslow’s Hierarchy of Needs [than learning],” she illuminated the reproduction of inequality. Focusing on education is devalued in an environment where “more basic concerns” like food and shelter loom large.

There is a critical connection to highlight between biopower, cultural capital, and geography. Duana Fullwiley’s discussion of discriminate biopower in her work on sickle cell in Senegal shows the “socio-political invisibility” of those whose health and illness is entertained with high levels of reluctance, if at all (Fullwiley, 2004, p. 159). The segregation of cultural capital, which I argue is synonymous with the privilege Jacobson teachers are identifying in this theme, is a form of discriminate biopower. Individuals and communities living on the fringes of dominant society face “socio-political invisibility” (Fullwiley, 2004, p. 159), and are forgotten and left to secure their own vitality. Discriminate biopower signifies the hidden injuries of race and class. Cultural capital, which includes ideas about who possesses intelligence and who does not, are interlocked with skin color and socioeconomic status.

Living in an area without access to basic resources like a grocery store symbolizes the ramifications of this socio-political invisibility. Individuals and communities are forced to

prioritize the very basics of survival. In environments like this, “learning how to read” is not considered necessary for survival in the same way that eating is, leaving certain communities of children deficient not only in terms of the vital nutrients needed for life itself (i.e. faced with hunger) but also in terms of the cultural capital needed to comfortably slot into mainstream society. Biopower connects itself to the possession of cultural capital, enacting the maxim of ‘making live’ for those imbued with privilege and ‘letting die’ those without it.

As the next sub-theme demonstrates, these same arguments hold when race is either explicitly or inexplicitly added to the picture. The injuries of race contain and maintain a strong spatial and demographic element. When American neighborhoods, which are often not only socioeconomically but also racially segregated, are deemed unsafe or are forgotten, so are their people (Moran, Skeggs, Tyrer, & Corteen, 2003; Skeggs, Moran, Tyrer, & Binnie, 2004). Through geographic segregation, the biopolitical state more clearly decides which lives, classes, and races are worthy of investment.

Spatializing Race: The intersections of segregationist policies

The historicities of race and privilege, alongside present realities shape “the discursive production of race within the landscape...” (Nayak, 2011, p. 5). In looking over the conversations I had with teachers at the Jacobson School, I consider “how the idea of race is brought to life in time and space, and how it may come to be concretised in place” (Nayak, 2011, p. 552). As Nayak explains, spatialized representations of race have “material, symbolic, and historical effects” (Nayak, 2011, p. 553). Historical traces of segregationist practices may be embedded in teachers’ beliefs about race, geography, and their everyday working contexts.

In addition to recognizing that cultural capital and socioeconomic status are geographically concentrated, I found that teachers spatialized race. In doing so, they advanced their awareness of the spatiality of privilege as economic disenfranchisement is more often felt by people of color. In terms of education, poverty affects the economic health of an area and the success with which poor schools attract quality teachers. Community investment in everything from how schools are run to how the very buildings are maintained is also impacted (Filardo, Vincent, Sung, & Stein, 2006). While low socio-economic status adversely affects all children, regardless of skin color, education disparities and geography become racialized when disproportionate numbers of African Americans and other minority groups find themselves living in disadvantaged or dangerous neighborhoods with limited access to quality and reliable resources (Timberlake, 2007), among them education (Fryer, 2010), but also health care and

community outreach (Mehra, Boyd, & Ickovics, 2017; Williams & Collins, 2001). What develops is residential segregation that is both economically and racially driven and which results in inequitable funding of schools⁷³. Early economic and family disadvantage means children start school at a disadvantage. The schools themselves often have lower quality teachers, fewer educational and monetary resources, and failing infrastructure. Inequalities in school funding “are substantial, they are maintained by state policy, and they are a form of racial inequality in disguise” (Walters, 2001, p. 45).

Given these realities, the fact that Jacobson teachers spatialized race and equated that racialization with disadvantage should not be surprising. As Massey writes, “residential segregation constitutes the ‘structural linchpin’ of racial stratification in the United States” (Massey, 2016, p. 4). Teachers are referencing historical events that have relegated bodies of color to the peripheries of society. In the first focus group, I asked teachers to respond to the statement “a student’s race plays an important role in their success in the classroom.” Bridget pondered whether race was more or less important depending upon where you lived:

Bridget: I was thinking a student’s race plays an important role in their success in the classroom in this school? Or are we talking, are you growing up in downtown Chicago where you are, whatever, having an environment in your particular family that you’re not read to or whatever, or had that opportunity to learn. (January 2017)

In talking about “downtown Chicago” Bridget invoked the language of the “inner city” (Delaney, 2002). The concept of the ‘inner city’ school, exists in part because “as the percent black in a residential area increases, whites are more likely to select alternative, higher-percentage-white schooling for their children” (Sikkink & Emerson, 2008). The practice of ‘White flight’ has resulted in poorly funded urban schools that are primarily comprised of students of color (Bonds & Sandy, 2016). “Downtown Chicago” is an area that is predominantly racial minority. Bridget’s spatial imaginary considers “downtown Chicago” to be different from the Jacobson School (“this school”) in terms of both culture and race. Children in “downtown Chicago” live in environments in which children aren’t read to or given

⁷³ “Children in families with low incomes are less likely to enter school well-prepared for success because of limited access to high quality child care, early education, and health care; greater demands on parental attention; and more stressful family and neighborhood circumstances. Because African American and Hispanic families have disproportionately lower incomes – which is itself a consequence of embedded racial inequities — children of color are at a greater risk than their White counterparts of entering school without sufficient readiness for success” (The Annie E. Casey Foundation, 2006, p. 1).

opportunities to learn. Here, Bridget magnifies the intersections of culture, privilege, and race and exposes the discriminate application of biopower to peripheral groups who are given fewer resources.

I saw the spatialization of race and its relationship with class status continue in the second focus group. As teachers looked over data on racial and socioeconomic disparities in gifted education, Henry pondered:

Henry: It would be interesting to see the next town over, Greenwood.⁷⁴ I think Greenwood is now about 45% Hispanic families, close to that, and the SES on average is lower than Fairway⁷⁵ [Jacobson's suburb]. So, it would be interesting to see just one town to the next, if those same numbers [on gifted education disparities] as [here] were repeated over there. (February 2017)

In raising this question, Henry bore witness to the intersections of race and class, which have been blended together through colonial processes and allowed teachers to racialize space. When Henry said: “I think Greenwood is now about 45% Hispanic families...and the SES on average is lower,” he racialized place and indirectly equated being of a person of color with being low-income, citing a segregationist history which has created a relationship between race and class. Both Henry above and Bridget in her conversation on “inner city schools” touched upon how power, class, race, and space converge to build expectations of people and what is imagined as possible for them. Life is shaped by where you live and influences an array of social phenomena, as Robert J. Sampson documented in his book on Chicago and the role of the neighborhood (Sampson, 2012). Children of color living in the ‘inner city’ are expected to perform at lower academic levels (e.g. “couldn’t count to ten, didn’t know what their real name was”), often because they do – the result of poor school quality, fewer resources, and an educational curriculum that was not created with the experiences of students of color in mind (Ladson-Billings, 2006, 2017). Communities of color are disenfranchised culturally and economically. These expectations and perceptions are part of a process of exclusion “grounded in time and history” which – to paraphrase Rob Kitchin whose work looks at disablist practices – are instrumental in recreating and sustaining racist and classist practices (Kitchin, 1998, p. 343). In these focus groups teachers pointed to spaces with “the status of national eponym for

⁷⁴ Name of suburb has been changed.

⁷⁵ Name of suburb has been changed.

all the evils and dangers now believed to afflict the dualized city” (Wacquant, 2007, pp. 67–68).

When Henry raised the question of whether racial disparities in gifted education would be as pronounced in geographies that have higher racially-defined minority concentrations, he is arguing that the underrepresentation of Hispanic students in gifted education in the macro-context might be different in certain micro-contexts where they are more represented in the general population. However, it is important to consider the likelihood of racially-defined minority and low-income residential areas having the same access to gifted education programs as upper-income neighborhoods. In questioning whether the data on racial disparities in gifted education would be different in a minority-heavy context, Henry echoed Jacqueline, who earlier in the meeting had asked: “would we find the same gaps if we were talking about possibly the African American population in like DC or wealthier neighborhoods?” (February 2017).

Segregationist policies have contributed to the geographic landscapes of the city of Chicago and its surrounding suburbs (Betancur, 1996; Grannis, 2005; Kain, 1968). As teachers spatialized race they highlighted the prevalence of racial segregation within the Cook County context. In one instance, the teachers chose to focus on the suburbs surrounding Chicago and touched upon the spatial dynamics of White flight (Crowder, 2000; Crowder & South, 2008; Quillian, 2002). During the conversation, Henry wondered what it would be like to be the racial minority in a community by imagining himself, a White male, living in the South Side of Chicago:

Richard: You know Chicory⁷⁶ is 62% White, 16% Asian, 15% Hispanic.

Petra: Granata is like 100% White

Henry: Oh, up in the Grover area.

Bridget: I was thinking the same thing about Parkerstown

Petra: Hentsville is very White

⁷⁶ Names of all suburbs in this excerpt have been changed.

Richard: Well, Hentsville's high school is 99% White, right?

Henry: One guy!

Petra: –One guy who has kids

Henry: –One guy! Can you imagine being that one guy? So, it'd be like me living in the South Side of Chicago.

(February 2017)

In this conversation, Jacobson teachers observed the borders of race, class, and capital that exist within geography. In linking race with space, teachers also conflated race with privilege and capital, reflecting the realities of American society. As Massey explains, “segregation is not a thing of the past, but a condition that continues to be generated and reinforced by ongoing social and economic processes that continue to operate within distinct segments of American society” (Massey, 2016, p. 6). Research tell us that poverty is spatially concentrated in racially-defined minority neighborhoods (Massey, 2016). The application of biopower to this context illustrates how segregationist policies have been transmitted historically and become affixed to certain bodies. Geographic segregation along race and class lines is a form of ‘social death’ (O. Patterson, 1985)⁷⁷ for those categorized into one of the low rungs of humanity’s ladder. The relative absence of biopolitical investment in low-income bodies and bodies of color underscores the practice of “policing the borders between bare life, life, and death” (Weheliye, 2014, p. 65). As I have argued, the prioritization of the wealth and health of the biopolitical state justifies varying levels of control and investment on the bodies of its citizens. As Jacobson teachers embodied the borders affecting the demographics of their school, suburb, and Chicago, they bore witness to the maintenance and reproduction of cultural capital, and inequality through biopower. The continued diffusion of racial and socioeconomic ‘coloniality’ is made possible through biopower’s ability to place focus on vitality as a mode of regulating the population and the violent hierarchical structures that uphold it.

Over the course of these focus groups, Jacobson teachers illuminated how geographic, economic, racial, and cultural borders impact upon a student’s educational experiences and

⁷⁷ Orlando Patterson uses the term “social death” to describe the removal of all citizen rights from slave communities except for life itself (O. Patterson, 1985).

opportunities. In short, “place matters” (Delaney, 2002, p. 12). As Jacobson teachers drew upon the existence of borders to contextualize the socioeconomic and ethnic demographics of their school, they developed geographies of intersectionality and biopower – establishing links between power structures, lived experience, and place (Rodó-de-Zárate, 2014). These intersections inform the “functional disconnection of dispossessed neighborhoods from national and global economics, and the reconfiguration of the welfare state in the polarizing city” (Wacquant, 2007, p. 67). In seeing borders, Jacobson teachers acknowledge the “advanced marginality” that is embedded in “territorial fixation” (Wacquant, 2007, p. 67). According to Wacquant, “territorial fixation,” or geographic segregation, leads to the “stigmatization” of racially-defined communities and “can disqualify the individual and deprive him or her from full acceptance by other” (Wacquant, 2007, p. 67). With regards to education, the intricate relationship between place and experience means that many of America’s children, in particular low-income children or children of color, do not have access to quality educational opportunities. Delaney writes that “racisms and the maintenance of racial hierarchies have structured spaces” (Delaney, 2002, pp. 11–12); this emerged in teachers’ narratives at the Jacobson School. Place and space influence individuals’ and communities’ knowledge landscapes, signifying the historical transmission of colonial and segregationist policies and events. Borders function to create “assemblages of the human, not-quite-human, and nonhuman” – a mechanism of racialization (Weheliye, 2014, p. 43). Biopower helps to clarify both how and why these borders are created and utilized by the biopolitical state. The geographic concentration of privilege enforces biopower’s regulatory ability to humanize or dehumanize.

Extending my analyses further, I want to argue that the forms of ideology underlying genetics research may come to represent new borders, new lines being drawn between intelligence and racialization, as supported by contemporary scientific research – crafting another form of “social and spatial marginalization” (Wacquant, 2007, p. 72). Teachers’ perspectives on intelligence, race, and class might point to ways in which genetic discourses could result in ‘durable marginalization’ (Wacquant, 2007, p. 71). I believe it is possible that deference to contemporary behavior genetics research findings without critical conversation might form new borders that uphold old ones in complex and powerful ways.

For example, if and when certain families (i.e. those with means and resources) decide to genotype their children for ADHD or dyslexia, a border forms between those who’ve utilized the potential benefits of genetics research and those who haven’t or couldn’t. Without proper regulations, what if genotyping efforts don’t stop at learning disabilities but extend to

athleticism or spatial ability? How might CRISPR gene-editing technologies, which have already been tested on humans (Cyranoski, 2016), redefine what it means to be human and how the human is created? Most importantly, who are most likely to be those with the means and resources to access these opportunities? As witnessed in this theme, teachers are aware of the geographies of privilege that exist and have tied this to race. The formation of a technoscientific border that maps onto existing socioeconomic and racial borders does not seem far off. The genetic possibilities argued by behavior genetics researchers could threaten the dreams and necessities of equitable educational opportunity, policy, teaching, and practice by appearing to validate categorizations of students, that most often occur along socioeconomic and racial lines.

Discussion

In this chapter, I sought to show how teachers think about intelligence, socioeconomic status, race, and genetics. In doing so, I worked to address the research question: **How are intelligence, race, socioeconomic status, and genetics understood and articulated by teachers working in different classroom contexts?**

I approached my qualitative work with an understanding that human beings by definition are complex and full of contradiction (Berliner, Lambek, Shweder, Irvine, & Piette, 2016) and that life is shaped by varying structures that intersect to inform advantage or disadvantage (Crenshaw, 1989) and even life and death (Rabinow & Rose, 2006).

Key insights suggest that the Jacobson teachers drew upon the language of determinism while describing their perspectives on intelligence and genetics. This is supported by statements like: “some people are ahead in the game” (p. 95); “intelligence is largely determined by the genes” (p. 96); and “sometimes people are inherently good at things” (p. 100, 101). These teachers may be inadvertently suggesting that genetics has a significant role to play in shaping an individual’s intelligence. Importantly, however, while a child may be born with a certain measure of intelligence, their environment can influence the extent to which they achieve or fail to achieve their genetic potential (e.g. Erin: “What about unrealized potential? What about thwarted intelligence?” (p.96)). In other words, while intelligence may be conflated with forms of essentialism, academic achievement doesn’t necessarily have to be. Molecular outlooks on intelligence represent a “truth discourse’ about the ‘vital’ character of living human beings” (Rabinow & Rose, 2003, p. 3). Science is considered an authority

competent to speak the ‘truth’ on the etiology of intelligence. Genetic ideologies on intelligence therefore provide a crucial lens for understanding how identity gets institutionally reproduced and legitimized. Intersectional points like race and class can and have been genetically imagined (Herrnstein & Murray, 1996; Shockley, 1972). Coupled with the molecularization of intelligence (Plomin & Stumm, 2018), genetic imaginaries on the historically burdened concepts shaping my dissertation have created a situation in which the classification of students is a natural outcome.

Jacobson teachers also politicized culture and class politics when examining inequities in academic performance – contributing to the emergence of a hidden dialogue on race. In adopting perspectives that turned to class and culture as explanations for racial disparities in academic achievement, teachers may have been attempting to avoid the conflation of race with intelligence. Given the extent to which I was able to work with these teachers, it is difficult to know their exact reasons for circumventing conversations on race. Nevertheless, in doing so, teachers fed into a wider social practice that upholds tacit racialized discourses and bypasses issues of race and racism located within a broader history – one that relegates the colored body to the fringes. Nayak tells us that “much of what we might think of race is largely imaginary, a projection of fear/desire by colonial minds steeped in the traditions of the Western Enlightenment” (Nayak, 2011, p. 554).

In the second theme, a discriminate biopower perspective unpacked why America and the American education system reproduce racial and socioeconomic inequality which has real and physical consequences for individuals. In applying the concepts of Alexander Weheliye (2014), I evidenced instances in which teachers racialized ‘sets’ of humans through their identification of acceptable cultural behaviors and practices that are tied to particular communities. Too, I showed how the discriminate application of biopower connects to both race and class.

In the final theme, teachers subtly linked space to privilege and skin color, casting the colored-body as low-income and disempowered. By identifying the power of geographical location and space, teachers unpacked how neighborhood borders perpetuate the othering of certain groups, namely racially-defined minority and low-income communities. Talking about the “South Side”, “downtown Chicago” or “inner city schools” therefore provided reference points about how cities and schools converge to shape inequality through urban, social, and educational policies. Wacquant (2007) would call these locations a “blemish of place” in which “already existing stigmata traditionally associated with poverty and ethnic origin or postcolonial immigrant status” are fixed upon urban landscapes (p. 67). Geographic

segregation draws attention to the privilege that goes along with Whiteness and money and towards “isolated and bounded territories” that are considered “leprous badlands...where only the refuse of society would accept to dwell” (Wacquant, 2007, p. 67). From the standpoint of biopower, the spatialization of race and privilege is created by and creates varying degrees of biopolitical investment in corporeality; “the biological existence of human beings has become political” (Rose, 2001, p. 1). Through the emergence of these three themes in conversations with teachers at the Jacobson School, I want to propose that it is possible to see how the introduction of behavior genetics into the education system might affect narratives on inequality and further politicize the human body. This argument is strengthened in the next chapter, as I turn towards presenting the narratives of teachers at West Elm.

Chapter VIII. West Elm

Introduction

West Elm is a school building surrounded by asphalt. The exit off the highway leads to a small park, but somehow what seem to be the colors of a leafy space increasingly turn from green to beige: first, a coin laundry mat, then a slew of fast food restaurants, and church after church. The old brick building of the school faces towering apartment buildings on one side and a church ministry on another. Inside, the linoleum floors meet walls of brightly painted murals, posters telling parents to read to their children, and displays of prominent African American historical figures.

My first day at West Elm was in early-November 2016, shortly after the Presidential election. I walked around with one of the school administrators, an African American woman named Georgina⁷⁸. As she explained to me, the school had spent the days following the election discussing the presidential poll they had conducted amongst their students. Every single seventh and eighth grader in the school had voted for Hillary Clinton and were grappling with the outcome of the national election – one which they likely did not expect. Georgina shared with me that the school was taking time to talk with students about “what it means to grow up Black” in the aftermath of Donald Trump’s victory. This was a question I thought about myself. What does it mean to grow up Black in Trump’s vision of America? I have considered how lucky I might be to attend a higher education institution abroad, away from an environment I perceive to be increasingly threatening to my person. The West Elm community does not have the same luxury of escape that I do.

West Elm is located in a neighborhood that is predominantly Black. The school itself is made up of approximately 500 students, 96.7% of these students are Black and 91.1% of all 500 children are low-income. As a charter school, West Elm draws in students whose families have selected in, and opted out, of the traditional public-school system. The school faces the challenges of a limited budget and a crumbling infrastructure. West Elm teachers had to overcome numerous financial and bureaucratic hurdles to take their fifth and sixth grade students to see the film “Hidden Figures.” Earlier in the year, the school gym roof had collapsed, after which the music room and school corridors were transformed into spaces for Physical Education lessons.

⁷⁸ Names of all participants have been changed.

On that autumn day in November, I had the opportunity to sit in on a couple of the classes taught by teachers I would learn more about through a series of deep, and at times, difficult conversations – just as I had at the Jacobson School. I met with West Elm teachers once a month from January-March to have our primary focus group discussions and I began email correspondence in December.

In early April, soon after my final meeting with the teachers, I began working with Florence in her social studies and math classrooms — coming in once or twice a week over a month-long period. On my second to last visit to the classroom, I worked with a fifth-grade girl named Brianna who shared with our small table-group her summary of a reading we had done on Katherine Johnson. Johnson was the NASA ‘human computer’ who calculated the shuttle trajectory for Alan Shepard, the first American in space. She was also the seminal character in the film “Hidden Figures,” which the students had recently gone to see. One of the messages that Brianna had taken away from the reading stood out for me and was represented in her diagram: “just because you are black you can be smart.” ‘Just because’, as a turn of phrase, already identifies a language of race and deficit, but in its expression, it points to an injustice that I believe Brianna clearly understands.

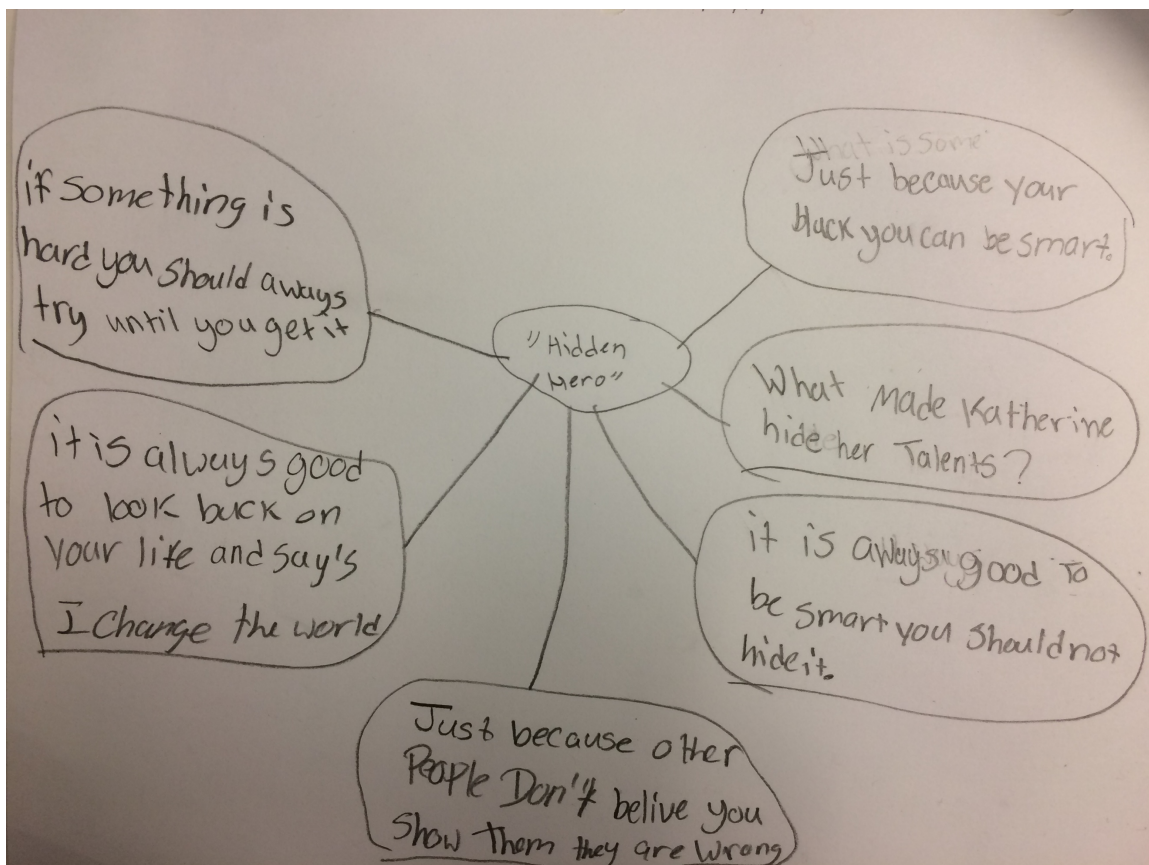


Figure 7 Brianna's Mind-map on Katherine Johnson Reading

Reading over Brianna's diagram, I felt she was saying that Katherine Johnson defied the stereotype that equates Whiteness with intelligence. As Chapter Two illustrated, the conflation of Whiteness with academic exceptionalism is historically entrenched; it is a history that informs and shapes the conversations that took place with the West Elm teachers I worked with.

Themes

In this chapter, I want to build upon the story the Jacobson teachers told in the previous chapter and look to another education environment to answer the question: **How are intelligence, race, socioeconomic status, and genetics understood and articulated by teachers working in different classroom contexts?** I document three ways in which teachers talked about intelligence, genetics, socioeconomic status, and race. I found that West Elm teachers also spoke of intelligence through a lens of determinism; the first theme **Projecting Determinism: Intelligence as Biopower** unpacks the links between intelligence, biopower, and race. In the second theme **Embodying Borders: Geographies of Race and Power**, I evidence how West Elm teachers elicited the many geographic, racial, and sociocultural borders that are enforced upon both their own lives and the lives of their students. West Elm and Jacobson teachers both racialized space and social class through a cartography of economic and cultural capital. Finally, West Elm teachers discussed the relation between power and status by pointing to economic capital as one of the primary modes of reproducing cultural capital. I document this in the third and final theme: **Financing Power: "The Old Boys Network"**. As counterevidence, I also document aspects of teachers' experiences and statements that challenge these themes. The first two themes presented in this chapter parallel emergent themes in the Jacobson School. The final theme is unique to West Elm and helped support my decision to separate these two schools into their own respective chapters.

I refer back to the Jacobson School throughout this chapter, drawing upon many of the theoretical arguments and historical mappings I laid out previously. I do this in part because some of the theoretical analysis from the Jacobson School carries over. However, I continue to highlight important distinctions and areas in which my theoretical perspectives are further advanced.

Participants

Florence, Eleanor, Cynthia, and Juliet each participated in focus groups carried out between January and March 2017⁷⁹. Of these four teachers, two identified as White, one as Asian, and one as biracial (Hispanic and White)⁸⁰. This aspect of my research opened a window into the experiences of teachers working in a disenfranchised and heavily racially and socioeconomically segregated neighborhood. These teachers are vocal about a bureaucratic system that has been set up to fail certain students: their students. Their classrooms were overcrowded and many of their students were achieving below grade-level.

As I emphasized in the previous chapter on the Jacobson School, the teacher narratives revealed in this chapter and the themes that emerged out of our focus group conversations are embodied functions of systemic structures and colonial projects whose legacies endure. Teachers are not the source of emergent concerns that arise in this qualitative interpretation. Responsibility falls upon the system.

Projecting Determinism: Intelligence as Biopower

Similar to the Jacobson School, West Elm teachers carried a language of determinism around intelligence throughout the three focus group discussions. These accounts, like those of the Jacobson School, reflect teachers' realities within their school and society. This section shares teacher narratives as it relates to intelligence, highlighting the embodied function of a genetics narrative that has endured since the 19th century. I hold the same argument as the previous chapter when it comes to teacher conceptualizations of intelligence: genetic ideologies pertaining to intelligence are a mode of regulating the politics of race, class, equity, and education (Rabinow & Rose, 2006). These biological perspectives on intelligence act as a powerful form of normalization, situating student performance in terms of words like 'gifting' and 'natural,' that could distract from efforts aimed at equity. Intelligence as a form of biopower projected determinism 1) through 'molecularization'; and 2) through a conversation on multiple intelligences.

⁷⁹ Eleanor was unable to attend the final focus group due to illness.

⁸⁰ Seventy-six (76.3%) percent of public school teachers are female, 23.7% male. 81.9% of public school teachers (including charter teachers) are White in comparison to 6.8% of teachers who are Black, 7.8% who are Hispanic, and 1.8% who are Asian. In the charter school subpopulation, 74.9% of teachers are female and 25.1% male. Of charter school teachers, 69.9% are White, 13.1% Hispanic, 11.8% Black, and 2.8% Asian. (R. Goldring et al., 2013).

Intelligence as a 'Vital Life Characteristic': "Natural Gifting" provides teacher narratives on intelligence that involve a degree of 'molecularization.' I consider how these views converse with the injuries of race and class that structure the United States. In *Diversifying Intelligence Benefits the Biopolitical State*, I provide evidence of how West Elm teachers were likewise drawn to the theory of multiple intelligences. I argue that the parsing of intelligence into multiple forms reveals a system of hierarchical categorization that allows the biopolitical state to identify which individuals or communities are more valuable and offers higher forms of investment that, in education, manifest in higher quality education.

Intelligence as a 'Vital Life Characteristic': "Natural Gifting"

Biopower contextualizes the mapping of the human genome which gave birth to the postgenomic era. As "new modes of individualization and conceptions of autonomy" are "increasingly understood in corporeal and vital terms," race, health, genealogy, reproduction and knowledge are increasingly interlocked, "continually transforming one another and recombined in multiple manners and modes" (Rabinow & Rose, 2003, p. 16). Today, our understandings of what it means to be human are increasingly 'molecularized,' building upon historical practices of considering genetics in fatalistic terms. Therefore, the tendency of teachers to speak about intelligence through the language of determinism might be seen, at least in part, as a manifestation of this history.

In the first focus group, when Florence shared that: "I do believe that everyone is different, given a different amount of whatever natural gifting that is. Not everybody is meant to be, you know, X Y and Z, and that's ok," she viewed intelligence through a determinist lens. Words like "gifting," "natural," "given," and "meant to be" imply an identifiable quality that is unequally distributed – similar to the meaning the word 'bright' has taken on in education spaces as a replacement for 'gifted' or 'intelligent' (Gillborn, 2016). "Natural gifting" acts as a code word for an innate capacity that posits capability and ability as endowments of the physical body. Florence's definition of intelligence as a "natural gifting" that individuals are "given a different amount of," illustrated the "practices of sorting and classification" that are "an-all pervasive feature of everyday life" (Lipphardt & Niewöhner, 2007, p. 46). As Lipphardt and Niewöhner (2007) discuss, practices of sorting and classification create difference and are historically-informed. Within the US education system, students are consistently tracked, streamed, and surveilled – placed in gifted education if they are identified as highly cognitively able, or special education if it is determined they are in need of extra or more targeted assistance.

Intelligence in this way becomes biopower, feeding into “everyday practice in the sciences,” which “...makes distinctions...on the basis of biological markers” (Lipphardt & Niewöhner, 2007, p. 46). The molecular gaze through which intelligence is viewed unintentionally echoes a biohistorical narrative that is part of a colonial constellation linking science, intelligence, race, and class.

Importantly, the “natural” “gifts” Florence mentioned were also presented in some ways as finite or limited. I found that West Elm teachers used the word “ceiling” to denote a limit to an individual’s capabilities. In the following exchange, the teachers discussed whether hard work and determination are enough to master a subject:

Eleanor: ...Let’s take the movie “Hidden Figures.” I mean I was always good in math, but I didn’t take one math class in college. I do not – I’m not sure that if I looked at calculating the trajectories of – I don’t know that I could do that. You’re [Juliet] saying if I really wanted to [calculate the trajectory of a shuttle in space] I could. I’m not really sure. I’m not sure.

Juliet: I don’t know the premise of that movie, so I don’t know – I can’t–

Eleanor: Like very high-level math, they’re really–

Cynthia: – [they’re] calculating the trajectory of space shuttles into space–

Eleanor: –Using math in new and different ways. I would sort of say–

Florence: –That’s why I feel like I have a ceiling.

Eleanor: Right. Yeah, I guess I think I have a ceiling. More power to you [Juliet] if you don’t. I mean that’s a great way of looking at the world.

(January 2017)

The vocabulary teachers used to describe intelligence demonstrate its biopower. In the above exchange, teachers are responding to Juliet’s belief that:

Juliet: Regardless of the type of intelligence you're talking about, I kind of believe in the growth mindset—that if I really wanted to be better at math I could probably do it. I think that most people if you want to do something and you want to be smarter and you believe that you can actually do it, then I think that's true. (January 2017)

Immediately afterwards, Florence responded to Juliet's resistance to determinism with the question: "but do you think that you would eventually hit a wall?" Then, to expand upon Florence's idea of a "wall," Eleanor referenced the film "Hidden Figures" to demonstrate her uncertainty about the validity of Juliet's stance on ability. The conversation that grew out of a reaction to Juliet's belief in the growth mindset led the other teachers to introduce the idea of a "ceiling" or "wall." While Juliet pushed against determinism, Florence and Eleanor seemed to be arguing that eventually hard work and determination will not be enough to help an individual master a particular area or task. Eleanor appeared to consider Juliet's point of view "a great way of looking at the world," rather than reality.

In another example, I asked teachers in the first focus group to think about gifted education programs and whether they thought children who were identified for those programs were 'smarter.' Eleanor responded by saying: "I do think there are some kids who are really just amazing" (January 2017). Florence expanded upon this by talking about one of her students who might fit into the mold of "some kids who are really just amazing:"

Florence: ...he [a student] was showing signs of giftedness by third grade, which is when I had him and even before then...I also have another kid who, same thing, showing that same potential by third grade and like he was already getting B's. He would go to sixth grade for math, three years above. And [I] would tell mom about it every time she would pick up – come for a progress report pickup – and he's still here [at West Elm] as an eighth grader. So, you know, his mind hasn't – not to say our teachers aren't amazing – but when you're at that level – I don't know what to do with you. I know my limitations.

Juliet: And, it's the need to be around kids — that have the same capacity.

Florence: Right, that have the same capacity to challenge you, and he's still here. I don't know if he's applying for [gifted education programs], these are the schools that he is capable of getting into – I don't know now anymore, I haven't been made privy to

his current grades and standardized testing. But when he was with me in third grade and in fifth grade it was still like out of this world...and that was the raw card he was given, like so gifted.

(January 2017)

Phrases like “raw card,” “capacity,” “ceiling,” “natural gifting,” “level,” and “wall” are biopower in action. In these instances, the socially valued concept of intelligence is thought of in terms of ‘molecular knowledge’ (Rabinow & Rose, 2003). Intelligence, is posited as a ‘vital life characteristic’ with the power to make certain bodies “desirable, legitimate, and efficacious” (Rabinow & Rose, 2003, p. 197). In the US education context, the “desirable, legitimate, and efficacious” map onto race and class as intelligence is often measured in terms of “grades and standardized testing” (Florence, January 2017). These are measures in which Black, Hispanic, Native American and/or low-income students lag behind their upper-income, White, and Asian counterparts. As such, intelligence becomes another mechanism for affixing certain bodies of color into positions of marginality. When Florence shared that: “for me when we always say that we’re a college preparatory school and that everybody can go to college. I disagree with that statement 100%. I don’t think everybody’s brain is meant to go to college and that’s ok,” she brought race into a conversation about higher education because the education environment she referenced is over 90% Black. In Western societies, higher education is seen both as an equalizer and another way to assess the ‘intelligence,’ or worth, of an individual. There is a perception that the more prestigious a higher education institution, the ‘smarter’ an individual who attends it ought to be. However, such thinking may eclipse the fact that many low-income and racially-defined minority students are restricted in their higher education choices for a number of reasons, including geographic distance from their family and financial constraints (Gibbons & Vignoles, 2012). The idea that “not everyone’s brain is meant to go to college,” suggests that one’s success in higher education is, in part, biologically influenced. Removed from the conversation are the realities of informal segregation, “the politics of race and the politics of the inner city” (Hall, 2016a, p. 148). In this context, Florence’s use of the phrase “and that’s ok” could be seen as normalizing the underrepresentation of certain communities in higher education by relegating this phenomenon to the molecular. However, it is important to note that Florence’s comments appear normalizing or essentialist because of the context in which she makes them. As discussed in Chapter Three, the idea that “not everybody’s brain is meant to go to college” could hold some truth; as environments become more equitable, findings from behavior genetics suggests that differences between individuals will continue to

exist and increasingly be attributed to genetic differences (Heath et al., 1985; Selita & Kovas, 2019). Yet, Florence is speaking from an environment heavily informed by social inequality; in the US context, her comments could distract from efforts aimed at social equity. In nations with greater levels of equity, Florence's comments might evoke less discomfort.

In short, as teachers thought about intelligence, they drew upon scientific discourses which have come to represent the truth discourses biopower operates through (Rabinow & Rose, 2003). These truth discourses have become normalized in our ways of thought and understanding because of the “allure of objectivity,” particularly around genomics (R. Benjamin, 2015). Take for example Eleanor, who in the first focus group said: “genetics is genetics, so there's no way to get away from that” (January 2017). Or Cynthia who, during a discussion on genetics-infused education policy in the third focus group, explained that:

Cynthia: I mean it seems like this [Asbury and Plomin's policy points] should've been somewhat common sense anyways – maybe it's probably more detailed and more elaborate because of the gene impact on it but overall, I think it's something that could be useful in our practice. (March 2017)

As we talked about the promises and pitfalls of genetics-informed research for education, Florence explained that “you can't deny that your genes are part of who you are” (March 2017). Mentions of the immutability of genetics are indicative of a historical legacy in which biology and genetics are thought of in essentialist ways; through this the concept of cognitive ability becomes a symbolically weighty vital life characteristic.

'Diversifying' intelligence benefits the biopolitical state

Current behavior genetics research defines intelligence as “the ability to learn, reason, and solve problems” (Plomin & Stumm, 2018, p. 1). These researchers argue that intelligence is important for many outcomes in life. I want to argue that behavior genetics research on intelligence politicizes life, particularly as an individual's educational attainment, occupation, and even health are socio-culturally and socio-politically informed but are also said to be strongly predicted by intelligence (Plomin & Stumm, 2018). Intelligence is further politicized by society's hierarchical ordering of ‘types’⁸¹ of intelligence. As with the teachers at the

⁸¹ As previously witnessed at the Jacobson School, West Elm teachers were familiar with Howard Gardner and the Theory of Multiple Intelligences.

Jacobson School, West Elm teachers argued that society values academic intelligence above all else.

In an exchange during the first focus group between Florence and Eleanor, the idea emerged that the current societal context has rendered having lower academic intelligence detrimental. Society is structured such that “we have systematically eliminated other possibilities [for advancement in society outside of going to college]” (Eleanor, January 2017). While West Elm teachers and Jacobson teachers introduced the idea of different intelligences, they also noted that academic intelligence is the most desired – as Eleanor put it – the “end all be all.” This conceptualization of academic intelligence is supported by the work of Zirkel and Pollack (2016) who found in a case analysis of a school district’s attempt to address racial inequalities that “academic performance...becomes a measure of worth.” Academic performance, as a measure of worth, reveals the possible implications of Florence’s belief that “I don’t think everybody’s brain is meant to go to college”: that some are less worthy than others. The importance assigned to academic intelligence played out further in the following conversation between Florence and Eleanor:

Florence: You talk about Dweck when you’re speaking into your kids’ lives, that’s the kind of mindset you use. You say, “you can do it”, “you can try hard, you can persevere.” But for me when we always say that we’re a college preparatory school and that everybody can go college. I disagree with that statement 100%. I don’t think everybody’s brain is meant to go to college and that’s ok.

Eleanor: But it isn’t ok right now because right now the way the United States is going—

Florence: –I see what you’re saying—

Eleanor: –Is this is the path. We have systematically eliminated other possibilities

Florence: Right, so in the ideal world, where that was not the only path and would, if we valued, all of the different intelligences that exist, then yeah. Because I think as it exists now that [academic intelligence and going to college] is seen as like the end-

Eleanor: –End all be all

Florence: –And it's not. I don't view it as the end all be all. I really strongly believe not everybody's supposed to go to college — and that's OK. Should they go to a technical school, a vocational school and still be successful in their life? Yes. Not everybody is meant to sit in the classroom...

(January 2017)

Again one might argue that the systematic elimination of “other possibilities” is biopower in action — a set of events or relations that create institutionalized routines and normalize interventions that optimize a form of valued life against that which is seen as threatening (B. Anderson, 2012; McWhorter, 2004). Academic intelligence has become institutionalized as biopolitically relevant. The teachers at West Elm, as individuals who have inherited institutional and cultural matrices of power (Bourdieu, 1986), recognized the optimization of academic intelligence and at times attributed the possession of intelligence to the molecular level. The conversation above highlights both determinism and a critical reading of intelligence that recognizes that society values certain kinds of intelligence and by extension professions and people more than others.

Furthermore, whilst a teacher like Florence may believe that genetics plays a role in a child's academic abilities, she also argues that in society “intelligence is solely linked to academics” (January 2017). This makes her aware of the limitations determinist conversation could place on students and compels her to “talk about Dweck when you're speaking into your kids' lives.” As Chapter Four showed, teacher beliefs can inform student achievement and self-perception. The teachers at West Elm seemed to believe they disrupt the possible influence of their internal beliefs by drawing upon the idea of multiple intelligences to demonstrate the important strengths different students may have in different areas; they also talked about adopting a growth mindset. As a result, a teacher like Florence must carefully navigate between believing in the role of biology and telling her students that “you can do it, you can try hard and you can persevere” (January 2017). The conflict between teacher beliefs and expected teaching practice is interesting as it shows that although teachers may believe in the role of genetics in student outcomes, they do not believe acknowledging this to students would be beneficial (e.g. Cynthia's desire to communicate to her students “you can go farther and do more” (January 2017)).

I believe that during these focus groups West Elm teachers thought genetics plays a role in student outcomes. Take for instance, Florence when she said: “you can't deny that your

genes are part of who you are” (March 2017); or when Cynthia explained: “they’re [one’s genetics] going to affect something about you” (March 2017). Moreover, teachers employed a language of possibility when talking about the relevance of genetics for education; a similar approach to how Asbury and Plomin marketed “G is for Genes.” For example, Cynthia shared: “I feel like so many more needs could be met because so much of it [Asbury and Plomin’s proposed genetics-infused education policies] is specific to the child” (Cynthia, March 2017).

As we discussed pre-reading materials on IQ tests in the second focus group and what they can or cannot measure, Eleanor talked about how “what’s not addressed at all is different sorts of intelligence, and that’s also another way of putting people – making people less than somebody else because their intelligence is a different sort” (February 2017). She echoed arguments the teachers made in the first focus group

Juliet: ... That’s important too – for the kids to know that you can be – there’s different ways to be intelligent which is something that we talk about in my class a lot.

Cynthia: Because sometimes they think that if they’re not good at one subject then that means that they’re just not smart as a whole, like an overarching not smart and that’s not true. Just because they [students] might not be proficient in one area doesn’t mean that they’re lacking in their whole life.

Florence: Even though Gardner’s in undergrad classes and we’re aware of this mindset, I feel that as a society we still don’t fully accept that [Gardner’s multiple intelligences] as a definition of intelligence. I feel like intelligence is solely linked to academics.

Eleanor: I would agree.

(January 2017)

Although Juliet mentioned that “there’s different ways to be intelligent” and Cynthia argued “just because they [students] might not be proficient in one area doesn’t mean they’re lacking in their whole life,” they established links between intelligence and the political economy. Florence recognized this when she said: “I feel that as a society we still don’t fully except [Gardner’s multiple intelligences] as a definition of intelligence”– she saw academics dominating the conversation on what intelligence is (January 2017). The power of intelligence, and academic intelligence in particular, is such that even attempts at ‘non-determinism’ (i.e.

Theory of Multiple Intelligences) are bound by the weightiness of academic intelligence. As Eleanor mentioned in the first focus group: “if so called intelligence and your grades in all your academic subjects are how you are judged it is another way that we shut down kids, that we give a message that – it does not empower children, it shuts them down (Eleanor, January 2017).

However, I sensed a tension in how West Elm teachers talked about intelligence. On the one hand, teachers employed deterministic language to describe intelligence. On the other, they performed critical readings of intelligence and pointed out how academic intelligence is used to sort children in schools and individuals in society. These contradictions highlight the mixed feelings teachers carry around intelligence and could be reflective of the apparent disconnect between beliefs and intended practice.

Fixed conceptualizations regarding intelligence and its origins have cast IQ as a ‘vital life characteristic.’ Behavior genetics research writes: “cognitive abilities predict educational attainment, income, health, and longevity, and thus contribute importantly to the intellectual capital of knowledge-based societies” (Plomin, Haworth, Meaburn, Price, & Davis, 2013, p. 562). Through biopower, I have sought to demonstrate the consequences of viewing intelligence as a form of vitality. As teachers pointed out, possessing academic intelligence is seen as the “end all be all,” which impacts how an individual is viewed within society and the opportunities and resources made available to them. In the United States, access and opportunities map onto skin color, establishing a link between biopower, intelligence, and race.

As I mentioned in the last chapter, biological discourses on intelligence have become a biopolitical truth discourse. In the practitioner accounts at both West Elm and the Jacobson School, the truth discourse surrounding intelligence hybridized “biological and demographic or even sociological styles of thought” (Rabinow & Rose, 2003, p. 4) through references to the theory of multiple intelligences and environmental factors.

As West Elm teachers reacted to the arguments of behavior genetics researchers in the third focus group, their stories illustrated how behavior genetics researchers have become authorities considered competent to speak the ‘truth’ that is their findings (Rabinow & Rose, 2006). I presented teachers with Asbury and Plomin’s 11 policy proposals⁸² for “genetically-sensitive schooling” (Asbury & Plomin, 2013) and a list of arguments behavior genetics researchers have made for incorporating genetics-infused research into education (e.g. Kovas, Tikhomirova, Selita, Tosto, & Malykh, 2016; Stanford University Center for Education Policy

⁸² The policy points and list of purported benefits are in Appendix A.

Analysis, 2015). In response, Florence talked about the benefits she saw such a system having for children with cognitive disabilities:

Florence: So, when Juliet brought up the ‘earlier more tailored career advice,’ for me I like that because there are some kids that have come across our paths and because of whatever cognitive disability they have – you know, even though we’re a college prep school, and all that stuff, I’m also, like what is their life realistically going to look like? And I think for those students in particular having real world options as a, being presented, that to me is a beneficial thing, right? Versus like a parent not having an understanding that their child has a severe cognitive disability – you know they have an IEP, you just chuck them all in – like you’re in sixth, seventh, eighth grade and you’re reading at the kindergarten level. What does that mean when you graduate high school? So that’s what I saw it [the proposed benefit] as – a benefit for those kids who have severe cognitive disabilities who can’t function in like a school like ours.

(March 2017)

In the above example, Florence commented on behavior genetics ability to intervene and identify cognitive impairments in order to provide children with alternative options. Gulson and Webb (2018) demonstrate how “education policy and ‘life’ have been connected through biopolitics,” discussing the biopolitics of “old’ and ‘new’ eugenics around streaming, testing, and segregation” (p. 276). The advent of behavior genetics signifies “the increased capacity to intervene in ‘life’ as a molecular biopolitics” (Rose, 2007 in Gulson & Webb, 2018, p. 276). Precision education is an example of an intervention on the human body. I felt Florence saw behavior genetics’ purported ability to offer “earlier and tailored career advice” (Asbury & Plomin, 2013) as support for her belief that “not everybody’s brain is meant to go to college.” Perhaps Florence sees behavior genetics as able to identify which “brains” are “meant to go to college” and provide the truth discourse she currently feels unable to provide parents (e.g. “a parent not having an understanding that their child has a severe cognitive disability”). In this way, Florence may not see herself as an authority ‘considered competent to speak that truth,’ but she believes that behavior genetics can be. Through this example, I believe it is possible to see how education policy and ‘life’ have been and could be connected through biopolitics.

Embodying Borders: Geographies of Race & Power

Borders are ways in which individuals both construct and understand the world (Nayak, 2011). Imagined borders – the ways borders are embodied, enacted or imagined by individuals or groups – mediate one’s own way of seeing how place and space function to shape people’s perspectives on those who live within or out. Gender, race, class, and geography are examples of borders that are also political constructions. Through borders and bordering, the “modes of investment” (Foucault & Senellart, 2008, p. 77) carried out by the biopolitical state are unequal and dependent upon the extent to which a body is considered worthy. Gulson and Symes (2007) argue that the study of borders and spaces within education enriches “understandings of the competing rationalities underlying educational policy change, social inequality and cultural practices” (p. 97).

Teachers at West Elm recognized the informal and formal segregation of privilege, advantage, opportunity, and social and cultural capital, identifying a relationship between geography, access, and opportunity. It became clear that teachers drew upon their own experiences to conceptualize borders: 1) in terms of the geographic concentration of capital resources; and 2) by spatializing race. The “political geography of race consists of space, place, and location as shaped simultaneously by gender, class, and scale” (Gilmore, 2002, p. 15). Given the racial segregation of the city of Chicago⁸³, seeing racial and socioeconomic borders in the geographic landscape is an expected outcome and also generates a point of intersectionality. These borders shape the lived experiences of Chicago residents, including the students and teachers of West Elm.

I want to emphasize that the US’s segregationist history contributed to the development of this theme. Bernasconi (2010) writes that the ‘medicalization’ of race and racism at one point or another “called for segregation, apartheid, eugenics, and eventually sterilization and the holocaust” (p. 205). The establishment of formal racial segregationist policies, which were legitimized through biosocial discourses on race, endure today in the form of geographic and socioeconomic borders that remain tied to skin color. These borders posit educational sites as biopolitical spaces in which the bodies of children, whose educatory experiences are shaped by their parents’ socioeconomic status and family home location, receive differential access to quality education. In the US, inequality is at times perpetuated and, in some instances, increased during an individual’s journey through education (Hanushek & Rivkin, 2006; Reardon, 2011; Reardon & Owens, 2014). This stems from the use of property taxes to fund

⁸³ Refer to the map in Chapter Six for a visual representation of Chicago’s racial segregation.

schools, which concentrate poorly funded schools in poor areas. Historical context and a complex system of intersectional (dis)advantage have secured biopower's disciplinary hold over the body in terms of race and class.

I have broken this section up into two sub-sections that parallel those of the Jacobson School. The first, *Spatializing Privilege: Cultural Capital is Geographically Concentrated*, provides evidence of teachers' geographic mapping of privilege or disadvantage. In the second sub-section, *Spatializing Race: The Intersections of Segregationist Policies*, I seek to unpack how understandings of race seem to be spatially applied. Echoing the Jacobson School, I want to argue again that space continues to function as a segregationist way to understand race.

Spatializing Privilege: Cultural capital is geographically concentrated

West Elm teachers work with underprivileged and underserved students. Their school is "bursting at the seams" (Juliet, March 2017) to cater to the children coming through their doors. The community does not have the same access to privilege and educational opportunity as the Jacobson School. Classrooms are predominantly populated with bodies of color who are also low income. These lived experiences shape how teachers see geography and the role it plays in informing advantage or disadvantage. Residents of West Elm encounter "socio-political invisibility" (Fullwiley, 2004, p. 159). The segregation of educational opportunity and social capital is an effect of this socio-political invisibility – a manifestation of discriminate biopower. West Elm teachers recognized that educational opportunity is informed by socioeconomic status and neighborhood location. Due to economic segregation, low-income parents have an even harder time securing resources for their children that other communities receive as a fundamental human right. Segregation leaves the marginalized searching for ways to secure their own vitality and physically demonstrates how they are considered unworthy of investment. Low-income communities of color like West Elm have to overcome the biopolitical state's maxim of 'letting die.'

West Elm teachers spatialized privilege in the second focus group when they looked at data on racial and socioeconomic disparities in the US education system, including in gifted education. Eleanor mentioned one of her students, whom she believed would benefit from gifted programming. However, the geographic distance of the gifted education program she recommended to her student's parents posed a potential challenge to access:

Eleanor: ...I got, there was a family that I told about the Saturday – [University] has a gifted and talented program and it's usually Saturday – and I was just talking to a parent about that. I said: "I'd look into this."

Florence: ...The thing is if you didn't say something, if teachers in the classroom didn't say something—

*Eleanor: –Right this is a kindergartener who can read engineering, he can read anything, and he's in kindergarten...He can read the "Project Lead the Way" story up there at the board and if he reads it they're [his classmates] like this ** demonstrates enthralment. ** So, I said [to his parents]: 'you need to just – hey this [being at West Elm] is ok – but, yeah'. But, I don't know. Do they want to drive from here to [northern suburb] every Saturday morning? I don't know.*

Florence: Right, do they have the option to do that. Is their job not on a Saturday where they are able to do that?

Cynthia: Do they have a car that could—?

Florence: –To get up to Hollow Woods⁸⁴ because it's not exactly public transportation friendly.

Eleanor: ... It's also an interesting function because sometimes I think if you have kids when you're 30 as opposed to when you're 18 or 20...you're better able to say this [children] takes priority...and I think sometimes in this neighborhood if you've got six kids it's hard to do. Or you don't have resources – all sorts of things are difficult.

Cynthia: And we do have a lot of young parents.

Florence: Whereas in different neighborhoods, where it's like upper-middle class, the parents are having their first kids in their forties versus in their lower teens or early twenties. That's a difference; you're in a different stage of life. (February 2017)

⁸⁴ Suburb name changed.

In the above conversation, gifted education is presented as a resource that is geographically removed from West Elm students. In this case, one of Eleanor's students, who is exhibiting signs of giftedness, is restricted in his educational opportunities because of the neighborhood he lives in. Eleanor and Florence talked about how upper-middle class families and older parents may be more invested in the lives of their children and might have the time and money to drive their child an hour north to a Saturday gifted education program. Existing literature supports the fact that upper-income parents are more invested in their children's education (Feuerstein, 2000); these teachers are likely correct to think the parents of Eleanor's student would be less able to drive him to this particular gifted program. However, I want to point out that there are structural barriers that inhibit the West Elm community. It may not be that parents are less 'invested.' Less invested suggests that parents are simply uninterested in their child's future instead of the possibility that they are unable to overcome the deleterious effects of economic and racial segregation and their lack of resources.

It is also worth considering that upper-income parents might already reside in locations where education opportunities like gifted education are more readily available; driving an hour North might be unnecessary for them if they already live there. While Florence was positive about bringing genetics-infused research into systems of education during our discussion in the third focus group (e.g. "I see this benefitting everybody in the student population"), she also realized that "we already have kids who should have support services and for whatever reason they don't. But, I know without a shadow of a doubt if they were just down the street, they would've gotten whatever they needed in a timely timeline" (March 2017). Florence knows that "tools have different effects based on your zip code" (March 2017); geography is tied to wealth.

To combat the starvation of resources, opportunity, and access among their school community, teachers at West Elm found it particularly important to convey to their students the possibilities outside their current environment. This may partially explain why teachers at West Elm offered more critical readings of intelligence than those at the Jacobson School. In the first focus group, Eleanor and Cynthia both talked about the value of imparting a growth mindset on their children who find themselves in spaces where "they already feel limited by a number of different things" (Cynthia, January 2017). Eleanor spatialized socioeconomic status when discussing the importance of "broadening what is possible" for her students:

Eleanor: I guess the biggest thing is that...I'm going to use this loosely – middle class kids grow up with the idea there are enormous possibilities. I think kids, say in this

neighborhood – what we seek to do is broaden their perspective of what is possible because they don't have this bigger perspective. Broadening what is possible – that can affect how they develop, even intellectually, what they think is possible. (January 2017)

Similar to Eleanor, Cynthia also talked about conveying possibility and optimism to her students. In the following conversation, I asked teachers to comment on a pre-reading excerpt from a work by Arthur Jensen, a psychologist who focused part of his academic career on asserting that race-based differences in intelligence were partly genetic:

Daphne: Jensen is talking about... 'Spearman's 'g,' which he is defining as this innate cognitive capacity that is rooted in the biological and fixed so to speak. I'm interested in your thoughts on that.

Eleanor: That [Spearman's g] may very well be true, but it's also something that can be used against X number of people.

Cynthia: And it's also not something you want to tell your kids. Because especially I feel like in this neighborhood they already feel limited by a number of different things, and so I feel like one of the big things we push at this school is that you can achieve and if you work hard enough you can, you know, get into a magnet high school, you can go to a college of your choice, you can go farther and do more.

(January 2017)

Although teachers did not dispute the possibility of an innate cognitive capacity (Eleanor: “that may very well be true”), they did caution against conveying this to their students who are in many ways acted upon by deterministic forces. Children like those at West Elm are consistently denied opportunities, “limited by a number of different things,” that research tells us narrows their possibilities. As teachers talked about student ability and achievement in relation to “this neighborhood,” “this school,” or “in this community,” they invoked the racialization of place. Although teachers may be open to molecular interpretations of intelligence, they also saw environmental factors like geography and societal marginalization, having a significant impact on their students’ chances at academic success. Here, biopower is twofold. On the one hand, the use of the term intelligence represents biopower with Eleanor’s

acceptance of Spearman's *g*. On the other hand, the geographical concentration of privilege Cynthia identifies has physical ramifications for bodies.

At another point in the first focus group, Florence reversed the conversation which had largely focused on what West Elm students do not have access to:

Florence: If you had a kid who's academically gifted, successful, came from Northwood,⁸⁵ and you threw him into a setting like this – would he be able to experience the same kind of success? And in what areas would that success be demonstrated in?
(January 2017)

Here Florence thought about what the experience would be like for a student from a wealthier northern suburb of Chicago if they were to be transplanted into the West Elm neighborhood. In sharing her perspectives on what would happen, Florence empowered her students by revealing a knowledge landscape her children possess that others in more financially privileged areas might not:

Florence: So, would he still be able to demonstrate that academic piece? Probably. But...the social piece? In terms of, how do you survive when things don't follow the rules? It's a real world where these kids [in our school] have to learn two different sets of norms: the norm of their environment and the norm of like our wider culture...Our kids are much more savvy because they have to navigate two different systems. (January 2017)

To better understand what Florence shared, I refer back to the last chapter's application of Matthew Hannah's exploration of biopower (Hannah, 2011). Hannah writes that "the control all people have over our own futures is premised upon some minimal secure access to resources" (Hannah, 2011, p. 1049). The inequitable pooling of privilege signified a "gap between the potential to support human life and the systematic failure to do so" (Hannah, 2011, p. 1052). Florence's children have to learn to "survive when things don't follow the rules"; the environment West Elm students live in is indicative of the 'systematic failure' to support human life.

⁸⁵ Name of suburb changed.

Spatializing Race: The intersections of segregationist policies

Converging educational, economic, and social policies have mobilized to “ground neoliberal policies directly in an appeal to the people” (Hall, 2016b, p. 203). Historical segregationist policies and contemporary choice policies in a world of rising austerity, xenophobia, and populism contributed to West Elm teachers’ ‘spatialization’ of race. Gulson and Webb (2016) argue that today “policy, and race and racializations cannot be understood outside of, or immune to, neoliberalism” and have shown how policy becomes “a form of racial biopolitics” (p. 153). Contemporary choice policies, which are both maintained by and borne out of advanced neoliberalism (W. Brown, 2015), take shape through school voucher programs, private schools, alternative schools, and charter schools. According to Brown, this advanced form of neoliberalism is quietly corroding democracy, shifting focus away from justice, equality, and popular sovereignty and towards human capital, market principles, and competition (W. Brown, 2015).

Gulson and Webb (2016) stipulate that these neoliberal education policies and practices have “transferred or downloaded...forms of racial biopolitics onto populations which are now ‘free’ and ‘empowered’ to produce and maintain variable raciologies” (p. 160). It is important to remember that the United States has in recent years moved to expand school choice policies, which some say perpetuate social and racial inequality (as discussed in Chapter Six), especially in large urban centers like New York, Chicago, and New Orleans, (Brathwaite, 2016; Cook, 2016; Lipman, 2011). The racial assemblages crafted out of neoliberal education policy, therefore, solidify and exacerbate existing geographic divisions along race and class lines.

I found that when a West Elm teacher talked about their school community in relation to money and geography, they most often invoked “conventional geographies of race” (Delaney, 2002, p. 6). Take for instance, Eleanor, who brought geography into the conversation when commenting on a pre-reading excerpt from a paper by behavior geneticist Robert Plomin. In reflecting on the statement “intelligence is one of the most heritable behavioral traits,” Eleanor expressed anxiety about how this scientific perspective might be abused to further marginalize children who are already geographically concentrated in disenfranchised communities:

Eleanor: One of the things that makes me a little nervous is not so much the statement that “intelligence is one of the most heritable behavioral traits” it’s that the use of that by a non-science, from a non-science perspective, allows you to say: “this group is

stupid” or, it makes me nervous that, you know, kids from the West Side are not going to be able to compete...On the other hand, genetics is genetics, so there’s no way to get away from that, but it makes me nervous that we could make less scientific conclusions from that...” (January 2017)

First, Eleanor seemed to display a level of trust in scientific research findings by saying her discomfort stemmed “not so much the statement that intelligence is one of the most heritable behavioral traits....” This supported her argument later in the conversation that “genetics is genetics.” However, she also exhibited anxiety over the power of Science and its possible misuse: “it’s that the use of that...from a non-science perspective allows you to say: ‘this group is stupid’.” In particular, she appeared to suggest that Science could further disempower “kids from the West Side”—children like the ones she teaches. The misuse of science to say: “this group is stupid” touches upon the lived experiences of the children at West Elm, who in addition to being relegated to a particular geographic region that is predominantly African American and low-income, are affected by historical discourses that equate race with intellectual ability. In Eleanor’s eyes, these children are “not going to be able to compete” against the symbolic weightiness scientific discourses hold within society, particularly if behavior genetics arguments are used to legitimize racial disparities in academic performance.

Additionally, when Juliet talked about her experiences growing up three miles from the school site in a completely different environment, she hinted at the racial segregation of Chicago. Her own experiences have shown her that success in life is influenced by “who you are and where you are coming from.”

Juliet: I grew up in Kleinshold⁸⁶ so I had literally three miles from this building. My experiences were so vastly different than any one’s here...I was lucky that I lived three miles west of here, you know? Because I was able to get so much more than — and it’s not because I was more deserving of it or anything like that — it’s just...I think a lot of it has to do with who you are and where you’re coming from and that’s not really fair. (February 2017)

“Who you are and where you’re coming from” is a depiction of the intersects of race, class, and geography – it speaks to an unfair system that advantages some and disadvantages

⁸⁶ Neighborhood name changed.

others. West Elm teachers were aware that an intersectional understanding was necessary for making sense of the lived experiences of children attending schools like theirs. Not unlike Eleanor, Florence also drew upon personal experiences to contextualize the existence of geographic and racial borders of privilege, though she did so more explicitly:

Florence: The 1996 quote talking about how the Black mean is 15 points below that of Whites. Sure, it was written from a White lens so why wouldn't the White people do better? Or even like for me growing up in a White suburb and being exposed to that culture, why wouldn't I do well on that? I was given the privilege of getting to be exposed to that, knowing the language of what it meant to take that test, so sure, of course, it's a no brainer, right? (February 2017)

The spatialization and racialization of Florence's experiences are bound to notions of privilege – the privilege of Whiteness, which she received because of where she grew up. While she makes mention of place, she also acknowledges Whiteness as the dominant culture. In doing so, she feeds into prior discussions with teachers about a system that has been set up to make some fail and others succeed: “the Black mean is 15 points below that of Whites. Sure, it was written from a White lens so why wouldn't the White people do better?” Conflating space with race makes physically apparent the effects of White privilege.

The racialization of space also occurred in conversation on the significance of parents. Parents were viewed by these teachers as care-givers who have the ability to either break down the borders that may be inhibiting their children or solidify them. Both Cynthia and Juliet maintained the importance of parents who understand the education system. In the following conversation, Cynthia begins by asking whether racial disparities in gifted education have to do with “parental disposition:”

Cynthia: Do you think that has something to do with, like a parental disposition – like White parents are more inclined to be pushy about it too – like: “my kid's special” or “my kid's super smart, or my kid's whatever.” Or in like – and I'm asking–maybe more Black parents are like: “I'm lucky my kids are even in school.” (February 2017)

Juliet's response to Cynthia discussed the knowledge landscapes of parents in different geographic settings, tying in location to race. Juliet's experiences have shown her that “parents in this community, don't even know that's [gifted education] a thing.” She went on to talk

about “someone who lives in Branfield⁸⁷” where she now lives and how those parents, “they know.” Juliet is aware that privilege “has a lot to do with where you’re living” and sees the impact of this on the lives of her own students:

Juliet: ...I think a lot of our parents in this community don’t even know that’s [gifted education] a thing. They don’t know that they could ask: “why don’t you have a gifted program?” They don’t know, they don’t know their rights as parents. They don’t know what to ask for, they don’t know the legality of it, whereas someone who lives in Branfield, where I live, those parents they know, and a lot of that has to do with where you’re living, the education that, you know – which is sad that that’s how Chicago is. (February 2017)

Through cartographies of race, privilege, and space, the teachers at West Elm identified cultural and systematic structures which inhibit equity. Too, they recognized the unfairness born out of dominant cultural expectations that not all are privy to (e.g. see Eleanor: “drank the Kool-Aid” in the next theme). In doing so, they hinted to the evacuation of public spaces in schools like their own, which cater to public school students while holding a charter status. Recognizing the geographic, sociocultural, and racial borders enforced upon West Elm and the children who attend it is intersectionality – it considers how boxes, categories, labels, and assigned definitions inform concepts of social inequality, relationality, and power (Collins & Bilge, 2016). This intersectional framework allows biopower to label the dispossession of the poor and colored body, and its risk of death (whether physical or social), as “an essential and noble pursuit necessary to ensure the survival of the social body” (Inda, 2002, p. 99). Geography serves as another way to categorize bodies in terms of worth and enforce discriminate biopower. I believe that when West Elm teachers talked about the borders enforced upon their students and the spaces they are or are not welcome in, they bore witness to marginal groups’ expulsion from the body politic.

Financing Power: “The Old Boys Network”

Money is a manifestation of capital. It helps determine one’s access to resources and opportunity, and position on the social ladder. As a symbol of status, money finances power.

⁸⁷ Neighborhood name changed.

As the previous theme showed, wealth is geographically concentrated in particular pockets of the United States (Florida & Mellander, 2016). These concepts are not new; there is an established understanding of the relationship between geography and wealth and how they solidify upper-class consciousness (Higley, 1995). Therefore, I begin this theme by acknowledging that much of what is shared here is applicable to the previous theme: *Embodying Borders: Geographies of Privilege and Race*. When talking about privilege and power, it is hard not to also talk about place, as Higley demonstrated in the book “Privilege, Power, and Place: The Geography of the American Upper Class” (Higley, 1995). At the same time, however, I want to talk about more than where privilege and power exist and focus in on who owns it, how they came to own it, and what it means for communities defined out of discourses of difference.

In the focus groups, West Elm teachers raised the importance of socioeconomic status in terms of power, access, and academic performance. They tended to believe that ‘the system,’ which operates through wealth, has been set up to prioritize certain communities from which their students are excluded. Additionally, teachers talked about the generational impact of wealth and identified those who comprise the establishment, namely White males. As I began analyzing how teachers talked about money and class status, I sensed yet again that teachers were experiencing conflict over the factors they saw affecting student achievement and ability. I still struggle to come to terms with how a teacher like Florence was able to view intelligence in terms of “natural giftings” or argue that “not everyone’s brain is meant to go to college” and also recognize biases in education, including the impact of funding on educational and social inequality. I sense a contradiction in holding these two perspectives. How is one able to believe that the system is set up to fail certain students and also that those same students are not necessarily destined for socially-desirable outcomes like higher education? When a teacher like Florence said “not everybody’s brain is meant to go to college” (January 2017) and also that the education system is “about whoever holds the power and whoever holds the power they don’t want to share the power” (February 2017), I am reminded that human beings are complex and full of contradiction (Berliner et al., 2016). Furthermore, I am reminded that the beliefs and perspectives of these teachers born out of dominant hegemonic discourses that are structurally entrenched.

I have chosen not to create sub-themes for this section as I feel it is a richer exploration of the mechanisms at play that lead to the bordering outlined in the previous theme. Instead, I look to understand who benefits from biopower: how, by whom, and for whom are power and biopower financed? As teachers revealed their perspectives on “who holds the power” and

“who continues to hold the power” (Florence, February 2017), I began to see an enduring biopower mentality about who is more or less worthy, valued, or needed in our society.

The idea of who is valued is bound up with financial status. This emerged when Eleanor coined the term “the old boys network” (February 2017), in the second focus group, to describe those with money and power. The teachers were talking about a handout⁸⁸ I had shared with them that presented two takes on IQ tests and what they measure. One excerpt quoted Ken Richardson, who talked about the construction of IQ tests to predict school achievement (Richardson, 2011), the other was an excerpt from a journal article on the heritability of intelligence (Davies et al., 2011). Juliet began by talking about how IQ tests are often used in essentialist ways: “they want a test that’s going to tell [them]: ‘I’m going to do a good job. I’m going to be successful’.” She continued by arguing that these tests “weren’t designed for inner city⁸⁹ kids who haven’t been exposed to everything.” Eleanor soon chimed in when Juliet asked: “who made these tests and who were they created for?” and spoke about “the old boys network” that is unwilling to let go of its privilege:

Eleanor: We were just talking about affirmative action, but if you think about it, there’s been, you know ‘the old boys network,’ for years and years and all the people in power have enjoyed the fruits of that, and yet when somebody says you need to do affirmative action for this other group of people that haven’t had that, the ‘old boys network,’ the old boys, don’t want to let go of that. (February 2017)

Teachers called out the “old boys network” and discussed the ramifications of the pooling of privilege because they see these effects in their working environment. West Elm students stand in contrast to the experiences of those in the “old boys network,” who are empowered and well-resourced. Juliet acknowledged this while drawing upon a hidden dialogue on race to talk about the ‘inner city’ children she teaches who “haven’t been exposed to everything” and who are at a disadvantage when it comes to taking tests that have great social meaning, but which were not designed for them. Eleanor also pointed out these intersections when talking about the experiences of her daughter who attended a gifted education primary school program before moving on to an International Baccalaureate (IB) program in secondary school.

⁸⁸ Refer to Appendix A for a copy of this handout.

⁸⁹ “Among the central places of what might be called conventional geographies of race lie “the inner city,” “the reservation,” and “the border” (Delaney, 2002, p. 6).

Eleanor: My daughter went to the gifted program at Franklin⁹⁰ and then she went to IB at Grafton High⁹¹ ... and I'm looking around at the IB program going 'there are no Black kids in the IB program' ... The head of the IB program went, 'middle-class Black parents don't want their kids going to school with ghetto kids.' So, I think when we talk about parents – I think it can be a function of educational status as much and finances as much as race in other words. If your parents are whatever, doctors, lawyers, whatever, you are going to be going to good schools, you are going to be going to good colleges regardless. It's just that proportionally you could argue that there are more Black people who have less money. (February 2017)

Eleanor brought race into the conversation but showed how money, in some ways, 'trumps' skin color. Even "middle-class Black parents don't want their kids going to school with the ghetto kids." In the Chicago context, "ghetto kids" are likely to be children of color and/or low-income children. Eleanor drew out the importance of financial stability and the entitlement it gives to parents regardless of race as well as the educational opportunities this affords children (e.g. "you are going to be going to good schools, you are going to be going to good colleges"). However, she also utilized intersectionality in her awareness that "there are more Black people who have less money." The coupling of race and wealth affixes monetary value to skin color. From a biopower perspective, those who are considered more worthy, talented, valued, or needed have secured financial status and are marked by a physical signifier: skin color.

I believe that the disenfranchisement of the West Elm school community makes it even more apparent to these teachers that privilege does not reside in the hands of their students, who are doubly disadvantaged by race and socioeconomic status. The lives and bodies of West Elm students receive differential (unequal) modes of investment. In contrast, the "old boys network" thrives and has "continued to stay in power by putting in the constructs that exist" (Florence, January 2017). I thought about this more deeply when I asked teachers to share the extent to which they agreed or disagreed with the statement "a child's socioeconomic status plays an important role in their success in the classroom." All of the teachers stood in the disagree corner, which initially surprised me given the context of their school where I thought

⁹⁰ School name changed.

⁹¹ School name changed.

class status would loom large. I asked the teachers to expand upon their reasoning for disagreeing with the statement, to which the Florence and Cynthia responded:

Florence: Because we have some like crazy geniuses in our school, like we really do, like very

Cynthia: –Like very talented

Florence: –Like very talented and not even just talking about the academic piece, but like so amazing that if they were dealt a different card, their path could be so different, so different from these – like high school, college, all of it – just one card different in their deck and it would be completely different.

(January 2017)

I continued to try and unpack their perspectives, which I felt could have two potential readings. First, it seemed to me as if teachers were saying that the “crazy geniuses” in their school showed them that socioeconomic status did not have to impact a child’s performance in the classroom. Reading their thoughts from this perspective might engage the concept of determinism. If “very talented” children were unaffected by socioeconomic status, was talent a product of ‘nature’ instead of ‘nurture’? At the same time, they seemed to also say that class status was important, that “if they [West Elm students] were dealt a different card, their path could be so different.” As Eleanor joined the conversation, I began to see this conversation in terms of the latter:

Eleanor: And I think the other factor is the way school funding is totally linked to the socioeconomic status of the neighborhood. We have made sure that by school funding, we’ve made sure to say: “the wealthier you are the better your school.” (January 2017)

The teachers circled back to money as a measure of intrinsic worth (“the wealthier you are the better your school”). Applying biopower, policies that perpetuate economic inequality through inequitable school funding are mechanisms through which biopower is maintained. This is then reproduced within schools themselves as those schools and areas that are better funded provide more educational opportunity and choice, including gifted education programming. In this way, economic policy feeds into education policy and its differential

application. Gulson and Webb (2017) talk about “education policy as a form of biopolitics,” discussing how education policy has become a “site that focuses on dismantling and remaking of the “body” (p. 23). While Gulson and Webb focus in particular on the “new biological rationalities” that may come to inform education policy, I believe that current education policy practices in the United States that rely upon tax-payer funding already are a form of biopolitics as they affect students on the basis of socioeconomic status and race. This is supported by Eleanor’s acknowledgement that “every student who’s in poverty doesn’t score as well [on tests]” and belief that “it’s the educational system that’s defined that [that socioeconomic status is to blame]” (January 2017). She further explained: “we hide behind saying “poverty does that,” but we’ve defined it. People in power defined that the funding of education—” (January 2017). I took Eleanor’s statement to mean that those in power are responsible for education disparities as they dictate the “funding of education.” I felt that Florence’s response to Eleanor elucidated this: “They’ve [people in power] continued to stay in power by putting in the constructs that exist.” These “constructs” institutionalize biopower in a way that normalizes the underperformance and underachievement of students like those at West Elm. As Cynthia pointed out “it’s not necessarily the child’s fault,” as low-income status has an array of implications for an individual. For instance, Eleanor talked about how poverty could make a child’s life “less predictable, their nutrition may be much less good, even their sleep” (January 2017). Eleanor is hinting to how biopower is carried out on the body; through less sleep and poor nutrition, the health of some bodies is not seen as a priority of the biopolitical state. Through a discussion of poverty, I came to see money as an apparatus for executing biopower.

As another example of how money enforced biopower, teachers talked about how systemic inequalities perpetuated by the “old boys network” affect the education system:

Florence: It’s [accepting affirmative action] relinquishing power. That’s what this has been all about, for the longest. It’s about who holds the power and whoever holds the power they don’t want to share the power.

Cynthia: It has a trickle-down effect, to the point where it affects the educational system.

Florence: Oh, for sure. It’s such a big problem, it’s so complicated. I mean—

Eleanor: –But the educational system is totally, I mean—

Florence: –Is biased

Eleanor: Well but I mean it's all related to property values, which means rich people have schools, which are better funded by definition.

Florence: Exactly. And then when you have this budget crisis and people who are living in these suburbs, of course they don't want X, Y of their taxpayer's money to go towards the whole pot.

Eleanor: But even within Chicago...Like the schools my kids went to, parents raised \$100,000 a year. They were public schools, but there was a parent group that was raising \$100,000. I mean, could you imagine this school raising \$100,000 a year from the parents?

Florence: Right so even in this city, even in this city it's the same thing. It's like how are we expected to have a parent-teacher organization where the parents themselves can bring in that kind of money when they're just trying to make it from paycheck to paycheck. It's not a fair system.

(February 2017)

Through this conversation, teachers observed how education reproduces inequalities and social relations of production (Jenks, 2003; R. Nash, 1990). For the West Elm teachers, education in the current context does not operate as an equalizer – social mobility, or the lack thereof, stands in conflict with democratic equality. Eleanor's observation that "rich people have schools, which are better funded by definition," highlighted the intersections of class and education, something considered an inherent right but, according to the teachers at West Elm, is actually dictated by inherited systems of privilege. These teachers were elucidating categories of marginalization. "It's not a fair system" is the result of different structures joining together to solidify either the privilege or disempowerment of certain groups.

Teachers also discussed the negative implications of genetics-infused education policy for equity in relation to finance-driven biopower. I want to repeat that teachers were positive about many of the purported promises behavior genetics could bring to education (e.g. Florence: that's what I saw it [the proposed benefit of earlier and more tailored career advice using an individual's genetic profile] as – a benefit for those kids who have severe cognitive disabilities

who can't function in like a school like ours (March 2017)). These positive views (alongside their concerns) were shared by all the teachers who were at the final focus group:

Daphne: Would you say that the general views or arguments that they [the behavior genetics researchers] were presenting you would react to in either a positive or negative way? Or neutral?

Florence: I mean in a positive way

Juliet: Overall positive

Cynthia: Yeah

Florence: It's like I see where it's wanting to go, I see how it's uncovering something that is never – you know that we haven't thought about in this way, and I'm like yeah it makes sense. But, just how is it going to actually play out

Cynthia: [it] Could be useful

Florence: –I think that's the part that I'm very nervous about.

Juliet: That's kind of what I was thinking too, like what would this actually look like, can people just come to a school and be like 'this is my child'. So, that's kind of what I was thinking as I was watching it.

Florence: And then it gets me thinking about issues of funding. We talked about policies – ... already have kids who should have support services and for whatever reason they don't, but I know without a shadow of a doubt if they were just down the street, they would've gotten whatever they needed, in a timely timeline...And there're going to be kids that we all experience that will leave this entire academic year despite our classroom efforts and documentations of X, Y, and Z – [they] still won't get what they need in terms of support services. So, it just, it's like these are great tools, but then what do you do with tools? And the tools have different effects based on your zip code, so...

(March 2017)

However, although they saw promise in genetics-infused educational research, teachers were also aware of the role of discriminate biopower in terms of how these promises might be carried out; teachers performed an intersectional understanding that has been informed by their everyday working environment. In all these accounts teachers were revealing the geographic markers that determine who is ‘in’ and who is ‘out’ when it comes to power and privilege. Teachers pointed to the geographic concentration of wealth when talking about zip codes and their connection to inequitable quality education and resource access. While I use this theme to show teachers’ recognition of the role of wealth in solidifying power, I also want to make clear that this power is heavily tied to space and place. As Harvey writes, “the globe has never been a level playing field upon which capital accumulation could play out its destiny...flows of capital found some terrains easier to occupy than others” (Harvey, 1998, p. 57)

The links between wealth, geography, and privilege emerged again in the third focus group when I showed teachers two videos of behavior genetics researchers in which each talked about what they felt their research could bring to education. Florence talked about the first video I showed of Robert Plomin. She had some anxiety over how genetics-infused policy might be applied:

Florence: In the first video where Plomin was talking about mentioning policy—it just got me thinking that this has good intentions but just knowing who holds power and makes policy and [that] also determines whether or not something that has good intentions is going to get intended results. Is it going to get to the places that it needs to get to? (March 2017)

What these teachers are highlighting is that “so many times it’s about connections” (Florence, February 2017). As Florence explained in the second focus group:

Florence: You could be really gifted and talented in your particular field and if you don’t have those connections, good luck. And so, it’s like who holds the power? Who continues to hold the power? And, [it’s about] how that transfer of power continues to happen generation after generation. (February 2017)

Connections, it would seem, are formed based upon an individual’s wealth, which, in turn, has an effect on the health and well-being of individuals and entire communities, often

along racial lines. These connections underscore the positionality of biopower as a financed-driven mechanism for regulating the politics of race and class. While the first theme spoke of intelligence as a form of biopower, I sought to show in this theme how biopower is guided and enforced by money.

Discussion

Engaging with teachers in a focus group format revealed that in many instances teachers already think of intelligence in molecular terms, prior to being introduced to the field of behavior genetics. There is a symbolic weightiness underlying scientific expertise, and more specifically genetic discourses, which influence the molecularization of ability. I reason that the ‘vital life characteristic’ that intelligence has been made into through ‘molecularization’ has real implications for systems of education. The body of research on polygenic influences on intelligence and educational attainment is growing (Belsky et al., 2016; de Zeeuw et al., 2014; Domingue et al., 2015; Kong et al., 2017; Okbay et al., 2016; Sniekers et al., 2017; Wedow et al., 2017). Researchers are trying to identify the specific genetic variants that predict these behaviors and outcomes. Alongside this are those looking to tie this to education directly (Asbury, 2015; Asbury & Plomin, 2013; Kovas et al., 2016) and others studying the ethical implications of such research (Martschenko, Trejo, & Domingue, 2018; Roberts, 2015; Sabatello, 2018). While some might see the infusion of genetics research into education and social policy as science fiction, several online genetic data services, including GenePlaza and DNA Land, have already started providing services to quantify anyone’s genetic IQ from a sample of saliva (Regalado, 2018).

An exploration of the views of teachers at the Jacobson School and West Elm unpacked the persistent biopolitical processes for identifying who is ‘worthy’ and ‘unworthy.’ Zirkel and Pollack (2016) found that “narratives identifying some students as worthy and others unworthy are highly influential in the outcomes of many educational policy and funding debates” (p. 1522); these policies and debates underpin the emergence of the second and third themes of this chapter. The impact of ideologies surrounding worth and value extend to nearly all facets of life and inform the current state of the United States and the racial and socioeconomic disparities that are systemic and enduring. I hope that through my data collection and analysis I have opened a window into showing how race, molecularization, socioeconomic status and geography inform each other.

In the focus groups at West Elm, I consistently felt a tension between the weightiness of Scientific discourses and the mechanisms teachers saw operating in their working environment to perpetuate disadvantage across generations. I believe this came through more strongly than at the Jacobson School. While West Elm teachers were aware of the role society plays in the generational transmission of human capital, they also projected determinism in their discussions of student achievement and intelligence by internalizing beliefs like: “you can’t deny that your genes are part of who you are” (p. 141, 143) and that “they’re [one’s genetics] going to affect something about you” (p. 144). This determinism symbolizes an inherited biopower mentality about who is more or less talented or intelligent and by extension, worthy, valued, and needed.

The double binds of racial and economic inequality impact West Elm students and teachers daily. Race, as a sociohistorical and political construct with accumulated economic consequences, is geographically characterized. West Elm teachers evoked the spatial foundations of inequality as they spatialized race in the context of Chicago in the second theme. Segregation, which Chicago is no stranger to, is systematically linked to unequal opportunity (Jackson, 2009; Yun & Moreno, 2006). The marriage of space, race, and wealth describes the intersectional borders that contribute to the lived experiences of those in the West Elm community and others like it. When thinking about borders, it is important to remember “the extent to which ‘race’ and gender as social constructs have been, and are, predicated upon biological categories” (Kobayashi & Peake, 1994, p. 225). Doing so helps clarify the relationship between the language of genetics and the language of race.

These languages are interconnected, although they emerged differently from each other. Discussions about genetics and intelligence contained traces of earlier colonial classifications that used race and class to hierarchically position individuals and communities. Teachers at West Elm recognized that academic intelligence is regarded as the “end all be all” (p. 142) and saw this as a challenge to their students. In viewing student ability through the lens of determinism, teachers like Florence created spaces for the molecularization of race, by arguing that “not everyone is meant to go to college” when describing students who are organizationally structured in a racial habitus.

Alongside this, West Elm teachers employed a form of bifocality, or the ability to engage with the macro and micro simultaneously. On the one hand, they understand that privilege or the lack thereof is embedded within macro level structures. On the other, they see their students as individually distinct entities whose abilities are in part shaped by their genetics. Identifying the barriers that affect their students signifies a critical understanding of

intersectional forces, like class, which are “subjective, structural, and about social positioning and everyday practices” (Brah & Phoenix, 2013, p. 80). At the same time, there appears to be a disconnect between what teachers believe about intelligence and student ability (i.e. determinism) and what they believe is important to communicate to their students (i.e. a growth-mindset).

I want to reiterate my point from the last chapter: genetic ideologies, as supported by contemporary scientific research, could become a future border, another form of durable “social and spatial marginalization” (Wacquant, 2007, p. 72). Teachers are aware of racial, economic, and physical borders that affect the lived experiences of their students; their cultural habit has become internalized in the ways they think, act, and interpret (Bourdieu & Nice, 1980). The rise of genetics as a discourse, I maintain, might reignite colonial traces in new ways, creating a new techno-scientific border, while at the same time, upholding the existing borders that are built on social markers of difference. I believe teachers in both schools are unaware of how they are narrating an emerging form of biopower when talking about intelligence. As Florence discussed in the first focus group on intelligence: “it’s not just a black and white situation. It’s messy to figure out” (January 2017).

Chapter IX. Results from National Survey

Introduction

In sharing the stories of teachers at the Jacobson School and West Elm, I explored how teachers talk about intelligence, genetics, socioeconomic status, and race. What emerged in the localized practitioner narratives was both a belief in the role of genetics in education outcomes and a level of uncertainty about its use in education research and policy.

A challenge of mixed-methods research is combining different forms of data collection that have their own stylistic approaches. This chapter is quantitatively focused. I present my findings from a brief exit-questionnaire I gave to focus group participants and from a 37-item 3-section national survey. The tone and purpose of this chapter are different to those of Chapters Seven and Eight because of the kind of data I am presenting on. This is a stylistic limitation I enter into this chapter aware of.

My national survey titled “Teacher Perspectives on Student Achievement,” is the primary focus of this chapter; it investigates teachers’ views on the relevance of genetics for education and their conceptualizations of intelligence, socioeconomic status, and race in relation to genetics. It was designed for public and private educators in PreK-12 schools across the United States and allowed educators to self-administer the survey online. In both my national survey and the focus group exit-questionnaires, I looked to assess anonymized teachers’ views on historically fraught concepts. In this chapter, I summarize the development of my national survey including the content, features, and results as well as the origin of specific items and the logic underlying their inclusion. I also make clear the limitations of this data, most notably that it is non-representative.

Since some of the most important players in education are teachers whose perceptions of a student have an impact on that child’s academic achievement and success (Allen, 2017; Blazar & Kraft, 2016; Peterson et al., 2016), my survey was created to answer: **How do teachers in a large sample conceptualize intelligence, socioeconomic status, and race in relation to genetics?**

Two secondary questions are also evaluated in this survey:

- 1. Is there any correlation between micro-level factors, like an educator’s background characteristics, and their beliefs about the importance of genetics in relation to intelligence, socioeconomic status, and race?**

2. What are teachers' views on the relevance of genetics for school-based education and views on genetics-informed education policies?

Responses from 660 participants revealed teachers' views on historically-burdened concepts in relation to systems of education and a child's academic success. Multivariate analyses assessed the relationship, if any, between a teacher's individual and school characteristics and their views on: 1) the relevance of genetics for education⁹²; and 2) the role genetics plays in shaping an individual's intelligence, socioeconomic status, and race. I believe my survey fills a gap in the literature by studying teacher opinions on the role of genetics in intelligence, race, and socioeconomic status as well as their views on the inclusion of genetics research findings in education policy. From my findings, which employ an intersectional framework in my regression analysis, I further my argument that genetic ideologies presented via behavior genetics research might serve as a truth discourse for American practitioners.

Methods

I used R statistical computing and graphics software to analyze responses. The information was gathered using the online-survey platform Qualtrics. Questions were constructed to display a spread of answers, which was meant to capture any shift in opinion as survey respondents were exposed to primary sources from behavior genetics researchers. However, as I discuss later, the ability to reliably capture any shift in opinion has strong limitations.

My survey includes both quantitative and qualitative components as respondents were given the option to clarify or expand upon any of their responses in short-form. Variables for focus in my survey were teacher characteristics and school characteristics. In particular, my survey looked to assess possible connections between a respondent's political orientation, age, ethnicity, and the type of schools and classrooms they work in (e.g. predominantly ethnic minority, gifted, charter, private, public, religiously-affiliated, alternative), and their opinions on the importance and relevance of genetics for intelligence, socioeconomic status, race, and education.

⁹² Note that there were no significant results when using multivariate regression analysis to assess the relationship between a respondents demographic characteristics and their views on the relevance of genetics research for education. As such, although this was an area of interest, regression results are not included in this chapter.

Procedures

A complete version of my survey can be found in Appendix B. Responses were collected between February 2017 and April 2017. Participants were directed to a survey link based on the kind of school they work in. Identical copies of the survey were run concurrently with private and public-school teachers recording responses in the relevant survey. I decided to separate these groups of teachers in order to monitor more easily which teachers were responding to my survey and which were not.

The survey was estimated to take between ten to fifteen minutes and gave respondents the option to save their responses and to come back and complete it at a later time. My justification for this decision was that it would give respondents flexibility in responding to the survey in increments rather than all at once⁹³. I told participants that the survey would take between fifteen and twenty minutes to complete, higher than the estimate offered by Qualtrics, to ensure that teachers budgeted ample time and did not get discouraged if the estimated ten minutes had passed before completion. However, the downside to this strategy is that it may have deterred some teachers if fifteen to twenty minutes seemed too long.

In each section of the survey, respondents were required to submit answers for all questions in a section before moving on to the next. The only questions that were optional in the survey were those that gave teachers opportunities to elaborate on their selected answers. Respondents were given three opportunities to elaborate on their answer selections: twice in the second section and once in the third. A potential issue with requiring responses is that it may have discouraged some participants from continuing on in the survey when there were questions they did not want to answer.

Additionally, respondents were not allowed to return to prior sections once they had been completed. My reason for this was that the survey engaged with difficult and charged topics. I wanted to capture initial perspectives on the role of genetics in relation to intelligence, race, and socioeconomic status, prior to the introduction of Asbury and Plomin's 'genetically-sensitive' schooling arguments and policy points. While respondents could change answers within a section before moving on, I designed sections so that later questions did not potentially

⁹³ However, this feature of the survey made collecting information on the mean survey duration for completed surveys difficult. The mean response time included those respondents who had left the survey and come back to complete it hours or days later, driving the average upwards above two and a half hours. For this reason, it is only possible to use the Qualtrics estimate for the time it would take to complete the survey in one go, which was ten minutes.

inform prior questions. I now begin my summary of the content covered in the three sections of my survey.

Section One

Section One collected respondents' individual and school characteristics, the results of which are shared in Tables 5-8 after I've described my survey sample. Section One contained 22 questions and captured teachers' characteristics. Individual characteristics included a participant's gender, age, ethnicity, political orientation, career duration, time working at their current school, and the subjects and grades they taught. School characteristics included the ethnic and socioeconomic demographics of a teacher's school, the kind of school (i.e. public, charter, or private, and whether the school was religiously-affiliated or an alternative school for students with special needs), and the location of the school (i.e. rural, suburban, or urban). Participants were also asked whether they worked in gifted education, had ever taught in a gifted education environment, or had ever taught any advanced courses such as Honors, International Baccalaureate (IB), or Advanced Placement (AP). The purpose of this section was to determine the kinds of teachers participating in the survey and the kinds of schools these teachers are coming from. Variables from Section One are used as the explanatory variables in the regression models conducted as part of the statistical analyses.

Section Two

Section Two contained six questions, several of which had multiple components. The purpose of this section was to begin identifying teacher perspectives on student ability and achievement and the extent to which teachers saw genetics playing a role in an individual's intelligence, socioeconomic status, and race. The section used a matrix table to ask participants the extent to which they agreed or disagreed with six different statements on a scale from 'Strongly agree' to 'Strongly disagree.' This question was designed to identify how important teachers believe genetics, race, and socioeconomic status are to a child's success in the classroom by asking respondents to indicate how much they personally agreed or disagreed with the following statements:

1. "A student's genetics plays an important role in their success in a classroom"
2. "A student's socioeconomic status plays an important role in their success in a classroom"

3. “A student’s race plays an important role in their success in a classroom”

The remaining three statements in the matrix table drew upon the Orchid-Dandelion hypothesis (Ellis & Boyce, 2008), also known as differential susceptibility theory (DST). DST argues that “some individuals are more susceptible than others to both negative (risk-promoting) and positive (development-enhancing) environmental conditions” (Ellis, Boyce, Belsky, Bakermans-Kranenburg, & Ijzendoorn, 2011, p. 7). I was interested in teachers’ views on DST because it was identified by a couple of behavior genetics researchers I spoke with as an area their field could advance. According to DST, Orchids are individuals who “are able to develop beautifully in conditions of support and nurture but promptly decline in conditions of neglect” and Dandelions are “relatively hardy and able to survive and thrive across a range of environments” (Piotrowski & Valkenburg, 2015, p. 1779). One sociogenomics researcher I interviewed explained that:

Carter: The way to think of them [biological propensities] is not that there’s good genes or bad genes. There’s certain genotypes that make us sensitive to the environment and that can be useful and certain genotypes that make us insensitive to the environment. So, some kids are Dandelions, filter out the same height, the same education, the same whatever, no matter what the environment is, they’re pretty robust...some kids can have very adverse circumstances and they seem to be resilient. Then there’s the other kids who are sensitive – the Orchids – and if they have really good environmental conditions they’ll thrive, super thrive, but if they don’t they’ll give in to the most problems. (November 2015)

Given that DST was identified as an area that could be furthered by behavior genetics, I incorporated these ideas into several statements⁹⁴ related to children and asked teachers to identify the extent to which they agreed or disagreed. This marked a subtle introduction to some of the ideas behind behavior genetics. The concept of ‘plasticity,’ or a genotype’s ability

⁹⁴ The statements were:

1. “Most children are blank slates, born into the world with equal abilities that are then affected by the environment.”
2. “Some children are “Orchids,” meaning they flourish in nurturing environments with the right set of circumstances but would be particularly sensitive to and affected by challenging or adverse situations.”
3. “Some children are “Dandelions,” meaning they are strong and resilient and can pull through in even the most disadvantaged circumstances.”

to produce more than one phenotype depending upon the environment it is exposed to, underpins DST and has become an area of research in sociogenomics, a sub-branch of which is behavior genetics (Conley & Malaspina, 2016; Ellis & Boyce, 2008; Slavich & Cole, 2013). Importantly, these three questions were designed to capture teacher opinions on different components of behavior genetics research without notifying teachers of the origin of the ideas. Literature suggests that portrayal of science as politically neutral and unproblematic encourages lay people to defer to scientific authority, particularly as “mainstream education still tends to portray scientists as the ultimate conveyors of truth” (Brossard & Nisbet, 2007, p. 29). The possibility of respondents deferring to scientific research meant it was important to try and capture initial teacher opinions prior to exposure to primary sources from behavior genetics researchers.

Section Two also asked respondents to rank in order of importance seven factors that may contribute to a child’s academic achievement and educational attainment:

1. Race/ethnicity
2. Gender
3. Socioeconomic status
4. Parents/guardians and home environment
5. Genetics
6. Teacher/school quality
7. Neighborhood environment

The matrix table created another opportunity to identify how important teachers thought genetics are in relation to student performance. Finally, the section sought to capture the extent to which teachers thought intelligence, race, and socioeconomic status are genetically influenced. Teachers were asked to use a sliding scale where 0 represented ‘nurture,’ or the environment, and 100 represented ‘nature,’ or biology, to show where intelligence, race, and socioeconomic status fell within the spectrum.

Section Three

Section Three had 13 questions and included a primary source video titled “Genetics and Education” in which Robert Plomin talked about the relevance of genetics for education. This final section was designed to capture teacher views on the relevance of genetics for

education through a series of questions on the primary source video and the 11 policy points put forth in the book “G is for Genes: The Impact of Genetics on Education and Achievement” (Asbury & Plomin, 2013).

Participants were asked to indicate the extent to which they agreed or disagreed with Plomin’s arguments about the role of genetics in education and about their thoughts on the impact the 11 policy points for precision education would have on: 1) the US education system as a whole; 2) the US teaching profession; and 3) ethnic minorities and low-income children who are underserved in the current system. Participants were also asked which of the 11 policy points were the most and least important and whether using a child’s genetic data to personalize their education plan would change their views on the proposed policy changes (i.e. positively change, negatively change, neither positively nor negatively change). Finally, participants were asked whether adding a course on the genetics of learning and education to teacher training programs would be beneficial for future educators. The aim of this section was to ascertain what teachers thought about genetics in relation to their students and education policy; however, as I discuss later, the wording of the questions in this section may have made it more difficult to achieve this objective than originally anticipated.

Data Collection

The survey was disseminated online⁹⁵ through email and social networking platforms. The reliance on social media and online platforms for survey sharing may explain why 66.8% of respondents were below the age of 45⁹⁶, creating a survey sample selection bias towards younger teachers. Furthermore, although the survey included responses from 48 states (Montana and Delaware were the only two states absent from the sample), Florida and Illinois were the most represented states in the sample with 56 and 287 responses respectively.

Attempts to encourage responses included email invitations and bi-weekly reminders and posting to social media groups over a three-month period. Circulation of the survey in social media groups also asked members to share posts with outside groups and individuals.

Upon completion of the survey, participants were given the option to share their emails and be entered into a raffle to win a \$50 Amazon gift-card. Four participants were randomly

⁹⁵ Refer to Appendix B for the email template sent out advertising this survey.

⁹⁶ The average age for a teacher in the United States is 42.5 years, the same average age of a traditional public school teacher in the United States. When examining the average age of teachers in different school environments, private school teachers are on average older (44 years) and charter school teachers are, on average, younger (37.9 years). Unfortunately, the National Center for Education Statistics does not provide the modal age of teachers in the United States.

selected using an online number generator which corresponded to the participant's response number (i.e. 1-660). I recognize that incentivizing the survey may have biased results by attracting certain kinds of respondents more than others. Based on the aforementioned survey dissemination tactics, the individual and school characteristics of the 660 responses included in analysis are detailed in Tables 5-8.

Illinois and Chicago

Similar to my qualitative research, I faced access challenges with my quantitative research. Initial efforts to target the survey area to Chicago and then to the state of Illinois explain the higher number of responses from educators in the state. Table 8 provides a breakdown of the Illinois and Chicago subsets of my survey and my regression analysis (Tables 15-21) includes an examination of the kinds of responses teachers in these geographic locations provided. Originally, I intended to create a survey that only targeted public and private school teachers in Chicago. In November 2016 a colleague introduced me to a contact at the Chicago Teacher's Union (CTU), the third largest local public school teacher's union in the United States, with approximately 25,000 members. After sharing my survey's aims and intentions, the CTU agreed to disseminate my survey in their weekly newsletter once the survey had been completed and piloted. In the autumn of 2016, I ran a pilot study among my American educator colleagues who were primarily based in the Bay Area of California and Northern Virginia. After piloting, I approached the CTU again in January 2017 to share the survey and we agreed on a bi-weekly advertisement of the survey over a two-month period. Unfortunately, a week before the survey was to go out, I received an email notifying me that the CTU had changed its policy on advertising studies and would no longer be able to send out my survey; my contact had not been aware of this change until after sending my survey to the newsletter organizer.

I had already compiled contact information for all private and charter schools in the city of Chicago by cross-referencing data from Chicago Public Schools, the National Council for Education Statistics Private School Universe Survey, the Lake Michigan Association of Independent Schools directory, and the Independent Schools Association of the Central States directory. Using this database, I sent emails out to all private and charter schools in the city of Chicago, whose contact information had been accessible online, and requested their participation in the survey. Of the 205 private schools identified in Chicago, 170 were emailed. Of those schools contacted, 21 agreed to participate, 8 declined, and 4 passed the survey to higher ups that failed to make further contact. Of the 125 charter schools listed on the Chicago

Public Schools website, 123 were contacted (2 were no longer in existence). Of the 123 contacted, 6 agreed to participate, 11 declined, and 3 passed the survey to higher ups that failed to make further contact. The Chicago Alliance of Charter Teachers and Staff (ACTS), a charter school teachers' union representing 12 charter schools included the survey in their weekly newsletter; none of the schools represented by ACTS had responded to my email requests. The union agreed to advertise my survey after I had a phone call with the Union Director to discuss my research and the aims of my survey.

However, I found I was getting a much higher response rate from private school teachers than charter school teachers and had virtually no responses from public school teachers. My rejection from CPS meant I could not access public schools directly to disseminate my survey. Instead, I needed the support of a third-party union or education organization who could share with their members.

Faced with this dilemma, I sought to expand the survey sample to all of Illinois. The Illinois Education Association (IEA) disseminated the survey in two member-newsletters which were sent out on a bi-weekly basis over the period of a month. The IEA is a branch of the National Education Association (NEA), the largest professional interest group for educators in the United States. The IEA has 135,000 members comprised of Illinois elementary and secondary teachers, higher education faculty and staff, retired educators, educational support professionals, and college students interested in careers in education. While the IEA does not provide data on the number of members who are current teachers, approximately 10,000 members are students and 29,500 are educational support professionals. Other local teacher unions and educator professional organizations in Chicago and Illinois were contacted via email and telephone but either declined to participate or did not respond to inquiries.

Difficulties finding respondents could be attributed to the length of the survey, self-censorship, and fear of engaging in a charged topic, even though anonymity was assured. As an example of how my survey topic may have hindered my ability to access teachers, a research proposal I submitted to Chicago Public Schools to conduct my dissertation was rejected on the grounds that:

There appears to be minimal direct benefit to CPS. Please note that the district receives a high volume of research proposals and in making its decision, must weigh the expected district benefit for each project versus the burden it creates for district staff as well as how well the project is aligned with the district's strategic priorities.
(September 2016)

National

When efforts to recruit participants in Chicago and the state of Illinois proved more difficult than anticipated, I attempted to include participants from throughout the United States. Seventeen national K-12 educator professional organizations were contacted via email or phone where possible. Of the seventeen organizations, seven responded, with only one, the National Association for Gifted Children (NAGC) agreeing to advertise the survey. The NAGC sent out my survey in their quarterly newsletter and posted it on the NAGC Facebook group. Two other organizations (the National Association for Music Education and the Association for Middle Level Education) offered to provide the emails or mailing addresses of their members for a fee that unfortunately I could not cover within my research budget. One organization offered to reach out to their wider network to gauge interest in disseminating the survey, but after a several weeks of silence responded to a follow-up with: “My original idea on how to do this has resulted in my spinning wheels, so I am now trying a new tact.” After further attempts to check-in failed to receive a response, I assumed the organization was no longer interested in circulating my project. Finally, of the remaining organizations, three declined to participate or said it was not in their capacity to disseminate a survey to their members — the remaining ten organizations did not respond to email or phone messages. While efforts to disseminate through national groups did increase response rates, further attempts included posting on an online educator community bulletin (Edutopia) and in five educator LinkedIn groups (History Teachers with 19,980 members; Big Apple Educators with 2,151 members; National Science Teachers Association with 29,605 members; Teacher’s Lounge with 214,493 members; and Educational Leadership with 77,611 members). Other social media dissemination included posting to Facebook pages (National Association of Independent Schools with 21,852 fans; Black Educators Rock with 6117 fans), Facebook groups (Black Special Educators Rock with 3,633 members; Black Educators Rock ELA/English with 17 members⁹⁷) and using personal educator contacts who shared the survey with colleagues and education organizations they were members of (e.g. Teach for America).

I felt that using an anonymous and incentivized survey that was estimated to take between 15 and 20 minutes might encourage more teachers to participate than those who had selected into the focus groups. In this way, my survey expands this dissertation’s central research questions to a wider pool, capturing teachers who were not represented in the focus

⁹⁷ All member numbers are during the time in which the survey was circulated to these groups. I checked the group numbers after posting the survey for the final time in these organizations’ online spaces.

groups. For instance, my inability to access the public-school system for the focus groups helped justify the creation of a survey that reached this population; a population that educates most children in the US and more specifically, most school-age children of color. However, there were difficulties with the survey recruitment process that created selection bias in my survey sample beyond the fact that 66.8% of respondents were below the age of 45. The survey has an overrepresentation of teachers from Chicago and Illinois and female teachers and was circulated online via social media, email, online forums, and through my pre-established educator contacts, which makes it a convenience sample (for more on sample bias see 176-177). Therefore, although the survey included a wider pool of American teachers than the focus groups, it still failed to capture a representative sample.

Data Cleaning

I use the following definition of data cleaning: “Data cleaning, also called data cleansing or scrubbing, deals with detecting and removing errors and inconsistencies from data in order to improve the quality of data” (Rahm & Do, 2000, p. 3). I recognize that the phrase ‘data cleaning’ might unsettle qualitative researchers. Qualitative research does not ‘clean’ data in the same sense as quantitative research. While quantitative data might remove contradictory responses, qualitative data takes note of these contradictions and sees them as human nature, looking to identify patterns, even if these patterns are at odds with each other. This is where I see qualitative and quantitative data conversing with each other to provide a more holistic account. While a survey allowed me to take my questions to more teachers throughout the United States who come from different demographic backgrounds and schools than the teachers at the Jacobson School or West Elm, the focus groups gave me the space to expand upon and clarify teacher perspectives over time; this more easily highlighted nuances in teacher interpretations. At the same time, I found that teachers taking my survey also shared a level of uncertainty about the role of genetics in intelligence, race, socioeconomic status, and education, speaking again to the complexity of my dissertation.

In my survey, data quality problems were single-source problems at the instance level and involved data entry errors. My data cleaning process entailed removing all major errors and contradictions in individual data sources. For example, respondents who put that they have not taught in any kind of gifted education environment but have also put that they currently teach gifted education signify a contradictory response.

With regards to my quantitative data, in order to best detect which kinds of errors and inconsistencies should be removed, detailed data analysis was necessary. I manually inspected the data and used R to clean the data of single-source instance problems. Data cleaning procedures and survey completion rates can be found on pp. 183-184 in Tables 3 and 4. Single-source instance problems included the identification of the following:

- Respondents who did not qualify for the survey because they teach outside of the United States. These respondents were manually identified.
- Respondents who did not complete enough of the survey to be included in analysis. These partial responses were identified using Qualtrics software.
 - The survey is made up of four sections. Section One collected respondent's personal and career history. Respondents who did not complete beyond Section One and therefore did not answer any questions pertaining to their beliefs about genetics, intelligence, race, and socioeconomic status were removed from the data set.
- Respondents who exhibited response patterns to suggest they were not answering the survey honestly. These responses were identified with the help of R and included:
 - Respondents who indicated that they have not taught in any kind of gifted education environment while later identifying that they currently work in gifted education.
 - Respondents who selected the 'most important' and 'least important' policy points from Asbury and Plomin's "G is for Genes" as the same.
- Respondents who indicated that a technological error prevented them from properly answering a question had any answer removed that was identified as having suffered from a technological error. These specific questions were manually identified by looking at respondents' short answers.

I also want to note missing values and where they occur in the data set. Of the 660 responses in the sample after data cleaning, 104 or 15.76% were incomplete. However, seven of the incomplete responses were due to a schema error. When I first opened the survey, the question asking teachers in which environment their school was situated (Urban, Rural, Suburban) was accidentally left out of the public national survey; this meant seven respondents

who completed the entire rest of the survey were unable to answer this particular question, but their responses were otherwise included in analyses.

Due to the structure of my survey — the fact that it was broken up into sections and required responses for all questions — meant that most respondents stopped the survey after completing a section. In fact, of the 97 responses that were partial due to respondent inaction, only two did not complete Section Two in its entirety. Of those two, one did not complete Section Two in its entirety due to a technical error with the sliding scale in the final question of the section — this respondent did go on to complete the rest of the survey afterwards. This means one respondent stopped at the sliding scale question and chose not to answer it, or the rest of the survey.

The final section is where most respondents stopped. Eighty-three respondents or 12.58% of the survey sample (after data cleaning) did not complete any part of Section Three. Reasons for this could be that the survey dealt with sensitive issues. The sliding scale question, which asked participants to identify the extent to which they thought intelligence, socioeconomic status, and race were genetically influenced may have made participants too uncomfortable to continue (although they answered the sliding scale question before stopping). The increasing rate of partial responses as participants moved through Section Three could also be related to the fact that Section Three presented respondents with a video and academic materials (i.e. policy points) that they were asked to comment on, which may have demanded too much time and energy. Ninety-five (95) survey participants (14.39% of sample after data cleaning) did not make it past the video clip questions and engage in questions on the 11 policy points from “G is for Genes”⁹⁸.

⁹⁸ There was also one respondent who answered the “most important policy point” question but not the “least important policy question” and likely skipped or missed that question as they continued to answer questions following. However, because they did not move on to the final section which asked whether they’d like to be entered into a drawing for a \$50 Amazon gift-card, they would not have received a prompt notifying them that one question went unanswered in Section Three.

Table 3 Survey Completion Rates

| Survey Completion Rates | | | | | | | | |
|-------------------------|-----------------------------|------------------------------|------------------------------|-------|------------------------------|-------|-------------|-------|
| Survey* | Total # opened survey | # Done at least Section 1 | # Done Beyond Section 1** | % | # Done Beyond Section Two | % | # completed | % |
| <i>Illinois</i> | 207 | 205 | 180 | 87.81 | 167 | 81.46 | 159 | 77.56 |
| <i>Chicago- Public</i> | 42 | 36 | 28 | 77.78 | 25 | 69.44 | 25 | 69.44 |
| <i>Chicago-Private</i> | 106 | 97 | 77 | 79.38 | 67 | 69.07 | 65 | 67.01 |
| <i>National- Public</i> | 471 | 443 | 383 | 86.46 | 324 | 73.14 | 322 | 72.68 |
| <i>National-Private</i> | 21 | 18 | 12 | 66.67 | 12 | 66.67 | 12 | 66.67 |
| <i>Total</i> | 847 | 799 | 680 | 85.11 | 595 | 74.47 | 583 | 72.96 |

*37 required survey questions

**Respondent must have gone beyond Section 1 (descriptive demographics) to be included in data analysis

Table 4 Data Cleaning Process

| Data Cleaning Process ⁹⁹ | | | | |
|---------------------------------------|-------------------------|------------------------------|--------|-------|
| Reason for Cleaning | Number | What was cleaned | | |
| <i>Confused responses*</i> | 4 | Removed all data | | |
| <i>Participant requested</i> | 1 | Removed all data | | |
| Technical difficulties | | | | |
| Type | | | | |
| <i>Sliding scale question</i> | 1 | Removed answers to question | | |
| <i>Policy points</i> | 2 | Removed answers to questions | | |
| Did not qualify | | | | |
| <i>Taught outside USA</i> | 12 | Removed all data | | |
| Total Number of Cleaned Responses: 20 | | | | |
| Totals Prior to Cleaning | | Totals After Cleaning | | |
| Survey | Done Beyond Section 1** | %*** | Number | % *** |
| <i>Illinois</i> | 180 | 26.47 | 178 | 26.18 |
| <i>Chicago- Public</i> | 28 | 4.12 | 26 | 3.82 |
| <i>Chicago-Private</i> | 77 | 11.32 | 76 | 11.18 |
| <i>National- Public</i> | 383 | 56.32 | 368 | 54.12 |
| <i>National-Private</i> | 12 | 1.76 | 12 | 1.76 |
| <i>Total</i> | 680 | 100.00 | 660 | 97.06 |

*Confused responses include:

- Selecting: “I have not taught in any of these [gifted education] environments” while also selecting “I currently work in gifted education”
- Selecting: “I have not taught any of these courses” while also selecting “Advanced Placement (AP)”; “Honors”; “International Baccalaureate (IB)”
- Listing the most and least important policy points as the same point

**Respondent must have gone beyond Section 1 (descriptive demographics) to be included in analysis.

*** Percentage taken out of 680: The number of respondents who completed beyond Section One and were automatically included in data analysis prior to cleaning

⁹⁹ Note that this data cleaning process was only done on those responses which would have been included in data analysis to begin with (i.e. responses that answered questions beyond Section One).

Sample

I outline the composition of the survey sample in Tables 5-8. Given the difficulties I faced in recruiting participants for this research, it is important to note that this online and self-report survey sample is opportunistic and as a result non-representative. Findings highlight correlation and not causation. The final sample consisted of 660 educators from 48 states and Washington, D.C.

Sample Characteristics

My survey collected respondents' individual and school characteristics, drawing upon the analytic tool of intersectionality to help analyze "the complexity in the world, in people, and in human experiences" (Collins & Bilge, 2016, p. 2). Table 5 presents the individual characteristics of survey respondents while Tables 6 and 7 cover the school characteristics. Table 8 covers the Illinois and Chicago subsets of my survey as these respondents comprised 43.48% of responses used in data analysis. Note that within Table 8, the Illinois subset includes all respondents who identified as teachers in Illinois and/or Chicago across all the different survey groups.

Individual and school characteristics were collected because "the events and conditions of social and political life and the self can seldom be understood as shaped by one factor" (Collins & Bilge, 2016, p. 2). As such, one of the questions driving this chapter is intersectional. When asking whether there is any correlation between micro-level factors (e.g. an educator's teaching environment or political orientation) and a teacher's beliefs about the importance of genetics in relation to intelligence, socioeconomic status, race, and education, I recognize that responses may not be shaped by a single factor; rather, there are "many axes that work together and influence each other" which may play a role in teacher attitudes towards genetics (Collins & Bilge, 2016, p. 2).

US national data considers teachers to be staff members who teach regularly scheduled classes to students in any of grades K–12. In relation to the US education system, the survey sample has an overrepresentation of female teachers, primary school teachers, and teachers working in schools with fewer than 500 students¹⁰⁰ (Tables 5 and 6). Moreover, the survey is skewed towards younger teachers and public-school teachers. The US teacher workforce is 76.10% female while 91.06% of survey respondents were female. With regards to the racial demographics of teachers in the survey, 85.30% of respondents were White, 4.70% African

¹⁰⁰ All data on the US education system in this section is taken from R. Goldring, Gray, and Bitterman, (2013).

American, 4.55% Hispanic, 1.82% Asian, and 1.97% multiracial; less than 1% of the survey was comprised of respondents who identified as Native American, Alaska Native, Native Hawaiian or Other Pacific Islander. In the United States education system, 82.7% of teachers are White, 6.4% African American, 7.5% Hispanic, 1.8% Asian, and 1.0% multiracial; less than 1% of the US teacher workforce are Native American, Alaska Native, Native Hawaiian or Other Pacific Islander. As such, this sample has a slight underrepresentation of African American and Hispanic teachers and a slight overrepresentation of White teachers, though the differences are less than 3% (Table 5). Table 6 shows there is also a heavy public school skew in the survey sample (86.67% of respondents); however, this is reflective of the national data in which 87.92% of all teachers in the United States work in a public school. Moreover, 82.42% of survey respondents are primary (K-8) teachers whereas 57.63% of the US teaching profession are classified as primary school teachers. Finally, 54.09% of survey respondents work in schools with fewer than 500 students. In comparison, 35.37% of teachers in the US workforce are employed in schools with fewer than 500 students. The characteristics of the survey sample illustrate its non-representativeness in relation to the US education system. Despite this there are some similarities with regards to the percentage of public and private school responses and the racial demographics of survey respondents.

Table 5 Survey Sample: Individual Characteristics

| Individual Characteristics of Respondents | | | | |
|---|----------------------------|-------|--------------------------|------------------------------|
| Characteristics | Survey N ¹⁰² | % | National ¹⁰¹ | |
| | | | N | % |
| Total | 660 | 100 | 3,850,100 ¹⁰³ | 100 |
| Gender | | | | |
| Male | 59 | 8.94 | — | 23.9 |
| Female | 601 | 91.06 | — | 76.1 |
| Total | 660 | 100 | — | 100 |
| Ethnicity | | | | |
| White (non-Latino) | 563 | 85.30 | — | 82.7 |
| African American | 31 | 4.70 | — | 6.4 |
| Hispanic or Latino | 30 | 4.55 | — | 7.5 |
| Asian | 12 | 1.82 | — | 1.8 |
| Native American or Alaska Native | 1 | 0.15 | — | 0.4 |
| Native Hawaiian or Other Pacific Islander | 1 | 0.15 | — | 0.1 |
| Two or more races | 13 | 1.97 | — | 1.0 |
| Other | 9 | 1.36 | — | — |
| Total | 660 | 100 | — | 100 |
| Age | | | | |
| Under 25 years old | 36 | 5.45 | Mean | Median ¹⁰⁴ |
| 25-34 years | 228 | 34.55 | 42.6 yrs. | 41.5 yrs. |
| 35-44 years | 177 | 17.73 | | |
| 45-54 years | 150 | 22.73 | | |
| 55-64 years | 65 | 9.85 | | |
| 65-74 years | 2 | 0.30 | | |
| 75 or older | 2 | 0.30 | | |
| Total | 660 | 100 | — | — |
| Political Orientation | | | | |
| Extremely conservative | 30 | 4.55 | | |
| Moderately conservative | 116 | 15.58 | | |
| Slightly conservative | 67 | 10.15 | | |
| Neither liberal nor conservative | 131 | 19.85 | | |
| Slightly liberal | 83 | 12.58 | | |
| Moderately liberal | 173 | 26.21 | | |
| Extremely liberal | 60 | 9.09 | | |
| Total | 660 | 100 | — | — |
| Years Teaching | | | | |
| This is my first year | 34 | 5.15 | Mean | |
| 1-2 years | 26 | 3.94 | 13.8 yrs. ¹⁰⁵ | |
| 3-5 years | 135 | 20.45 | | |
| 6-10 years | 129 | 19.55 | | |
| 11-15 years | 127 | 19.24 | | |
| 16-20 years | 81 | 12.27 | | |
| More than 20 years ¹⁰⁶ | 128 | 19.39 | | |
| Total | 660 | 100 | — | — |

¹⁰¹ All national data (both public and private schools) in Tables 5-7 taken from (R. Goldring et al., 2013)

¹⁰² N = the sample size (number of teachers).

¹⁰³ Represents the total number of teachers in the US, both part-time and full-time, private and public.

¹⁰⁴ Having the mode age for teachers in the United States would allow for a comparison between the modal group of 25-34 in my survey, however, the National Center for Education Statistics (NCES) does not provide this.

¹⁰⁵ Private teachers on average have more years of teaching experience (14.2 yrs) than public school teachers (13.8 yrs). Charter-school teachers have the least amount of teaching experience on average (8.7 yrs).

¹⁰⁶ The 2011-12 NCES Schools and Staffing Survey uses the US Census Bureau's sampling scheme to stratify teachers according to the following: (1) Beginning teachers (in first year of teaching); (2) Early-career teachers (in second or third years of teaching), (3) Mid-career teachers (in 4th-19th years of teaching), and (4) Experienced teachers (R. Goldring et al., 2013).

Table 6 Survey Sample: School Characteristics

| School Characteristics of Respondents | | | | |
|--|--------|-------|--|--------------------------------|
| Characteristics | Survey | | National | |
| | N | % | N | % |
| Total | 660 | 100 | 3,850,100 | 100 |
| Types of Schools | | | | |
| Public | 572 | 86.67 | Public | 3,385,200 87.92 |
| Of which charter | 46 | 6.97 | Of which charter | 115,600 3.00 |
| Private | 88 | 13.33 | Private | 464,900 12.08 |
| Total public & private | 660 | 100 | Total public & private | 3,850,100 100 |
| Primary (K-8) | 544 | 82.42 | Primary (K-8) | 2,219,101 57.63 |
| Secondary (9-12) | 100 | 15.15 | Secondary (9-12) | 1,033,300 26.83 |
| Combined | 16 | 2.4 | Combined | 205,000 5.32 |
| Total | 660 | 100 | Total | 3,457,401 ¹⁰⁷ 89.80 |
| Socioeconomic Composition of Students | | | | |
| % of K-12 FRPM students ¹⁰⁸ | | | % of Public ¹⁰⁹ K-12 FRPM students ¹¹⁰ | |
| <10 ¹¹¹ FRPM | 88 | 13.33 | 0-34 FRPM | 1,109,700 28.82 |
| 10-19 | 71 | 10.76 | 35-49 | 573,200 14.89 |
| 20-39 | 81 | 12.27 | 50-74 | 881,000 22.88 |
| 40-59 | 111 | 16.82 | 75 or more | 757,400 19.67 |
| 60-90 | 172 | 26.06 | School didn't participate | 63,900 1.66 |
| > 90 | 137 | 20.76 | | |
| Total | 660 | 100 | Total | 3,385,200 100 |
| Ethnic-minority Composition of Students¹¹² | | | Data not available on % of teachers | |
| <10% ethnic-minority | 122 | 18.48 | | |
| 10%-19% | 98 | 14.85 | | |
| 20-39% | 115 | 17.42 | | |
| 40-59% | 81 | 12.27 | | |
| 60-90% | 120 | 18.18 | | |
| > 90% | 124 | 18.79 | | |
| Total | 660 | 100 | | |

¹⁰⁷ Some categories of schools, particularly private combined schools had too few observations and were not included in the data set. For this reason, the total does not add to 3,850,100.

¹⁰⁸ Note that measures for the survey sample and the national data are the same: the percentage of children on Free or Reduced-Price Meals. Unfortunately, the categories don't align; upon reflection I should have created the same bracket system as the national data. Data is of the percentage of teachers in each type of school. The survey told respondents that low-income meant a child was on Free or Reduced-Price meals.

¹⁰⁹ There is no data available on the number of teachers working in private schools with students approved for Free or Reduced-Price Meals.

¹¹⁰ Note that measures for the survey sample and the national data are the same: the percentage of children on Free or Reduced-Price Meals. Unfortunately, the categories don't align; upon reflection I should have created the same bracket system as the national data. Data is of the percentage of teachers in each type of school. The survey told respondents that low-income meant a child was on Free or Reduced-Price meals.

¹¹¹ My survey used the phrasing "low-income" instead of FRPM students but told respondents that low-income meant a child was eligible for FRPM.

¹¹² My survey told respondents ethnic-minority meant non-White.

Table 7 Survey Sample: School Characteristics Contd.

| School Characteristics of Respondents contd. | | | | | |
|--|--------|-------|----------------|------------|-------|
| Characteristics | Survey | | National | | |
| | N | % | | N | % |
| Total | 660 | 100 | | 3,850,100 | 100 |
| School Size | | | | | |
| < 500 students | 357 | 54.09 | < 500 students | 1,361,500 | 35.37 |
| 500-999 | 222 | 33.64 | 500-999 | 1,422,300 | 36.94 |
| > 1000 | 81 | 12.27 | > 1000 | 829,700 | 21.55 |
| Total | 660 | 100 | Total | 3,613,500* | 93.85 |
| School Location | | | | | |
| Urban | 208 | 31.52 | Urban | 197,300 | 5.12 |
| Rural | 190 | 28.79 | Rural | 916,600 | 23.81 |
| Suburban | 255 | 38.64 | Suburban | 1,098,400 | 28.53 |
| Town | — | — | Town | 438,600 | 11.39 |
| Missing ¹¹³ | 7 | 1.06 | Missing | — | — |
| Total | 660 | 100 | Total | 2,650,900* | 68.95 |

*Some categories of schools, particularly very large and small private schools had too few observations and therefore were not reported in the data. Additionally, some school locations, particularly a number of urban public schools and rural and suburban private schools, had too few observations and were not reported in the data. For this reason, the totals do not add to 3,850,100 (Goldring, Gray, & Bitterman, 2013).

¹¹³ This data is missing due to an error in the National Public survey that did not ask participants to select the location of the school in which they were working. This error was corrected shortly after the survey was opened but meant seven respondents were not asked this question.

Table 8 Survey Sample: Illinois and Chicago Subset

Characteristics of Illinois and Chicago Subset Respondents¹¹⁴

| Characteristics | Illinois | | Chicago | | W/out Illinois | | W/out Chicago | |
|--|------------------|-----------------------|---------|--------|----------------|--------|---------------|--------|
| | S ¹¹⁵ | % of N ¹¹⁶ | S | % of N | S | % of N | S | % of N |
| Total | 287 | 43.48 | 106 | 16.06 | 373 | 56.52 | 554 | 83.94 |
| Gender | | | | | | | | |
| Male | 31 | 4.70 | 19 | 2.88 | 28 | 4.24 | 40 | 6.06 |
| Female | 256 | 38.79 | 87 | 13.18 | 345 | 52.27 | 514 | 77.88 |
| Total | 287 | 43.48 | 106 | 16.06 | 373 | 56.52 | 554 | 83.94 |
| Ethnicity | | | | | | | | |
| White (non-Latino) | 245 | 37.12 | 88 | 13.33 | 318 | 48.18 | 475 | 71.97 |
| African American | 11 | 1.67 | 8 | 1.21 | 20 | 3.03 | 23 | 3.48 |
| Hispanic or Latino | 10 | 1.52 | 2 | 0.30 | 20 | 3.03 | 28 | 4.24 |
| Asian | 6 | 0.91 | 3 | 0.45 | 6 | 0.91 | 9 | 1.36 |
| Native American or Alaska Native | 0 | 0 | 0 | 0 | 1 | 0.15 | 1 | 0.15 |
| Native Hawaiian/Other Pacific Islander | 0 | 0 | 0 | 0 | 1 | 0.15 | 1 | 0.15 |
| Two or more races | 9 | 1.36 | 3 | 0.45 | 4 | 0.61 | 10 | 1.52 |
| Other | 6 | 0.91 | 2 | 0.30 | 3 | 0.45 | 7 | 1.06 |
| Total | 287 | 43.48 | 106 | 16.06 | 373 | 56.52 | 554 | 83.94 |
| Age | | | | | | | | |
| Under 25 years old | 9 | 1.36 | 3 | 0.45 | 27 | 4.09 | 33 | 5.00 |
| 25-34 years | 100 | 15.15 | 45 | 6.82 | 128 | 19.39 | 183 | 27.73 |
| 35-44 years | 72 | 10.91 | 21 | 3.18 | 105 | 15.91 | 156 | 23.64 |
| 45-54 years | 68 | 10.30 | 16 | 2.42 | 82 | 12.42 | 134 | 20.30 |
| 55-64 years | 34 | 5.15 | 18 | 2.73 | 31 | 4.70 | 47 | 7.12 |
| 65-74 years | 2 | 0.30 | 1 | 0.15 | 0 | 0 | 1 | 0.15 |
| 75 or older | 2 | 0.30 | 2 | 0.30 | 0 | 0 | 0 | 0 |
| Total | 287 | 43.48 | 106 | 16.06 | 373 | 56.52 | 554 | 83.94 |
| Political Orientation | | | | | | | | |
| Extremely conservative | 9 | 1.36 | 3 | 0.45 | 21 | 3.18 | 27 | 4.09 |

¹¹⁴ Note that this number differs from the combination of the Illinois, Chicago-Public, and Chicago-Private respondents in Table 4 (N=280). This is because respondents who took the National surveys could also have been from Illinois. Therefore, N=287 is the total number of respondents across all survey iterations who were from Illinois.

¹¹⁵ S is the subset group; N is the total survey sample (660)

¹¹⁶ Reminder that here N is the survey sample size post data cleaning (660).

| | | | | | | | | |
|----------------------------------|------|-------|-----|-------|-----|-------|-----|-------|
| Moderately conservative | 42 | 6.36 | 16 | 2.42 | 74 | 11.21 | 100 | 15.15 |
| Slightly conservative | 4522 | 3.33 | 5 | 0.76 | 45 | 6.82 | 62 | 9.39 |
| Neither liberal nor conservative | 47 | 7.12 | 16 | 2.42 | 84 | 12.72 | 115 | 17.42 |
| Slightly liberal | 38 | 5.75 | 10 | 1.52 | 45 | 6.82 | 73 | 11.06 |
| Moderately liberal | 96 | 14.55 | 41 | 6.21 | 77 | 11.67 | 132 | 20.00 |
| Extremely liberal | 33 | 5.00 | 15 | 2.27 | 27 | 4.09 | 45 | 6.81 |
| Total | 287 | 43.48 | 106 | 16.06 | 373 | 56.52 | 554 | 83.94 |
| School Characteristics | | | | | | | | |
| Public | 211 | 31.97 | 30 | 4.55 | 361 | 54.70 | 542 | 82.12 |
| Of which charter | 19 | 2.88 | 18 | 2.72 | 27 | 4.09 | 28 | 4.24 |
| Private | 76 | 11.52 | 76 | 11.52 | 12 | 1.82 | 12 | 1.81 |
| Total public & private | 287 | 43.48 | 106 | 16.06 | 373 | 56.52 | 554 | 83.94 |
| Primary (K-8) | 205 | 31.06 | 60 | 9.09 | 339 | 51.36 | 484 | 73.33 |
| Secondary (9-12) | 73 | 11.06 | 41 | 6.21 | 27 | 4.09 | 59 | 8.94 |
| Combined | 9 | 1.36 | 5 | 0.76 | 7 | 1.06 | 11 | 1.67 |
| Total | 287 | 43.48 | 106 | 16.06 | 373 | 56.52 | 554 | 83.94 |

Descriptive Analysis

In this section, I provide descriptive analysis of survey responses from Sections Two and Three. I applied descriptive analysis to Section Two and analyzed the role teachers see genetics playing in intelligence, socioeconomic status, and race. Additionally, I looked in particular at whether an educator's political orientation made a difference to how they responded¹¹⁷. Later in this chapter, I expand upon the sliding scale question in Section Two using regression models to establish whether there is any correlation between micro-level factors (i.e. educators' background characteristics), and their beliefs about the importance of genetics in relation to intelligence, socioeconomic status, race.

I also applied descriptive analysis to Section Three. I assessed teachers' views on the relevance of genetics for school-based education and views on genetics-informed education policies.

Section Two

In Section Two, I focus on two questions in particular: teacher responses to questions on DST (Table 9¹¹⁸), and the sliding scale question which asked teachers to identify the extent to which intelligence, race, and socioeconomic status are genetically influenced (Figures 8-10 and 13-18). Just over eighty-three percent (83.64%) of teachers agreed to some extent¹¹⁹ that “a student's socioeconomic status plays an important role in their success in a classroom.” In comparison, 64.09% of teachers felt “a student's genetics plays an important role in their success in a classroom.” Only 30.9% of teachers were in some form of agreement with the statement “a student's race plays an important role in their success in a classroom.”

For DST related questions, most teachers agreed that some children are ‘Dandelions’ (90.76%) or ‘Orchids’ (92.7%), suggesting that teachers see differences between the children in their lives in terms of their resilience. Coupled with the ‘Blank-Slate’ question, in which less than half of teachers (43.95%) thought “most children are blank slates, born into the world with equal abilities that are then affected by the

¹¹⁷ The explanation for why I looked at political orientation specifically is covered later in this chapter.

¹¹⁸ Note that highlighted values in the following tables in this chapter signify responses that had the highest percentage of teachers selecting it. Later when I present my regression analyses, yellow highlighted responses will signify statistically significant values ($p < 0.05$) and borderline significant values ($p < .1$) will be highlighted in green.

¹¹⁹ This includes responses that ranged from “somewhat agree” to “strongly agree.”

environment,” it seems possible that the differences teachers see between ‘Dandelions’ and ‘Orchids’ may begin at birth. I found the survey findings on DST and the Blank Slate philosophy supported my qualitative findings. Nine of the ten focus group teachers disagreed with the Blank-Slate question (one was undecided) while four agreed with the ‘Orchid’ question and eight with the ‘Dandelion’ question during our group activity in the first focus group¹²⁰.

¹²⁰ A reminder that this focus group activity asked respondents to stand in the “agree,” “disagree,” “undecided,” or “abstain,” corner in response to the same statements I have asked in the national survey.

Table 9 Teacher Views on Blank Slates, Orchids, and Dandelions

| Question | Strongly disagree | Disagree | Somewhat disagree | Neither agree nor disagree | Somewhat agree | Agree | Strongly Agree | Missing |
|---|-------------------|-----------------|-------------------|----------------------------|---------------------------------|-----------------|-----------------|---------|
| <i>"A student's genetics plays an important role in their success in a classroom"</i> | 25 (3.79%) | 58 (8.79 %) | 76 (11.52%) | 78 (11.82%) | 258 (39.09% ¹²¹) | 134 (20.30%) | 31 (4.70%) | -- |
| <i>"A student's race plays an important role in their success in a classroom"</i> | 101 (15.30%) | 159 (24.09%) | 66 (10.00%) | 130 (19.70%) | 129 (19.55%) | 53 (8.03%) | 22 (3.33%) | -- |
| <i>"A student's socioeconomic status plays an important role in their success in a classroom"</i> | 13 (1.97%) | 29 (4.39%) | 35 (5.30%) | 31 (4.70%) | 234 (35.45%) | 200 (30.30%) | 118 (17.88%) | -- |
| <i>"Most children are blank slates, born into the world with equal abilities that are then affected by the environment"</i> | 33 (5.00%) | 99 (15.00%) | 133 (20.15%) | 39 (5.91%) | 68 (10.30%) | 154 (23.33%) | 68 (10.30%) | -- |
| <i>"Some children are "Orchids", meaning they flourish in nurturing environments with the right set of circumstances, but would be particularly sensitive to and affected by challenging or adverse situations"</i> | 1 (0.15%) | 7 (1.06%) | 14 (2.12%) | 26 (3.94%) | 169 (25.61%) | 302 (45.76%) | 141 (21.36%) | -- |
| <i>"Some children are "Dandelions," meaning they are strong and resilient and can pull through in even the most disadvantaged circumstances"</i> | 4 (0.61%) | 5 (0.76%) | 22 (6.67%) | 30 (4.55%) | 190 (28.79%) | 265 (40.15%) | 144 (21.82%) | -- |

¹²¹ I have highlighted responses for each question that received the highest percentage.

I also asked teachers to rank in order of importance factors that affect a child's academic achievement and educational attainment (Table 10). More than half (56.36%) of respondents thought a child's home life was the most important factor affecting students' academic achievement and educational attainment. Forty-three percent (43.03%) saw gender as the least important factor affecting a child's academic achievement and educational attainment. Findings indicate there was less consensus on the importance of other factors, with only 27.42% and 29.55% of respondents agreeing about the relative importance of genetics (5th most important) and socioeconomic status (4th most important) respectively. Examined another way, only 16.21% of respondents identified race as one of the top three (out of seven) most important factors that affect a student's academic achievement and educational attainment in comparison to 45.92% for socioeconomic status and 29.1% for genetics.

The vast majority of respondents do not think race/ethnicity is an important determinant compared to the other factors (more than 50% put it at 6 or 7, more than 80% put it at 5, 6, or 7). Further, when it came to genetics, more than 50% of respondents put it at 5, 6, or 7. It would seem that parents, teachers, and peers are who teachers think matter. These responses become increasingly interesting later in Section Three when they are compared against teacher responses to Robert Plomin's video clip on behavior genetics for educators. In Section Two, teachers ranked genetics to be of relatively low importance and race/ethnicity even lower. However, when asked about Robert Plomin's arguments in Section Three, they seem to agree about the importance of genetics. This conflicting response within the same survey is interesting and could be an example of deference to scientific research and its researchers. In applying a biopower framework, I argue that it is possible that after exposure to Plomin's arguments about behavior genetics and its relevance for education, educators may be more likely to view genetics as important; this possibility posits genetics as a truth discourse shared by perceived authority figures.

Table 10 Academic Achievement and Educational Attainment Factors

| Factor | Ranked Order of Importance | | | | | | | M |
|------------------------------------|----------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|----|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | |
| Race/Ethnicity | 20 (3.03%) | 42 (6.36%) | 45 (6.82%) | 45 (6.82%) | 133 (20.15%) | 229 (38.17%) | 146 (22.12%) | -- |
| Gender | 56 (8.48%) | 34 (5.15%) | 7 (1.06%) | 24 (3.64%) | 64 (9.70%) | 191 (28.94%) | 284 (43.03%) | -- |
| Genetics | 31 (4.70%) | 58 (8.79%) | 103 (15.61%) | 114 (17.27%) | 181 (27.42%) | 83 (12.58%) | 90 (13.64%) | -- |
| SES | 24 (3.64%) | 103 (15.61%) | 176 (26.67%) | 195 (29.55%) | 104 (15.76%) | 41 (6.21%) | 17 (2.58%) | -- |
| Parents/Guardian & Home Enviro. | 372 (56.36%) | 143 (21.67%) | 29 (4.39%) | 16 (2.42%) | 8 (1.21%) | 34 (5.15%) | 58 (8.79%) | -- |
| Teacher/School Quality | 144 (21.82%) | 210 (31.82%) | 102 (15.45%) | 89 (13.48%) | 42 (6.36%) | 35 (5.30%) | 38 (5.76%) | -- |
| Neighborhood Environment | 13 (1.97%) | 70 (10.61%) | 198 (30.0%) | 177 (26.82%) | 128 (19.39%) | 47 (7.12%) | 27 (1.06%) | -- |

1 = Most important

7 = Least important

At the end of Section Two was the set of questions I was most interested in. I asked teachers to identify the extent to which they thought intelligence, race, and

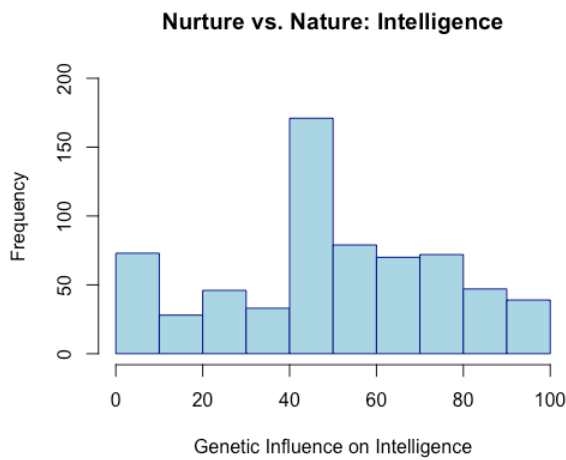


Figure 8 Intelligence Sliding Scale

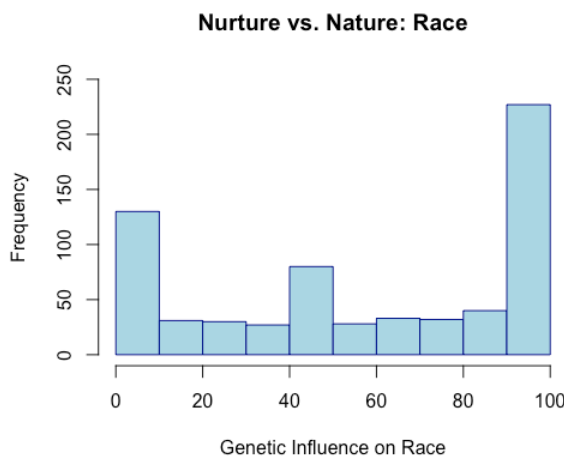


Figure 9 Race Sliding Scale

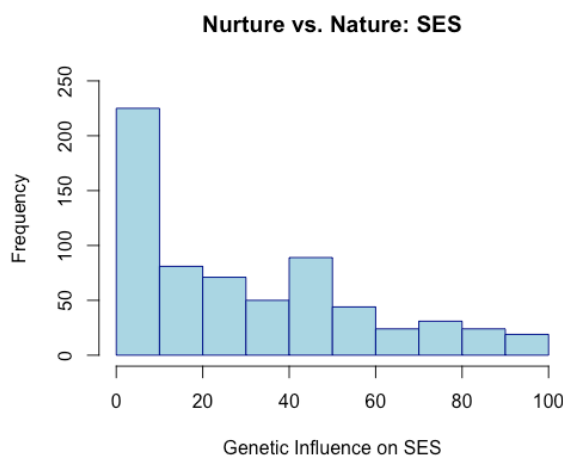


Figure 10 SES Sliding Scale

socioeconomic status were influenced by genetics. This question was asked before teachers were explicitly introduced to arguments in support of genetics-informed research in education. These sliding scales form the basis of my regression analyses. As such, I spend time now unpacking them descriptively.

I found that teachers were more likely to see race as genetically influenced than either intelligence or socioeconomic status. In my survey, the mean response for intelligence was 51.46 versus 59.04 for race and 30.84 for socioeconomic status. At the same time, the standard deviations were quite high: 25.99 for intelligence, 37.74 for race, and 27.73 for socioeconomic status. The standard deviations highlight the breadth of responses and lack of consensus on the role of genetics for these three concepts.

Upon reflection, it would have been interesting to repeat this question at the end of the survey to assess whether responses changed after listening to Robert Plomin

and reading the 11 policy points put forth in “G is for Genes.” Although I did not do

this in the survey, I asked focus group teachers this same set of questions at the end of their participation in my research. I felt an exit-questionnaire¹²² would allow me to ask teachers questions in a more direct manner and perhaps encourage uninhibited participation as responses were anonymous. The sliding scale means for the focus group exit-questionnaire were similar to the national survey; teachers were also more likely to see intelligence (mean 62) and race (mean 55.78) as genetically influenced than socioeconomic status (mean 17.56). Interestingly, in the focus groups, teachers were more likely to see intelligence as genetically influenced than they were to see race. Furthermore, the means for both intelligence and race were higher than the mean responses in the national survey.

I want to note that the higher standard deviation for race in comparison to intelligence and SES in the national survey shows how variable responses were to this particular question. This may be due to the charged nature of ‘race’ in the United States, in particular after the 2016 election, where race has become an area of discussion, debate, and polarization (Benner, 2018; Serwer, 2018). Many of the same analytic caveats I raised for the qualitative components apply here, as the hesitancy to engage in ‘race-talk’ may impact upon respondents’ selections for the race sliding scale. It is also important to recognize that the US public education system is increasingly comprised of students of color, meaning that White and female teachers who make up the majority of the teacher workforce in the USA will more often be working with students who are from a different ethnic background. As this chapter shows, regression models suggest that White teachers were slightly more likely to identify race as biologically influenced than teachers of color. This could mean White teachers in the survey may be more likely to see themselves as ‘different’ from their students in essentialist terms.

After finding the range in responses to the sliding scale question, I looked to see whether there were differences between teachers on the basis of their political orientation. This was a step forward in assessing whether there is any correlation between micro-level factors, like an educator’s political orientation, gender, age, or ethnicity, and their beliefs about the importance of genetics in relation to intelligence, socioeconomic status, race.

¹²² One of the focus group participants did not complete the exit-questionnaire.



Figure 11 Social Perceptions of Political Orientation and Views on IQ

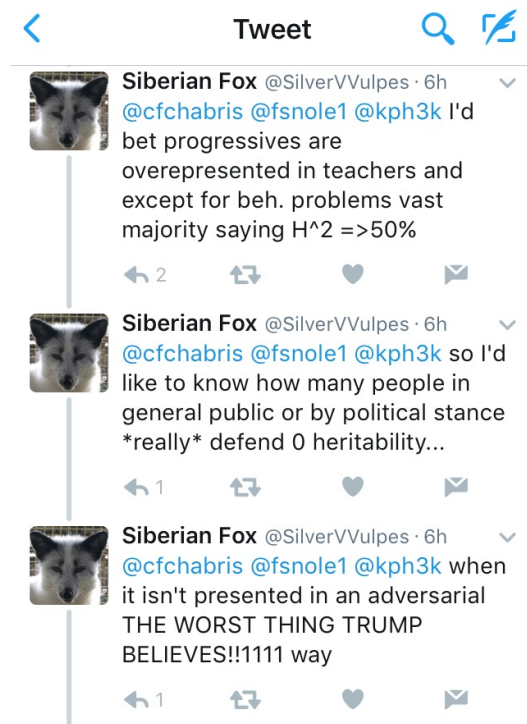


Figure 12 Twitter Conversation Between Behavior Genetics Researchers

I did this because I had sensed the existence of a societal perception that political conservatives hold more deterministic views of individual's abilities and placement within society while progressives reject this determinism, at times to a fault. One behavior genetics researcher tweeted an image (Figure 11)

that I think illustrates this sentiment. In another instance (Figure 12), a group of researchers interested in genetics, intelligence, and education had an online-discussion about how prevalent the idea that 'genes play no role' is among educators and the public. The researchers were referencing the Walker and Plomin (2005) paper I introduced in Chapter Four, which looked at teacher perceptions of intelligence in relation to genetics and the environment. One tweet said "I'd bet progressives are over-represented in teachers" and then in citing Walker and Plomin (2005) wrote: "...and except for [behavioral] problems [the]

vast majority [of teachers] say H^2 [heritability] = 50.¹²³"

Given this perception – which has not been extensively examined empirically – I decided to look at political orientation in response to the sliding scale questions. I focused in particular on the extremes of the two largest political ideologies in the US:

¹²³ I should note that this is a factually correct reading of the paper.

conservatives and liberals. My decision to look at differences between participants who identified as “extremely conservative” and “extremely liberal” stems from the possibility that those who identify as “slightly conservative” share a lot of overlap with those who are “slightly liberal.” This would make it harder to assess whether there is any relationship between the political orientation of a teacher and their beliefs about the importance of genetics in relation to intelligence, socioeconomic status, and race.

For race, the mean for extremely conservative respondents was 53.23 and 45.87 for extremely liberal respondents; the standard deviations were 36.96 and 39.25 respectively (see Figures 13 and 16). When it came to socioeconomic status, the mean response for extreme conservatives was 37.03 and 27.7 for extreme liberals; the standard deviations were 29.69 and 29.20 respectively (see Figures 14 and 17). Finally, with regard to intelligence, the mean for respondents who identified as “extremely conservative” was 53.97 and 47.2 for those who identified as “extremely liberal” (see Figures 15 and 18). Again, the standard deviations were high, though the lowest out of the three: 26.24 for extremely conservative respondents and 22.16 for extremely liberal ones. In general, it would appear that extremely conservative respondents on average saw intelligence, race, and socioeconomic status as slightly more genetically influenced than extremely liberal respondents. At the same time, the standard deviation estimates were large, and differences were not statistically significant in the regression models presented later in this chapter. The differences across people with extremely liberal and conservative orientations show that views on race in particular don’t map perfectly onto political orientation. Some conservatives also see race as not particularly biologically influenced.

These histograms show that people choose extreme answers and highlight possible differences between the most politically conservative and the most politically liberal when it comes to their perceptions of the role of genetics in shaping an individual’s intelligence, race, or socioeconomic status. Reasons for the polarization of responses to these questions could be that respondents are simply pulling the slider to one direction or another without much thought, or they genuinely believe the constructs of intelligence, socioeconomic status, and race are either primarily ‘nature’ or ‘nurture.’ This means that the ‘nature’ vs. ‘nurture’ debate may continue to prevail over discussions of a combination of nature *and* nurture.

It may also allude to findings in the field of psychology about genetic essentialism, which highlights how people think about genetics and the ramifications

this kind of thinking could have on a person and on society. People tend not to process information about genetic attributions in a rational or even-handed way (Dar-Nimrod & Heine, 2011; Heine, 2017) and “tend to think of genetic attributions as being immutable, of a specific etiology, natural, and dividing people into homogenous and discrete groups” (Heine et al., 2017, p. 137). What stands out from these histograms is that a relatively high proportion of people think socioeconomic status is down to the environment, though conservatives are still somewhat more likely than extreme liberals to think it is biological. On the other hand, when it comes to intelligence most people think biology plays a bigger role. My descriptive findings suggest that conservatives may think genes have more of an influence on intelligence and race than extremely liberal respondents do.

Extreme Conservative: Race

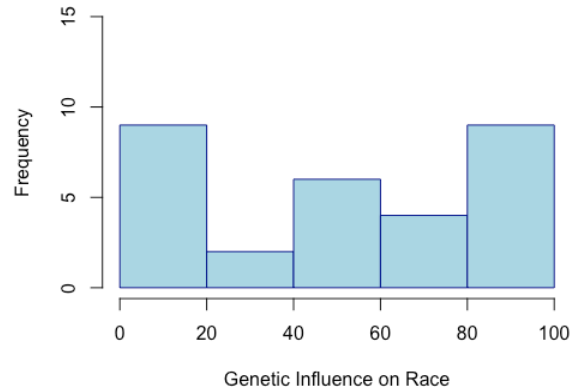


Figure 13 Extreme Conservatives Race Sliding Scale

Extreme Conservative: SES

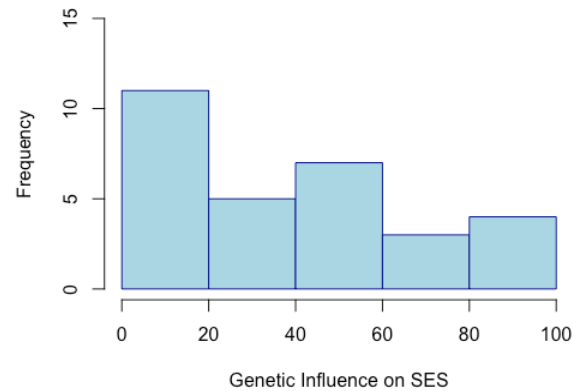


Figure 14 Extreme Conservatives SES Sliding Scale

Extreme Conservatives: Intelligence

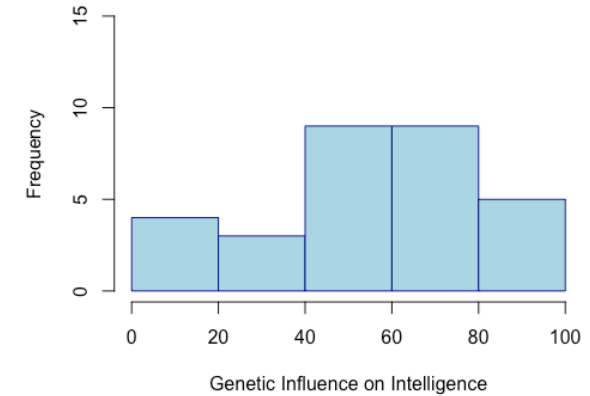


Figure 15 Extreme Conservatives Intelligence Sliding Scale

Extreme Liberal: Race

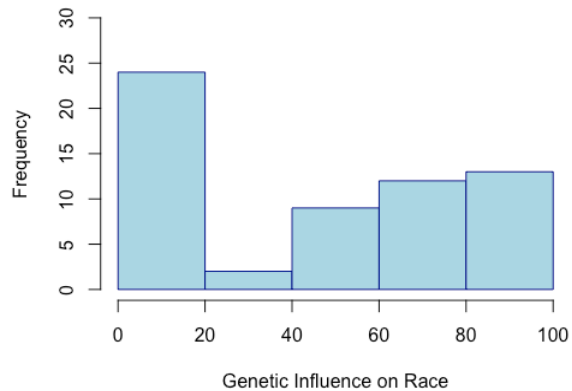


Figure 16 Extreme Liberals Race Sliding Scale

Extreme Liberal: SES

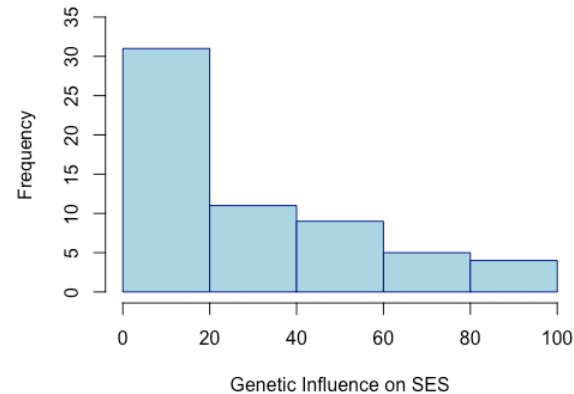


Figure 17 Extreme Liberals SES Sliding Scale

Extreme Liberals: Intelligence

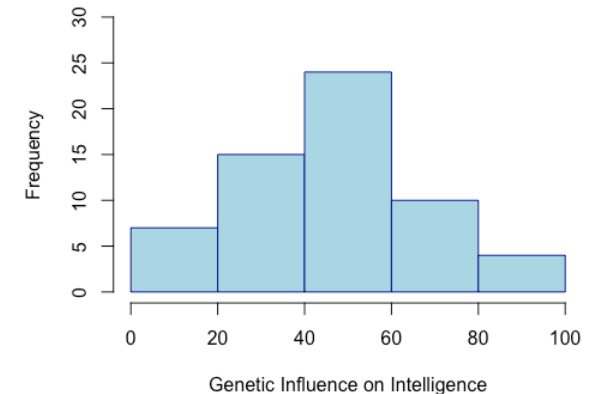


Figure 18 Extreme Liberals Intelligence Sliding Scale

Section Three

Since the focus of my dissertation is to understand the potential impact of behavior genetics research on teacher perceptions of student ability and achievement, it was important to provide survey respondents with primary-source accounts. This was the intention behind Section Three (Tables 11-14). I provided a minute-long extract of a ten-minute video titled “Genetics and Education,” in which leading behavior geneticist Robert Plomin speaks to educators about what genetics research could bring to schools (results in Table 11). The video is publicly accessible and was published on YouTube by TES Teaching Resources, a UK-based platform that allows educators to “share and download free lesson plans, classroom resources, revision guides and curriculum worksheets” (TES Teaching Resources, 2009).

In the video, Plomin discusses the role of genetics in student ability and achievement and asks practitioners to recognize the importance and utility of genetics within classrooms. I asked teachers to share the extent to which they agreed or disagreed with Robert Plomin’s video. Four-hundred and fifty-eight (458), or 79.37%, of teachers made it to Section Three of the survey “somewhat agree,” “agree,” or “strongly agree” with Robert Plomin’s views in the video. I also took extracts from the video and asked teachers about their views regarding specific statements. The reasoning behind this was two-fold. First, I realized that not all respondents would take the time to watch the video clip and providing extracts would allow them to respond to the most important elements without having to watch the video. Second, in the video Plomin does not always talk about genetics directly. Although two of the extracts I asked teachers to comment on did not explicitly mention genetics, they drew upon findings in genetics research. These two statements had some of the highest numbers of teacher support. Forty-eight (48.18%) of teachers “agree” that “not only do children differ in how easily they learn, but it’s sort of in what they learn and what they like to learn,” with 92.55% of all respondents selecting either “somewhat agree,” “agree,” or “strongly agree.” Most teachers (93.24%) also agreed to some extent that “we ought to be providing the opportunities for children to discover their strengths and minimize their weaknesses,” with 44.54% selecting “strongly agree.” While these two statements do not talk about genetics, Plomin’s core argument is that a knowledge of genetics can help us to “provide opportunities for children to discover their strengths and minimize their weaknesses” and that children differ “in how easily they learn, in what they learn, and what they like to learn,” in part because of their genetics (TES Resources, 2015). I decided to include statements with and without explicit mention of genes in part to see if there was a difference between teacher responses to these different kinds

of statements. Although the two statements that did not directly talk about genetics had the highest percentages of teachers in some form of agreement, the other extracts teachers were asked to comment on that did mention genetics also had high levels of agreement.

Over ninety-one percent (91.68%) of respondents agreed to varying degrees with the statement “children differ, and they differ genetically,” with 47.31% of the 577 respondents selecting “agree.” Additionally, 83.3% of teachers also selected a variation of “agree” for: “don’t just automatically blame teachers and schools and parents. Realize that genetics is important,” with 39.69% selecting “agree,” 28.25% selecting “somewhat agree” and 18.37% choosing “strongly agree.” I found that the tendency to agree with these statements paralleled the focus group findings in which seven out of the nine teachers to take the exit-questionnaire agreed with “don't just automatically blame teachers, and schools, and parents. Realize that genetics is important” and eight out of nine felt “we ought to be providing the opportunities for children to discover their strengths and minimize their weaknesses.” Moreover, all the focus group teachers who took the exit-questionnaire agreed to varying degrees with “children differ, and they differ genetically.”

Table 11 Teacher Views on Robert Plomin

| Question | Strongly disagree | Disagree | Somewhat disagree | Neither agree nor disagree | Somewhat agree | Agree | Strongly Agree | Missing ¹²⁴ |
|---|-----------------------------|---------------|-------------------|----------------------------|-----------------|-----------------|-----------------|------------------------|
| <i>“To what extent do you personally agree or disagree with the researcher’s views in this video clip?”</i> | 5 (0.87%) ¹²⁵ | 19 (3.29%) | 33 (5.72%) | 62 (10.75%) | 183 (31.72%) | 199 (34.49%) | 76 (13.17%) | 83 (12.57%) |
| <i>“Children differ, and they differ genetically”</i> | 3 (0.52%) | 7 (1.21%) | 16 (2.77%) | 22 (3.81%) | 110 (19.06%) | 273 (47.31%) | 146 (25.30%) | 83 (12.57%) |
| <i>“Don’t just automatically blame teachers, and schools, and parents. Realize that genetics is important.”</i> | 3 (0.52%) | 18 (3.12%) | 30 (5.20%) | 28 (4.85%) | 163 (28.25%) | 229 (39.69%) | 106 (18.37%) | 83 (12.57%) |
| <i>“Not only do they [children] differ in how easily they learn but it’s sort of in what they learn and what they like to learn.”</i> | 2 (0.35%) | 3 (0.52%) | 14 (4.43%) | 24 (4.16%) | 90 (10.40%) | 278 (48.18%) | 166 (28.77%) | 83 (12.57%) |
| <i>“We ought to be providing the opportunities for children to discover their strengths and minimize their weaknesses”</i> | 1 (0.17%) | 4 (0.69%) | 14 (2.43%) | 20 (3.47%) | 72 (12.48%) | 209 (36.22%) | 257 (44.54%) | 83 (12.57%) |

¹²⁴ Percentages for missing are calculated in terms of the N at the start of the survey (660). For example, 12.57% of people who started the survey did not get to the question: “To what extent do you personally agree or disagree with the researcher’s views in this video clip?”

¹²⁵ Percentages are calculated based on the number of respondents to answer the question. In this case, only 577 teachers answered this question. Therefore the 5 teachers who selected “strongly disagree” are 0.87% of the 577 who answered the question.

I also asked teachers about the proposals Asbury and Plomin make for precision education in “G is for Genes” (see Tables 12-14). As I mentioned in Chapter Three, Asbury and Plomin (2013) make an appeal for considering genetically-sensitive schooling as an alternative to the current system that is defined by “...arbitrary hoops set in place by partisan, vote-courting governments” (p. 11). They also talk about the high-stakes environments teachers work in and advocate for “not placing restrictions on what teachers can teach and how they can teach it” (p. 164). In the book, Asbury and Plomin call for increased choice (“it all comes down to choice” (p. 186)), and conclude by saying “it’s time to use the lessons of behavioral genetics to crease a school system that celebrates and encourages this wonderful diversity” (p. 187). They offer eleven policy recommendations for creating a school system that can “draw out natural ability and build individual education plans for every single child, based on pupils’ specific abilities and interests” (p. 11). Importantly, the eleven policy recommendations (see Table 13 p. 211) do not explicitly mention genetics. However, the authors do discuss the genetics findings that underpin the proposals they advocate for.

Although the policy recommendations fit under the umbrella of precision education, the extent to which teachers supported them is not necessarily indicative of their attitudes towards genetics research. For instance, Asbury and Plomin (2013) propose to “increase the range of subject options available to all students and give teachers more freedom in their lessons” and “offer free, high-quality preschool education to disadvantaged families from age 2, free, high-quality preschool to all children from age 3 to 4, and extra support for children from low-SES families from birth” (pp 161-177). Policy points like these touch upon other educational issues such as differential access to quality education – a pressing issue in US education policy that teachers in the focus groups raised as important, particularly in West Elm’s theme “Financing Power: ‘The Old Boys’ Network’.” Therefore, although 66.55% of the 565 teachers to answer this block of questions felt that these policies would have a positive impact on the US education system and 54.69% felt it would positively impact the US teacher profession, it is possible that these responses say little about their perceptions of genetics research. When the majority (72.04%) of survey respondents said they believed that Asbury and Plomin’s policy proposals would have a positive effect on ethnic minorities and low-income students who are underserved in the current system, they could be thinking of redistributive policies such as offering free high-quality preschool or leveling the “playing field for extracurricular activities by providing extra support to pupils from families with fewer resources.” This seems likely as the highest percentage (34.51%) of respondents to select a policy point as the most important chose offering free high-quality preschool (see Table 14).

Teachers in the focus groups also thought offering free high-quality preschool was important. For instance, Juliet (West Elm) explained in the third focus group: “I think that’s so important, like high quality preschool education, especially to disadvantaged children...it makes a huge huge difference when the kids come to school” (March 2017). Petra (Jacobson School) echoed this: “I think in general it [these policy points] would be to their [historically underserved groups] benefit, especially starting early and offering the high-quality education” (April 2017).

Upon reflection, I should have included the genetic basis for the policy recommendations that Asbury and Plomin provided in the survey as this would have more clearly allowed respondents to see the connections between the policy recommendations and findings in behavior genetics. At the time, however, I was afraid of creating an infographic that would be large and overwhelming in a survey that was already lengthy. Therefore, in the survey, the best indicator of teacher attitudes towards genetics-informed research in education is the fact that 65.66% of respondents said their views on these policy points would not change if individual education plans were “based on an individual’s genetic profile and the identified specific abilities and interests.” Interestingly, 16.46% felt their views would negatively change while 17.88% felt it would positively change. In conjunction with the initial positivity survey respondents expressed towards these policy points, these findings suggest that incorporating genetics research into schooling is not thought of negatively by teachers.

The decision not to provide the genetic argument for the policy recommendations was a limitation of my survey. Linking back to the qualitative analysis, I believe this limitation is another reason why being able to discuss teacher attitudes towards incorporating genetics research into education in the third focus group was valuable. In the final focus group, teachers were given the genetic basis for the policy recommendations in their pre-reading materials and we spent time clarifying some of the scientific terminology to aid in the understandings of what precision education might entail.

At West Elm, Florence talked about “some kids that have come across our paths and because of whatever like cognitive disability they have – even though we’re like a college prep school, and all that stuff – I’m also, like what is their life realistically going to look like?” She felt that “for those students in particular,” the argument that behavior genetics would be able to provide earlier and more tailored career advice (similar to Asbury and Plomin’s policy #9¹²⁶), “is a beneficial thing.” As I mentioned in the previous chapter, Florence went on to say: “I saw it as a benefit for those kids who have severe cognitive disabilities who can’t function in a

¹²⁶ The list of policies can be found on Table 13 in Chapter Nine.

school like ours” (March 2017). In relation to the idea that behavior genetics could identify learning disabilities earlier and more effectively (similar to Asbury and Plomin’s policy #3), Bridget, at the Jacobson School, said “I was thinking like dyslexia – could you be knowing at 18 months ‘my child’s going to have dyslexia or be predisposed to that’ – that could be beneficial to know” (April 2017). Erin, although a private school teacher, talked about policy #4 in relation to the public school system which has teachers “drowning in the paper work” who “can’t actually plan anything to address the children because of the paperwork” (April 2017). She went on to say:

Erin: So, if we had some sort of family approach or if the teachers were respected and trusted and we didn’t have to document it all, we didn’t have to justify it all, we didn’t have to match or individualize education plans to some menu from common core ...it would be intuitive because I would say right now [at the Jacobson School] we do have individualized education plans for our students. I know that my goal for this one [student] for the year is different than my goal for this one [student] and I might talk to the parents about it. (April 2017)

Furthermore, Cynthia, in response to policy #3, shared with the group: “I feel like it would be useful for the [students] – for all – to realize that none of us are actually completely normal. Each one of us has something that makes us different, or something that makes us unique and for some of it, it affects the way we learn more than...what other people have affects them” (March 2017).

In the focus group exit-questionnaire the majority (6/9) of teachers aligned with the national survey and thought Asbury and Plomin’s policy points would have a positive impact on the US education system and on low-income and ethnic-minority students. Focus group teachers were also provided with a list of some of the potential benefits researchers believe an increased knowledge of the role of genetics in cognitive ability and educational attainment could bring to schools in both the third focus group and the exit-questionnaire. In the exit-questionnaire, teachers were asked to select as many as they believed would be beneficial to their professional practice. The list of purported benefits included:

- The ability to target interventions more specifically to each child
- The ability to decide on streaming/tracking of students more precisely

- Earlier identification of children who might need special input
- Increased focus on personalized learning
- The ability of parents to request special education interventions for their child based on the child's genetic data
- The ability to individualize extra-curricular activities based on identified genetic strengths

Seven out of nine teachers found potential promise in genetic research's ability to increase personalization, offer more targeted educational interventions, and help identify earlier children who may require special input (e.g. through the identification of learning disabilities). All nine were in some form of agreement with the statement: "Research that explains genetic and environmental influences on cognitive ability and educational attainment could be useful for teachers." Eight of the nine teachers to take the exit-questionnaire also thought: "the science of behavioral genetics has a role to play in K-12 education" and selected "I would like to learn more about behavioral genetics and its relevance in education." Teachers' interest in learning more about behavior genetics signifies the 'regime of truth' (Rabinow & Rose, 2006) in which scientific research finds itself.

In retrospect, I should have also asked teachers in the national survey to identify the purported behavior genetics benefits they thought would be relevant to education policy and practice. A sequential mixed-methods design might have allowed me to realize the benefits of doing so if I had not collected survey responses until after finishing my qualitative data collection. However, with a parallel design, the survey ran alongside the focus groups and it was not until the third focus group that I thought to include this list that we were discussing in the focus group exit-questionnaire. Further research would benefit from asking teachers in a larger sample to select the genetics-informed education interventions they consider most beneficial.

Additionally, while many of the teachers in the focus group exit-questionnaire seemed to hold positive attitudes towards incorporating genetics research into education policy, in focus group discussions teachers raised some hesitations about whether these policies would be implemented in ways that kept equity in mind. As I discuss in the next chapter, teachers in both the focus groups and the survey saw promises and pitfalls to the incorporation of behavior genetics into US education policy. As I mentioned in the West Elm theme "Financing Biopower: 'The Old Boys' Network'," Florence had shared her opinion that "these [the policy

points] are great tools, but then what do you do with tools? And the tools have different effects based on your zip code” (March 2017). At the Jacobson School, Petra felt:

Petra: These 11 policy points are very benevolent, and I think in other people’s hands they would be very dangerous...so that’d be great if every student could have an individualized learning plan, but what I see is like, we tested your genes, you showed no aptitude and now you don’t even get to go to school. (April 2017)

Bringing the focus groups into conversation with the national survey sheds light on possible explanation for why survey respondents were slightly less likely to agree with the statement: “A student’s genetics plays an important role in their success in the classroom.” Thirty-nine percent (39.09%) of national survey respondents selected “somewhat agree,” 20.30% selected “agree,” and 4.70% chose “strongly agree” in response to the statement with “a student’s genetics plays an important role in their success in the classroom.” Phrased another way, 64.09% of respondents were in some form of agreement. In comparison, survey respondents were more likely to agree with: “Don’t just automatically blame teachers, and schools, and parents. Realize that genetics is important.” Twenty-eight percent (28.25%) selected “somewhat agree,” 39.69% selected “agree,” and 18.37% chose “strongly agree.” In other words, over eighty-percent (86.31%) of survey respondents agreed to some extent with “don’t just blame...realize genetics is important.”

In the focus groups it seemed that although teachers believed genetics were important and used molecularized discourses to talk about intelligence, they were wary of ascribing that determinism directly onto their students. So, while a teacher like Petra could say “I think sometimes people are inherently good at things and some people will never achieve” (January 2017), she also expressed anxiety about implementing genetics-informed research into education. Perhaps this conflict was also experienced by teachers in the national survey and may be contributing to their slightly more uncertain view on “a *student’s* genetics is important” in comparison to “...realize genetics is important.” One is a specific statement while the other is more general.

Levels of uncertainty also appeared in my questions asking teachers about whether they thought teacher education programs should add a course on the genetics of learning and achievement. Although 43.72% of survey respondents thought it would be beneficial to add a course in the genetics of learning and education in teacher training courses, 46.73% of survey respondents were unsure. That said, only 9.56% felt adding a course on the genetics of learning

and education in teacher training would be detrimental. These findings are related to the findings of Crosswaite and Asbury (2018), which found that among UK teachers surveyed, respondents were neither extremely open nor extremely closed to the idea of behavioral genetics playing a role in education. Crosswaite and Asbury concluded that based on these results, it is likely teachers would be welcoming to the possibility of learning more about behavior genetics.

Table 12 Teacher Views on "G is for Genes"

| Question | Negative | Neither Positive nor Negative | Positive | Missing |
|--|----------------------|----------------------------------|----------------------|----------------|
| <i>"In general, what kind of impact do you think these proposed policies would have on the US education system?"</i> | 63 (11.15%) | 126 (22.30%) | 376 (66.55%) | 95 (14.39%) |
| <i>"What kind of impact do you think these proposed policies would have on the US teacher profession?"</i> | 120 (21.24%) | 136 (24.07%) | 309 (54.69%) | 95 (14.39%) |
| <i>"What kind of impact do you think these proposed policies would have on ethnic minorities and low-income students in the US education system?"</i> | 50 (8.85%) | 108 (24.07%) | 407 (72.04%) | 95 (14.39%) |
| Question | Negatively change | My views would not change | Positively change | Missing |
| <i>"Would tailoring an individual education plan based on an individual's genetic profile and the identified specific abilities and interests change your views on these proposed policies? If so, how?"</i> | 93 (16.46%) | 371 (65.66%) | 101 (17.88%) | 95 (14.39%) |
| Question | No | Maybe | Yes | Missing |
| <i>"Do you think adding a course in the genetics of learning and education in teacher training courses would be beneficial to teachers?"</i> | 54 (9.56%) | 264 (46.73%) | 247 (43.72%) | 95 (14.39%) |

Table 13 "G is for Genes" Policy Points

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| Proposed Policy: | Proposed Policy: |
|--|---|
| 1. Keep mandatory subjects to a minimum, restrict to a Basic Skills examination | 7. Level the playing field for extracurricular activities by providing extra support to pupils from families with fewer resources. |
| 2. Increase the range of subject options available to all students and give teachers more freedom in their lessons. | 8. Set a standardized PE program for all children in primary school and Year 7 and then in Year 8 and above allow them to choose the form of exercise they will undertake. |
| 3. If a child needs extra help give it, instead of labels and bureaucracy. | 9. Increase the number and range of options available for work-and college-based vocational training; make apprenticeships more affordable for and attractive to employers; and educate students so they have mastered basic skills, found their true interests, and are more attractive to employers. |
| 4. Each student has an Individual Education Plan, which should be reviewed and revised each year. Every child should receive a personalized school-leaving certificate at the end of their compulsory education. | 10. Add a course in the genetics of learning and education for all in teacher training, and issue a call for tender for groups and individuals who wish to design and pilot practical approaches to the personalization of education. Successful techniques, training, and resources should subsequently be made available to all schools. |
| 5. Introduce a weekly Thinking Skills session for all pupils (no National Curriculum or public examinations for this, but schools will commit to an hour per week on Thinking Skills and implement as they see best). | 11. Size makes choice viable. Make our schools bigger and the links between the different levels of schooling stronger. |
| 6. Offer free, high-quality preschool education to disadvantaged children from age 2, free, high-quality preschool to all children from age 3 to 4, and extra support to children in low-SES families from birth. | |

Asbury, K., & Plomin, R. (2013). *G is for genes : the impact of genetics on education and achievement*, xii, 197 pages.

¹²⁷ Note that this version of the policy points, which was given to survey respondents, differs from the one shared in Table 1 in Chapter Three. Survey respondents were not provided with a full table that included the genetic justifications for the policy points. As I have mentioned and will reiterate, upon reflection I should have included the genetic arguments, but was wary of providing survey respondents with a graphic that would appear overwhelming and contain too much information. However, focus group respondents were provided with the version of the policy points that was shared in Table 1 because there was time to discuss each policy and the genetic basis for their proposal.

Table 14 "G is for Genes" Most and Least Important Policy Points

| Question | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | Missing |
|---|---------------|----------------|----------------|----------------|---------------|-----------------|----------------|----------------|----------------|---------------|-----------------|----------------|
| <i>Which of these 11 policy points do you believe is most important?</i> | 18 (3.19%) | 92 (16.28%) | 92 (16.28%) | 35 (6.19%) | 26 (4.60%) | 195 (34.51%) | 13 (2.30%) | 3 (0.53%) | 80 (14.16%) | 8 (1.42%) | 3 (0.53%) | 95 (14.39%) |
| <i>Which of these 11 policy points do you believe is least important?</i> | 56 (9.91%) | 6 (1.06%) | 13 (2.30%) | 68 (12.04%) | 39 (6.90%) | 6 (1.06%) | 67 (11.86%) | 91 (16.11%) | 5 (0.88%) | 44 (7.79%) | 169 (29.91%) | 96 (14.55%) |

Statistical Models and Analysis

From the descriptive analyses, it would seem that teachers generally felt that genetics plays a role in the differences seen between children in a classroom. Additionally, they seemed to suggest that teachers either held positive attitudes towards bringing genetics-informed research into education or were ambivalent about it. At no point in the survey were teachers overwhelmingly negative about genetics, its role in student ability and achievement, or its relevance for the US education system. It also seemed that when identifying the extent to which intelligence, race, and socioeconomic status are genetically influenced, teachers' responses were fairly mixed. However, all teachers were more likely to see intelligence and race as more genetically influenced than socioeconomic status. Additionally, there seemed to be a slight pattern between a respondent's political orientation and how genetically influenced they saw intelligence, race, and socioeconomic status; extremely conservative respondents on average saw all three variables are slightly more genetically influenced than extremely liberal respondents.

Given these findings, I had a sense of which questions I should look at in more detail to assess whether there is any correlation between micro-level factors and educator beliefs about the importance of genetics in relation to intelligence, socioeconomic status, race. In the following section, I focus on the sliding scale questions in particular, using t-tests and multivariate regression analysis to answer my research questions.

Results

T Tests

T-tests are typically used to determine if sets of data are significantly different from each other. For example, in my survey, I wondered whether teachers who identify as White were responding differently to teachers who identify as other than White on these sliding scale questions. With T-tests it is worth noting that there is the possibility for confounding variables. For instance, a T-test might show that teachers working in schools that are overwhelmingly (>90%) low-income responded differently to teachers working in schools in which <10% of the student body is classified as low-income. However, it could be that poorer schools have more teachers of color as the data suggests (R. Goldring et al., 2013) and that the T-test is actually measuring the different responses between teachers of color and White teachers instead of teachers in poor schools versus rich schools. Therefore, while T-tests may show there is a significant difference, running regression analysis that could control for race in the above example does a better job of eliminating confounding variables.

That said, I began by running T-tests (Table 15) on the sliding scales between the following ‘extreme’ groups:

- White and non-White teachers
- Extremely conservative and extremely liberal teachers
- Teachers who have been working for more than 20 years and those who have been working for 2 or less
- Gifted education teachers and non-gifted education teachers
- Public and private school teachers
- Schools that are comprised of >90% low-income students and schools with <10% low-income students
- Schools that are >90% ethnic-minority with schools that are <10% ethnic-minority.

I found that White and non-White teachers were significantly different¹²⁸ ($p=0.04$) from each other when it came to the race sliding scale, with White teachers being

¹²⁸ Note that all statistically significant results in this chapter will be highlighted in yellow ($p<0.05$). All results of borderline significance have been highlighted green ($p<0.1$).

more likely to see race as genetically influenced ($t=2.07$). Teachers working for more than twenty years were significantly different ($p=0.01$ and $p=0.005$) from teachers who had been working for less than 2 years when it came to both intelligence ($t=2.49$) and race ($t=-2.85$) respectively. Gifted education teachers also seemed to see intelligence as more genetically influenced ($t=2.80$) than non-gifted education teachers ($p=0.01$). When it came to public and private school teachers, there were no statistically significant differences. However, teachers working in schools that were $>90\%$ ethnic minority were less likely to think intelligence is genetically influenced ($t=-2.89$) than teachers working in schools that were $<10\%$ ethnic minority ($p=0.004$).

Table 15 Sliding Scale T-Tests

| Variable | Sliding Scale | t | df | p | Mean of x | Mean of y | 95 % confidence interval |
|---|----------------------|-------------|-----------|----------|-----------|-----------|--------------------------|
| <i>White and Non-White Teachers</i> | Intelligence | 0.52 | 133.27 | 0.60 | 51.23 | 49.69 | -4.28 7.35 |
| | Race ¹²⁹ | 2.07 | 132.35 | 0.04* | 59.84 | 51.12 | 0.41 17.03 |
| | Socioeconomic Status | -0.67 | 126.93 | 0.503 | 30.12 | 32.33 | -8.71 4.30 |
| <i>Extremely Conservative and Extremely Liberal</i> | Intelligence | 1.21 | 50.24 | 0.23 | 53.97 | 47.20 | -4.44 17.97 |
| | Race | 0.87 | 61.33 | 0.39 | 53.23 | 45.87 | -9.51 24.24 |
| | Socioeconomic Status | 1.41 | 57.24 | 0.16 | 37.03 | 27.70 | -3.89 22.55 |
| <i>Experienced teachers (>20yrs teaching) and New Teachers (2yrs or less)</i> | Intelligence | 2.49 | 93.87 | 0.02* | 56.78 | 47.33 | 1.90 16.99 |
| | Race | -2.85 | 99.00 | 0.01** | 53.75 | 68.67 | -25.32 -4.52 |
| | Socioeconomic Status | 1.62 | 103.88 | 0.11 | 32.45 | 26.467 | -1.32 13.29 |
| <i>Gifted Education Teachers and Non-Gifted</i> | Intelligence | 2.80 | 116.2 | 0.01** | 58.47 | 49.85 | 2.53 14.70 |
| | Race | 0.501 | 114.38 | 0.61 | 58.25 | 58.25 | -6.61 11.17 |
| | Socioeconomic Status | -1.34 | 116.41 | 0.18 | 26.70 | 31.02 | -10.72 2.09 |
| <i>Public and Private School Teachers</i> | Intelligence | 1.5115 | 101.5 | 0.13 | 51.79 | 45.85 | -1.86 13.74 |
| | Race | 0.89 | 105.43 | 0.39 | 59.15 | 54.74 | -5.80 14.62 |
| | Socioeconomic Status | 1.93 | 109.94 | 0.06 | 31.35 | 24.56 | -0.178 13.77 |
| <i>Schools w/ >90% ethnic minorities and schools with <10% ethnic minorities on Sliding Scale</i> | Intelligence | -2.89 | 242.45 | 0.004** | 43.14 | 52.12 | -15.10 -2.87 |
| | Race | -0.58 | 243 | 0.56 | 57.97 | 60.84 | -12.70 6.95 |
| | Socioeconomic Status | 0.27 | 240.33 | 0.78 | 29.35484 | 28.41 | -5.84 7.73 |
| <i>Schools with >90% low-income students and schools with <10% low-income students</i> | Intelligence | -1.56 | 151.47 | 0.12 | 44.42 | 50.68 | -14.19 1.66 |
| | Race | -1.30 | 183.41 | 0.19 | 53.74 | 60.64 | -17.37 3.56 |
| | Socioeconomic Status | -0.045 | 191.38 | 0.96 | 29.36 | 29.53 | -7.69 7.36 |
| Signif. Codes | 0 '***' | 0.001 '***' | 0.01 '**' | 0.05 '.' | | | |

¹²⁹ In this chapter, I have highlighted in yellow all responses with a significant p-value ($p < 0.05$). All responses highlighted in green are at the cusp of significance ($p < 0.1$).

Regressions

The T-test findings helped to identify areas of potential importance in the regression models. With regressions I could check whether the significant differences I found between particular groups of teachers remained when controlling for other variables¹³⁰. Before presenting findings, I want to discuss a couple of points. First, I decided to control for Illinois and Chicago because the survey sample had an over-representation of teachers from these areas. There is, however, a limitation to this as teachers who are in Chicago are also in Illinois which may complicate results. That said, I thought it important to place both as not all teachers who are in Illinois are in Chicago. Illinois teachers who do not work in Chicago may be working in different kinds of schools with a different demographic make-up. Second, I realize that by placing every variable I have inevitably ended up with some variables comprised of less than 50 respondents. For instance, I could have decided to group all respondents who identified as some degree of conservative (i.e. “extremely conservative,” “moderately conservative,” “slightly conservative”) together and all respondents who identified as some degree of liberal together to form bigger groups; only thirty respondents had identified as “extremely conservative.” However, I decided against this because, as mentioned earlier, I felt that the difference between a respondent who is “slightly liberal” and one who is “slightly conservative” may actually be quite small and therefore confound results between “conservative” and “liberal” respondents. The only area in which there were very small numbers of respondents (<10) in each bracket was school size as only seven respondents were working in schools with less than fifty students. To try and address this issue I created a code that looked to see whether there was a difference in responses as the size of the school a teacher was working in increased rather than to look at each possible selection individually. It is my intention that by including Illinois and Chicago as variables in my regressions and making these adjustments with regards to looking at the effects of school size, I have worked to avoid potential issues that could confound results.

¹³⁰ Table 26 in Appendix B lists the variables tested in my multivariate regressions and specifies the base case, or control for each set of variables that is not included in the regression models.

Intelligence

This model (Table 16) suggests that there is variation in teachers' views that is unrelated to their characteristics except for experience and age. The fact that teacher characteristics were generally not correlated with their views on genes in relation to intelligence is of importance. In particular, two areas I was especially interested in – one's political stance and whether or not they work in gifted education – did not appear to significantly predict views.

When controlling for all variables collected in the survey, those who have been working in the teaching force for 16-20 years ($p=0.02$) and those above the age of 65 ($p=0.05$) were more likely to think intelligence is genetically influenced. In particular, teachers over the age of 65 had a large estimate, which tells us that on the sliding scale for intelligence this group on average saw intelligence 37.23 points higher on the scale (out of 100) than others. Notably, female teachers were more likely than male teachers to see intelligence as genetically influenced and the p -value was just outside the realm of significance ($p=0.056$). There does not appear to be a statistically significant difference between the means of educators who work with predominantly low-income and ethnic-minority communities and those who work in predominantly upper-income and White communities when it comes to their views on the extent to which intelligence is genetically influenced. There also was no significant difference between primary and secondary school teachers or between public and private school teachers. This latter point is an interesting point of conversation with Crosswaite and Asbury (2018), which found that public (state) school teachers in the UK were more likely than teachers working in independent (fee-paying private) schools to hold a growth mindset; a growth mindset significantly predicted holding views of intelligence that saw the environment as more important.

Table 16 Intelligence Sliding Scale Linear Model¹³²

| Variable | Estimate | Std. Error | t value | p-value |
|-----------------------------|----------|------------|----------|-----------|
| (Intercept) | 39.43 | 10.64 | 3.71 | 0.0002*** |
| Extremely conservative | 4.03 | 5.06 | 0.80 | 0.43 |
| Extremely liberal | -5.51 | 3.86 | -1.43 | 0.15 |
| Moderately conservative | 0.88 | 2.92 | 0.30 | 0.76 |
| Moderately liberal | -3.55 | 2.60 | -1.37 | 0.17 |
| School >90% ethnic-minority | -2.28 | 4.91 | -0.46 | 0.64 |
| 60-90% ethnic-minority | 6.38 | 3.97 | 1.61 | 0.11 |
| <40% ethnic-minority | -1.07 | 3.98 | -0.27 | 0.79 |
| <20% ethnic-minority | 4.99 | 4.23 | 1.18 | 0.24 |
| <10% ethnic-minority | -0.01 | 4.18 | -0.003 | 0.10 |
| School >90% low-income | -3.97 | 4.32 | -0.92 | 0.36 |
| 60-90% low-income | -0.50 | 3.39 | -0.15 | 0.89 |
| <40% low-income | 2.12 | 4.18 | 0.51 | 0.61 |
| <20% low-income | 5.52 | 4.51 | 1.22 | 0.22 |
| <10% low-income | 2.55 | 4.72 | 0.54 | 0.60 |
| Teaching 20+ yrs. | 4.40 | 3.78 | 1.17 | 0.24 |
| Teaching 16-20 yrs. | 9.06 | 3.77 | 2.40 | 0.02* |
| Teaching 3-10 yrs. | 4.09 | 3.45 | 1.19 | 0.24 |
| Teaching 1-2 yrs. | 4.02 | 5.24 | 0.77 | 0.44 |
| Age under 25 yrs. | -6.04 | 5.94 | -1.02 | 0.31 |
| Age 25-34 yrs. | -4.15 | 3.33 | -1.25 | 0.21 |
| Age 45-54 yrs. | 1.13 | 3.21 | 0.35 | 0.72 |
| Age 55-64 yrs. | -0.05 | 4.30 | -0.01 | 0.99 |
| Age 65+ yrs. | 37.23 | 18.69 | 1.99 | 0.05* |
| Current gifted edu. teacher | 4.75 | 3.53 | 1.35 | 0.18 |
| Has gifted edu. experience | 1.18 | 2.34 | 0.51 | 0.61 |
| Has taught AP/IB/u | 4.93 | 3.33 | 1.48 | 0.14 |
| Public school | -0.45 | 6.43 | -0.07 | 0.94 |
| Alternative school | -0.38 | 7.74 | -0.05 | 0.96 |
| Religious affiliated school | -2.53 | 6.15 | -0.41 | 0.68 |
| Ethnicity-White | -0.98 | 3.13 | -0.31 | 0.75 |
| Female | 7.61 | 3.98 | 1.91 | 0.056 |
| Rural | -0.03 | 3.05 | -0.01 | 0.99 |
| Urban | 2.56 | 3.25 | 0.79 | 0.43 |
| School size ¹³¹ | 0.49 | 1.20 | 0.41 | 0.68 |
| Primary school | 1.53 | 3.72 | 0.41 | 0.68 |
| Illinois | -2.31 | 2.56 | -0.90 | 0.37 |
| Chicago | -8.33 | 5.25 | -1.59 | 0.11 |
| Signif. Codes | 0 '***' | 0.001 '**' | 0.01 '*' | 0.05 '.' |

¹³¹ Based upon a code created for school size: >5000+ =7; > 2000 but < 5000=6; > 1000 but < 2000=5; > 500 but < 1000=4; > 250 but < 500=3; > 50 but < 250 =2; < 50 students=1

¹³² Dependent variable: extent to which teachers see intelligence as genetically influenced (0-100).

1. Sample size: 660 teachers

I also ran a robustness check with only the main demographic characteristics (without intersections) to test findings and found that teachers with 16-20 years of teaching experience ($p=0.03$) continued to be statistically significant for the intelligence sliding scale. While retirement age teachers had shown up as statistically significant in the multivariate regression model, they did not in the robustness check ($p=0.97$). Female teachers moved away from standing at the cusp of a significant p-value ($p=0.07$). Interestingly, teachers aged 25-34 appeared statistically significant in the robustness check ($p=0.03$) and seemed less likely to see intelligence as genetically influenced; this would align with the finding in Table 17 that retirement age teachers were more likely to see intelligence as genetically influenced.

Table 17 Intelligence Sliding Scale Robustness Check

| Variable | Estimate | Std. Error | t value | p-value |
|---------------------|----------|------------|----------|-------------------|
| (Intercept) | 42.93 | 5.93 | 7.24 | 0.000000000001*** |
| Ethnicity-White | 1.62 | 2.93 | 0.55 | 0.58 |
| Female | 6.63 | 3.61 | 1.84 | 0.07 |
| Public School | 2.62 | 3.54 | 0.74 | 0.46 |
| Teaching 20+ yrs. | 4.25 | 3.71 | 1.15 | 0.25 |
| Teaching 16-20 yrs. | 8.29 | 3.72 | 2.23 | 0.03* |
| Teaching 3-10 yrs. | 2.75 | 3.37 | 0.82 | 0.41 |
| Teaching 1-2 yrs. | 3.25 | 5.09 | 0.64 | 0.52 |
| Age under 25 yrs. | -6.51 | 5.91 | -1.10 | 0.273 |
| Age 25-34 yrs. | -7.01 | 3.27 | -2.14 | 0.03* |
| Age 45-54 yrs. | -0.272 | 3.15 | -0.09 | 0.93 |
| Age 55-64 yrs. | -0.75 | 4.26 | -0.18 | 0.86 |
| Age 65+ yrs. | 30.56 | 9 | 1.66 | 0.97 |
| Rural | -2.24 | 2.48 | -0.90 | 0.37 |
| Urban | -3.48 | 2.71 | -1.29 | 0.20 |
| Signif. Codes | 0 '***' | 0.001 '**' | 0.01 '*' | 0.05 '.' |

Residuals: Min (-61.82); 1Q (-13.68); Median (1.69); 3Q (17.12); Max (56.55)

Multiple R-squared: 0.05; Adjusted R-squared: 0.02; F-statistic: 2.15 on 14 and 635 DF; p-value: 0.009

I also ran a regression for my intelligence sliding scale with interaction variables. I was interested in exploring a number of interactions. I began by assessing the interaction between age and ethnicity. I was interested in this interaction because

2. Noting estimated by OLS: Min (-64.77); 1Q (-13.38); Median (2.04); 3Q (15.92); Max (57.67)
3. Multiple R-squared: 0.12; Adjusted R-squared: 0.05; F-statistic: 1.94 on 37 and 603 DF; p-value: 0.0009
4. Base case is a non-White, private school, male teacher working in a secondary school outside of Illinois in which 40-59% of students are ethnic-minority and 40-59% of students are low-income.

ethnicity/race is a key area of interest in this dissertation and certain age brackets (25-34 years; 65+ years) had emerged as statistically significant in either the full regression or the robustness check. I therefore tested the interaction between teachers who identified as White and those who were over the age of 45 (just above the average age for US teachers). The interaction (Table 18) was on the cusp of significance ($p = 0.09$). The confidence interval for this interaction was -1.53, 23.44.

Table 18 Intelligence Sliding Scale Interaction Effect: Ethnicity and Age

| Variable | Estimate | Std. Error | t value | p-value |
|-----------------|----------|------------|---------|-------------------------|
| (Intercept) | 51.35 | 1.01 | 50.862 | <0.0000000000000002 *** |
| ≥ 45yrs | 4.44 | 2.15 | 2.07 | 0.04* |
| Ethnicity-White | 1.71 | 2.87 | 0.6 | 0.55 |
| Interaction | 10.96 | 6.36 | 1.72 | 0.09. |

Residual standard error: 25.87 on 655 degrees of freedom (1 observation deleted due to missingness)
Multiple R-squared: 0.01; Adjusted R-squared: 0.01; F-statistic: 2.63 on 3 and 655 DF
p-value: 0.05

I then ran an interaction effect looking political orientation and ethnicity (Table 19). Given my interest in understanding whether political orientation aligned with one's views on the etiology of intelligence, I chose to explore the interaction between identifying as White and identifying as conservative. For this interaction effect, I identified conservative respondents as those who identified as 'moderately conservative' or 'extremely conservative'. The interaction was not statistically significant.

Table 19 Intelligence Sliding Scale Interaction Effect: Ethnicity and Conservatism

| Variable | Estimate | Std. Error | t value | p-value |
|------------------|----------|------------|---------|-------------------------|
| (Intercept) | 51.27 | 1.02 | 50.24 | <0.0000000000000002 *** |
| Conservative | 2.27 | 2.50 | 0.91 | 0.37 |
| Ethnicity- White | 2.23 | 2.30 | 0.75 | 0.46 |
| Interaction | 11.83 | 8.70 | 1.36 | 0.17 |

Residual standard error: 25.96 on 655 degrees of freedom (1 observation deleted due to missingness)
Multiple R-squared: 0.01; Adjusted R-squared: 0.001; F-statistic: 1.2 on 3 and 655 DF
p-value: 0.31

Race

I found that extremely liberal teachers were less likely to think race is genetically influenced ($p=0.03$) than politically neutral teachers (Table 20). White teachers were more likely than teachers of color to think race is genetically influenced ($p=0.03$). The difference between White teachers and teachers of color supported the T-test results.

I also want to point out that although teachers who had been working in the profession for between 16-20 years did not generate a significant p-value, the p-value was 0.07 and agreed with the significant and negative direction of T-tests results on teachers who had been working for more than twenty years and those who had been working for less than two when it came to their selections for the race sliding scale. Teachers aged 25-34 were also on the cusp of a significant p-value ($p=0.09$) and seemed more likely to see race as genetically influenced than older teachers. These findings, coupled with the findings on the intelligence sliding scale, call for further exploration with a representative sample of how age and length of time in the profession may correspond to practitioner views on the etiology of intelligence and race.

Table 20 Race Sliding Scale Linear Model¹³⁴

| Variable | Estimate | Std. Error | t value | p-value |
|-----------------------------|----------|------------|----------|----------|
| (Intercept) | 54.15 | 15.64 | 3.46 | 0.001** |
| Extremely conservative | -6.69 | 7.43 | -0.90 | 0.37 |
| Extremely liberal | -12.62 | 5.67 | -2.22 | 0.03* |
| Moderately conservative | -3.23 | 4.30 | -0.75 | 0.45 |
| Moderately liberal | 5.28 | 3.82 | 1.38 | 0.17 |
| School >90% ethnic-minority | 3.26 | 7.22 | 0.45 | 0.65 |
| 60-90% ethnic-minority | -4.97 | 5.83 | -0.85 | 0.39 |
| <40% ethnic-minority | -3.67 | 5.86 | -0.63 | 0.53 |
| <20% ethnic-minority | -8.10 | 6.23 | -1.30 | 0.19 |
| <10% ethnic-minority | -3.76 | 6.14 | -0.61 | 0.54 |
| School >90% low-income | -9.65 | 6.35 | -1.52 | 0.13 |
| 60-90% low-income | -1.05 | 4.98 | -0.21 | 0.83 |
| <40% low-income | -3.77 | 6.16 | -0.61 | 0.54 |
| <20% low-income | 4.31 | 6.64 | 0.65 | 0.52 |
| <10% low-income | 2.84 | 6.95 | 0.41 | 0.68 |
| Teaching 20+ yrs. | -6.78 | 5.55 | -1.22 | 0.22 |
| Teaching 16-20 yrs. | -10.17 | 5.55 | -1.84 | 0.07 . |
| Teaching 3-10 yrs. | -4.52 | 5.07 | -0.89 | 0.37 |
| Teaching 1-2 yrs. | 2.25 | 7.71 | 0.29 | 0.77 |
| Age under 25 yrs. | 13.36 | 8.74 | 1.53 | 0.13 |
| Age 25-34 yrs. | 8.42 | 4.90 | 1.72 | 0.09 |
| Age 45-54 yrs. | 0.29 | 4.72 | 0.06 | 0.95 |
| Age 55-64 yrs. | 5.94 | 6.33 | 0.94 | 0.35 |
| Age 65+ yrs. | -19.84 | 27.48 | -0.72 | 0.47 |
| Current gifted edu. teacher | 4.38 | 5.19 | 0.84 | 0.40 |
| Has gifted edu. experience | 0.80 | 3.44 | 0.23 | 0.82 |
| Has taught AP/IB/Honors | 6.459 | 4.90 | 1.32 | 0.19 |
| Public school | -0.26 | 9.46 | 0.03 | 0.98 |
| Alternative school | 13.54 | 11.38 | 1.19 | 0.23 |
| Religious affiliated school | 0.50 | 9.04 | 0.06 | 0.96 |
| Ethnicity-White | 9.82 | 4.60 | 2.13 | 0.03* |
| Female | -3.04 | 5.85 | -0.52 | 0.60 |
| Rural | 1.22 | 4.49 | 0.27 | 0.79 |
| Urban | -0.30 | 4.79 | -0.06 | 0.95 |
| School size ¹³³ | 1.43 | 1.77 | 0.81 | 0.42 |
| Primary school | -2.03 | 5.47 | -0.37 | 0.71 |
| Illinois | -0.01 | 3.76 | 0.00 | 0.10 |
| Chicago | -6.74 | 7.71 | -0.87 | 0.38 |
| Signif. Codes | 0 '***' | 0.001 '**' | 0.01 '*' | 0.05 '.' |

¹³³ Based upon a code created for school size: >5000+=7; > 2000 but < 5000=6; > 1000 but < 2000=5; > 500 but < 1000=4; > 250 but < 500=3; > 50 but < 250=2; < 50 students=1

¹³⁴

1. Dependent variable: extent to which teachers see intelligence as genetically influenced (0-100).
2. Sample size: 660 teachers

Here I also ran a robustness check with only the main demographic characteristics to test findings (Table 21). I found that White teachers continued to be statistically significant for the race sliding scale ($p=0.02$). Teachers with 16-20 years of teaching experience also appeared statistically significant in the robustness check ($p=0.05$).

Table 21 Race Sliding Scale Robustness Check

| Variable | Estimate | Std. Error | t value | p-value |
|---------------------|----------|------------|----------|-----------------|
| (Intercept) | 56.65 | 8.66 | 6.55 | 0.000000001 *** |
| Ethnicity- White | 9.89 | 4.28 | 2.31 | 0.02* |
| Female | -5.35 | 5.27 | -1.02 | 0.31 |
| Public School | 0.89 | 5.17 | 17 | 0.86 |
| Teaching 20+ yrs. | -4.91 | 5.41 | -0.91 | 0.36 |
| Teaching 16-20 yrs. | -10.79 | 5.44 | -1.99 | 0.05 |
| Teaching 3-10 yrs. | -5.02 | 4.92 | -1.02 | 0.31 |
| Teaching 1-2 yrs. | 1.85 | 7.44 | 0.25 | 0.80 |
| Age under 25 yrs. | 12.54 | 8.63 | 1.45 | 0.15 |
| Age 25-34 yrs. | 7.77 | 4.78 | 1.63 | 0.10 |
| Age 45-54 yrs. | -1.84 | 4.60 | -0.40 | 0.69 |
| Age 55-64 yrs. | 5.44 | 6.23 | 0.88 | 0.38 |
| Age 65+ yrs. | -30.50 | 26.86 | -1.14 | 0.26 |
| Rural | -2.12 | 3.62 | -0.58 | 0.56 |
| Urban | -2.59 | 3.96 | -0.65 | 0.51 |
| Signif. Codes | 0 '***' | 0.001 '**' | 0.01 '*' | 0.05 '.' |

*Residuals: Min (-73.88); 1Q (-33.75); Median (4.17); 3Q (35.17); Max (61.88)

Multiple R-squared: 0.04; Adjusted R-squared: 0.02; F-statistic: 1.85 on 14 and 635 DF;

p-value: 0.03_

Next, I ran a regression for my race sliding scale with interaction variables. Given that ethnicity and length in profession had appeared statistically significant or with a p-value of less than 0.1 in the full regression and robustness check, I decided to explore interactions with these predictors in additional regression models. I looked at the interaction between those who had been teaching for sixteen years or longer and who identified as White (Table 22). I decided to look at this particular career duration because it is above the mean American teaching career of 13.8 years. I found there was a significant interaction effect ($p=0.04$) for teachers who had been teaching for 16 years

3. Noting estimated by OLS: Min (-78.4); 1Q (-31.55); Median (5.47); 3Q (32.29); Max (70.27)

4. Multiple R-squared: 0.08; Adjusted R-squared: 0.03; F-statistic: 1.46 on 37 and 603 DF; p-value: 0.04

Base case is a non-White, private school, male teacher working in a secondary school outside of Illinois in which 40-59% of students are ethnic-minority and 40-59% of students are low-income.

or longer and who identified as White; this demographic was less likely to see race as biologically influenced. That said, there was a large confidence interval (-36.54, -0.75) due to the noisiness of the unrepresentative sample.

Table 22 Race Sliding Scale Interaction Effect: Career Length and Ethnicity

| Variable | Estimate | Std. Error | t value | p-value |
|--------------------|----------|------------|---------|--------------------------|
| (Intercept) | 59.197 | 1.457 | 40.632 | < 0.0000000000000002 *** |
| ≥16 Years Teaching | -8.23 | 3.13 | -2.63 | 0.009 ** |
| Ethnicity-White | 8.03 | 4.12 | 1.95 | 0.05 . |
| Interaction | -18.64 | 9.11 | -2.05 | 0.04 * |

Residual standard error: 37.38 on 655 degrees of freedom (1 observation deleted due to missingness)
Multiple R-squared: 0.02; Adjusted R-squared: 0.02; F-statistic: 5.15 on 3 and 655 DF
p-value: 0.002

I also explored the interaction between age and ethnicity (Table 23). Age had emerged as a variable of interest in the intelligence sliding scale, and I was interested to see whether it was an important variable when it came to teachers' views on race. The interaction effect showed that that older teachers were less likely to consider race as genetically influenced while White teachers were more likely; however, neither of these were statistically significant. Nevertheless, when looking at the interaction between being an older teacher and being White, analysis suggests that White older teachers were significantly likely ($p=0.002$) to have a lower value for the dependent variable. In other words, White older teachers were significantly likely to see race as environmentally influenced. This finding suggests that the effect of age on views of race should be further explored in a representative sample.

Table 23 Race Sliding Scale Interaction Effect: Age and Ethnicity

| Variable | Estimate | Std. Error | t value | p-value |
|-----------------|----------|------------|---------|--------------------------|
| (Intercept) | 59.36 | 1.46 | 40.73 | < 0.0000000000000002 *** |
| ≥ 45yrs | -4.94 | 3.1 | -1.59 | 0.11 |
| Ethnicity-White | 7.13 | 4.14 | 1.72 | 0.09 |
| Interaction | -28.31 | 9.18 | -3.08 | 0.002 |

Residual standard error: 37.34 on 655 degrees of freedom (1 observation deleted due to missingness)
Multiple R-squared: 0.03; Adjusted R-squared: 0.02; F-statistic: 5.53 on 3 and 655 DF
p-value: 0.0009

Socioeconomic Status

Moderately liberal teachers were less likely to think socioeconomic status is genetically influenced ($p=0.001$), while rural teachers were more likely to think socioeconomic status is genetically influenced ($p=0.02$) (Table 24). Notably, none of the estimates for socioeconomic status were above ten, and most were below 5, which corresponds with the histogram results that show most respondents did not see socioeconomic status as genetically influenced. I believe this finding might help explain why other studies have found that individuals are more willing to talk about socioeconomic achievement gaps than race-based ones (Valant & Newark, 2016). Perhaps the polarization and fear of engaging in discussions about race might also be informed by whether or not individuals see race as genetically influenced. Could individuals be more open to discussing and addressing socioeconomic achievement gaps because they see it as more environmentally driven? This question calls for further research.

Table 24 SES Sliding Scale Linear Model¹³⁵

| Variable | Estimate | Std. Error | t value | p-value |
|-----------------------------|----------|------------|----------|----------|
| (Intercept) | 18.07 | 11.48 | 1.57 | 0.12 |
| Extremely conservative | 3.71 | 5.46 | 0.68 | 0.50 |
| Extremely liberal | -6.80 | 4.16 | -1.63 | 0.10 |
| Moderately conservative | 0.06 | 3.16 | 0.02 | 0.98 |
| Moderately liberal | -8.97 | 2.81 | -3.20 | 0.002** |
| School >90% ethnic-minority | 2.36 | 5.30 | 0.44 | 0.66 |
| 60-90% ethnic-minority | 6.29 | 4.28 | 1.47 | 0.14 |
| <40% ethnic-minority | -1.73 | 4.30 | -0.40 | 0.69 |
| <20% ethnic-minority | 1.91 | 4.57 | 0.42 | 0.68 |
| <10% ethnic-minority | -5.60 | 4.51 | -1.24 | 0.22 |
| School >90% low-income | -6.64 | 4.67 | -1.42 | 0.16 |
| 60-90% low-income | -5.57 | 3.66 | -1.52 | 0.13 |
| <40% low-income | -1.46 | 4.52 | -0.32 | 0.75 |
| <20% low-income | 5.31 | 4.87 | 1.09 | 0.28 |
| <10% low-income | 3.03 | 5.10 | 0.59 | 0.55 |
| Teaching 20+ yrs. | -0.29 | 4.08 | -0.07 | 0.94 |
| Teaching 16-20 yrs. | 2.59 | 4.08 | 0.63 | 0.53 |
| Teaching 3-10 yrs. | -1.02 | 3.73 | -0.27 | 0.78 |
| Teaching 1-2 yrs. | -4.79 | 5.66 | -0.85 | 0.40 |
| Age under 25 yrs. | -3.49 | 6.42 | -0.54 | 0.59 |
| Age 25-34 yrs. | -0.21 | 3.60 | -0.06 | 0.95 |
| Age 45-54 yrs. | 1.77 | 3.46 | 0.51 | 0.61 |
| Age 55-64 yrs. | -0.32 | 4.65 | -0.07 | 0.95 |
| Age 65+ yrs. | 7.29 | 20.18 | 0.36 | 0.72 |
| Current gifted edu. teacher | -3.49 | 3.81 | -0.92 | 0.36 |
| Has gifted edu. experience | -2.05 | 2.53 | -0.81 | 0.42 |
| Has taught AP/IB/Honors | -1.11 | 3.60 | -0.31 | 0.75 |
| Public school | 6.42 | 6.94 | 0.93 | 0.36 |
| Alternative school | 8.21 | 8.36 | 0.98 | 0.33 |
| Religious affiliated school | -5.01 | 6.64 | -0.75 | 0.45 |
| Ethnicity-White | -0.40 | 3.38 | 0.12 | 0.91 |
| Female | 1.95 | 4.30 | 0.46 | 0.65 |
| Rural | 7.59 | 3.30 | 2.30 | 0.02* |
| Urban | 3.47 | 3.51 | 0.99 | 0.32 |
| School size ¹³⁶ | 1.77 | 1.30 | 1.37 | 0.17 |
| Primary school | 3.37 | 4.02 | 0.84 | 0.40 |
| Illinois | -3.07 | 2.76 | -1.11 | 0.27 |
| Chicago | 7.35 | 5.66 | 1.30 | 0.19 |
| Signif. Codes | 0 '***' | 0.001 '**' | 0.01 '*' | 0.05 '.' |

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1. Dependent variable: extent to which teachers see intelligence as genetically influenced (0-100).
2. Sample size: 660 teachers
3. Noting estimated by OLS: Min (-45.93); 1Q (-22.51); Median (-4.91); 3Q (18.39); Max (82.13)
4. Multiple R-squared: 0.07; Adjusted R-squared: 0.01; F-statistic: 1.25 on 37 and 603 DF, p-value: 0.15

In the robustness check I ran, none of the main demographic characteristics turned up as significant, echoing the regression model with all variables (Table 25). That said, it is worth noting that teachers working in rural environments were on the edge of a significant p-value ($p=0.09$) in the robustness check.

Table 25 SES Sliding Scale Robustness Check

| Variable | Estimate | Std. Error | t value | p-value |
|---------------------|----------|------------|----------|----------|
| (Intercept) | 21.65 | 6.38 | 3.39 | 0.0007** |
| Ethnicity- White | 0.21 | 3.16 | 0.07 | 0.95 |
| Female | 2.38 | 3.89 | 0.61 | 0.54 |
| Public School | 5.50 | 3.82 | 1.44 | 0.15 |
| Teaching 20+ yrs. | -1.37 | 3.99 | -0.34 | 0.73 |
| Teaching 16-20 yrs. | 3.76 | 4.01 | 0.94 | 0.35 |
| Teaching 3-10 yrs. | -0.73 | 3.63 | -0.20 | 0.84 |
| Teaching 1-2 yrs. | -2.80 | 5.48 | -0.51 | 0.61 |
| Age under 25 yrs. | -2.30 | 6.37 | -0.36 | 0.72 |
| Age 25-34 yrs. | -1.88 | 3.52 | -0.55 | 0.59 |
| Age 45-54 yrs. | 1.05 | 3.40 | 0.31 | 0.76 |
| Age 55-64 yrs. | 0.18 | 4.60 | 0.38 | 0.97 |
| Age 65+ yrs. | 1.62 | 19.81 | 0.08 | 0.93 |
| Rural | 4.58 | 2.67 | 1.72 | 0.09 |
| Urban | 3.96 | 2.92 | 1.36 | 0.18 |
| Signif. Codes | 0 '***' | 0.001 '**' | 0.01 '*' | 0.05 '.' |

*Residuals: Min (-39.14); 1Q (-24.63); Median (-6.13); 3Q (20.46); Max (73.30)
 Multiple R-squared: 0.02; Adjusted R-squared: -0.01; F-statistic: 0.74 on 14 and 635 DF;
 p-value: 0.73_

I chose not to run interaction effects for the socioeconomic sliding scale given the findings from the full regression analysis, most notably the small estimate sizes and insignificant p-values.

¹³⁶ Based upon a code created for school size: >5000+=7; > 2000 but < 5000=6; > 1000 but < 2000= 5; > 500 but < 1000=4; > 250 but < 500=3; > 50 but < 250 =2; < 50 students=1

Discussion

This chapter has taken an intersectional perspective to identify which intersections ‘matter’ when it comes to intelligence, socioeconomic status, race, and genetics in a context in which race and class are important factors for many life outcomes. However, as I’ve shown, there were no clear-cut patterns when it comes to a teacher’s background characteristics and their understandings of the role of genetics in relation to intelligence, race, and socioeconomic status. Many teachers saw genetics playing a role in education-related outcomes, supporting the findings of Walker and Plomin (2005) and Crosswaite and Asbury (2018). The fact that 91.68% of teachers agreed to some extent that “children differ, and they differ genetically” illustrates a possible alignment with the arguments of behavior geneticists. Kathryn Asbury, co-author of “G is for Genes,” also found that the teachers she spoke to about her book reacted similarly to findings in behavior genetics and to the idea of genetics-informed education policy:

Asbury: I have to say in talking to teachers, I haven’t heard anything negative [about bringing genetics into education]. What I do hear, and I have some sympathy for, is ‘well it’s all very interesting, and yes, we can see that genes play a play a part in how the children who are appearing in our classrooms are, but what can we do with it?’
(December 2015)

Asbury’s findings were supported by my survey respondents, including this one who shared:

I know genetics is hugely controversial because in a democratic society we believe we can influence outcomes. Honestly, I always wanted to believe this, but I’ve seen families where with modest interventions their children have been exceptionally successful, and others where their children have to work extremely hard to keep up.

– Respondent #206, White and Hispanic female suburban public school teacher

In the above instance, although the respondent “always wanted to believe” that genetics do not “influence outcomes,” her experiences as a teacher have shown her otherwise. Importantly, she seemed to suggest that believing genetics plays a role goes against the principles of a democratic society.

However, teachers also saw the environment playing an almost equal role. One respondent wrote in the survey that “environments influence but genetics set a baseline” (Respondent #154, White male rural public school teacher), which I felt echoed the sentiments shared by Richard (Jacobson School) who explained in the first focus group that “you have this one student that goes [and] just knocks it [an assignment] out of the park...there’s got to be environment in it. But there’s also — you got to have the horsepower too” (January 2017). I felt that both Richard and the survey respondent were speaking to the same idea: genetics sets a baseline for ability that the environment either enhances or suppresses. Moreover, the fact that 56.36% of respondents saw parents/guardian and home environment as the most important factor in a child’s academic achievement and educational attainment speaks to the importance teachers assign to the environment.

Although many survey respondents recognized the role of genetics, there were teachers who expressed concern over bringing genetics-informed research into education. In one instance, a survey respondent acknowledged the role of genetics while also stressing the importance of tailoring instruction regardless of what genetics might say:

Genetics may provide a child with varying aptitudes for learning, interacting, processing information, communicating & managing his or her environment. All of those abilities or lack thereof could play an important role in the child's success in a classroom. However, educators & related service providers should be tailoring instruction so that needs of each individual student are met and learning and growth opportunities are facilitated for all regardless of current level or perceived natural ability.

– Respondent #136, White female urban public school teacher

Other examples show that while teachers do not seem to deny that genetics plays a role, some remain anxious about how scientific research has been and therefore might be misused. One respondent elaborated:

In an oppressive society (such as ours), using genetics as a reason for classifying people can be very dangerous if people do not understand the limitations of such an approach.

– Respondent #605 Hispanic female urban public school teacher

These views point to the complex association between genetics and determinism and a fear of the ideological power of the two when combined. In both the survey and the focus groups it would seem many teachers were aware of the historical legacy of using genetic ideologies to assert race and class-based differences.

So, what do my survey findings mean for education right now? What does the survey tell us that the focus groups could not? In the autumn of 2014, the percentage of students enrolled in public elementary and secondary schools who were White was less than 50% (49.5%) for the first time and represents a decrease from 58% in the fall of 2004 (National Center for Education Statistics, 2016). In other words, “the cultural gap between children in the [sic] schools and teachers is large and growing” (Sleeter, 2001). As the teacher workforce increasingly becomes professionalized, the gap between the White teachers in the public education system and the low-income and minority students who comprise it will widen (Sleeter, 2001). This is potentially important when considering the findings from my survey, which suggest that in a non-representative sample, White teachers, who are increasingly educating children ‘ethnically different’ to them, are more likely to see race as genetically influenced. This could impact teacher perceptions of students, which I have shown affect children’s academic performance, success, referral for special education or gifted education, and rates of discipline (Okonofua, Walton, & Eberhardt, 2016; Tenenbaum & Ruck, 2007; Warikoo et al., 2016). Research in education demonstrates that teachers’ differential treatment of students on the basis of race “contribute to racial disparities in achievement and other forms of racial stratification in schools” (Warikoo et al., 2016, p. 508). My survey findings regarding teacher perspectives on intelligence and race in relation to genetics hint at the possibility that teachers are not just seeing phenotypic (external and observable) differences between themselves and their students. It is possible that teachers see these differences from a genetic perspective, which may be contributing to the established relationship between a teacher’s view of a student and that child’s educational outcomes.

Warikoo et al. (2016) argue that implicit racial associations inform teacher perceptions of students and “detract from the warmth and responsiveness of teachers in interracial interactions with students” (p. 509). I want to raise the possibility that without careful and open discussion of behavior genetics arguments and findings, implicit genetic associations could also come to inform teachers’ perceptions of students. Whether and how these associations might be tied to race or socioeconomic class cannot be known through my survey. Nonetheless, my survey has found that many teachers already believe genetics plays a role in a student’s

ability and that some teacher background characteristics, including age, time in the profession, and race, do seem to matter when it comes to educator views on intelligence and race in relation to genetics. The demographic differences between educators and the students they teach will be of increasing importance in public education, particularly if these differences are considered in essentialist terms.

Chapter X. Conclusion

Genetic discourses have real implications for systems of education and the educators and children situated within them. The discussion on the role of genetics in intelligence and achievement is not new (Galton, 1869; Galton & Schuster, 1906); nor is the conversation on what this means for education (Jensen, 1991; Shockley, 1972). What is new, is how genetically-informed research is converging with systems of education. The onslaught of genetic data made possible through technological developments is cascading into public and educational spaces, more accessible to the everyday American than ever before.

In the third focus group, West Elm teacher Florence stated: “you can’t deny that your genes are part of who you are...so, why wouldn’t this [current behavior genetics research] have been a science from long ago? Makes sense” (March 2017). She is making a valid observation. The field of behavior genetics is, to some degree, a “science from long ago.” While previous research made biological arguments without any genetic data to support it (e.g. Herrnstein & Murray, 1996), researchers today discuss the genetics of intelligence and educational attainment in terms of twin-studies (Polderman et al., 2015) and GWAS (Rietveld et al., 2013; Trampush et al., 2017; Wedow et al., 2017). Researchers like Robert Plomin share their findings in YouTube videos (TES Teaching Resources, 2009), on the radio (*BBC Radio 4 - Intelligence*, 2014), and in popular news media (Harden, 2018; Velasco, 2018; Wilby, 2014; Yong, 2016). Conversation on the genetics of intelligence that were once decried in academic spaces (Allemang, 2012) now seem more muted, replaced with large genetics research consortiums and books titled “The Genome Factor” (Conley & Fletcher, 2017), “The Genetic Lottery” (Harden, Forthcoming), and “Blueprint: How DNA Makes Us Who We Are” (Plomin, 2018). The floodgates of genetic data have opened. The question is: what might this mean for education policy and teachers and students in schools? In this dissertation, I have looked to answer this question within the US context where racism and classism remain pressing issues¹³⁷.

¹³⁷ Race remains a pressing issue for many reasons. In the United States today, people of color are consistently found to earn less (Florida & Mellander, 2016; Meyer & Sullivan, 2017). They are more likely to live in a poor and dangerous neighborhood (Timberlake, 2007), more likely to be evicted (Desmond, 2012). People of color are representationally more likely to be placed behind bars and subject to police brutality (Pettit & Western, 2004; Wakefield & Uggen, 2010). They are more likely to be in poor health or die an early death (Krieger, 2015; Williams & Collins, 2001). Class also continues to be important. Income segregation continues to grow (Bischoff & Reardon, 2013) and research documents the relationship between an individual’s income and their life expectancy (Chetty et al., 2016).

Education is frequently proposed as the solution to social problems, but it is problematic itself. Low-income students and students of color are more likely to be found in lower-quality schools (Berkowitz, Moore, Astor, & Benbenishty, 2016; Hanushek et al., 2007; Logan & Burdick-Will, 2016) and have lower educational attainment and test-scores (Hanushek & Rivkin, 2006; Ladson-Billings, 2006; Reardon, 2011). Children of color are more likely to be disciplined in school (Carter et al., 2017; Okonofua et al., 2016) and are often misidentified when it comes to special education services (though there is debate on whether they are over or under identified: e.g. Morgan et al., 2018, 2015; Zhang, Katsiyannis, Ju, & Roberts, 2014). Children in poverty and racially-defined minorities are less likely to be referred for gifted education or advanced academic programming (Erwin & Worrell, 2012; Ford, 2014); this influences their likelihood of attending an elite private higher education institution (Ford & Whiting, 2016). Education is not the equalizer it is often thought to be.

I was motivated to undertake a doctoral dissertation dealing with controversial topics because I believe it is important we confront them headfirst. My aim has always been to look at how contemporary behavior genetics research might impact educational systems in a country that divides its citizens along race and class lines. At a more philosophical level, I've been contemplating what behavior genetics research means for equity in an environment where equity-oriented policies like affirmative action continue to be debated (*Fisher v. University of Texas*, 2013) and reversed (Green, Apuzzo, & Benner, 2018). Pretending that behavioral genetics research does not exist will not combat its misuse or how it is interpreted, nor does it help us to identify solutions against determinism. One way or another, behavior genetics and its arguments will make its way to teachers – it is time to have a systematic conversation about what this means and could mean. In order to constructively address concerns, threats, and dilemmas, it is necessary to pay attention to this growing body of scientific research – to open up the conversation, move past critique, and find viable and constructive solutions that keep equity in mind.

What I Did

In this dissertation, I sought to provide micro and macro-level accounts of the American education system and what the teachers within it think about the charged concepts of race, intelligence, socioeconomic status, and genetics. My mixed-methods design combined teacher focus groups in two PreK-8 schools in the Chicago metropolitan area with a survey of 660

teachers across the United States. In my work, I identified nuances in perspectives, which have deepened the contributions I have made to the field of education research.

What I contributed to education research

On the whole, the qualitative and quantitative findings of this dissertation reinforce each other. Teachers in both forms of data collection believe genetics plays a role in student ability and individual achievement differences. At the same time, they recognize the role of the environment – parents and families in particular. Additionally, teachers expressed concern over the equitable application of genetics-informed research and how it might be misused. In general, however, participants seemed positive about what genetics-informed research could bring to education.

Intelligence

Many teachers in both the focus groups and survey saw genetics playing a role in a student's ability and achievement in the classroom. More specifically, survey respondents viewed intelligence in terms of *both* 'nature' and 'nurture' equally: 48.54% environmentally influenced and 51.46% genetically influenced. This result supports prior survey research on teacher perceptions of intelligence in relation to biology and the environment (Crosswaite & Asbury, 2018; Walker & Plomin, 2005) and current behavior genetics findings on the heritability of intelligence (Polderman et al., 2015). As the focus groups illuminated, educator views on intelligence may come from their awareness of the inter-relationship between the environment and academic achievement and their experiences working with children who come from seemingly similar backgrounds but have different levels of achievement.

The focus groups showed in detail how teachers view intelligence, highlighting discussions of both an innate cognitive capacity and multiple intelligences; academic achievement was seen by focus group teachers as the most valued form of intelligence in American society. The survey showed that on a hundred-point sliding scale, teachers who have been working for 16-20 years and those above the age of 65 were more likely to see intelligence as genetically influenced. Forty-two survey respondents saw intelligence as purely environmentally influenced while twenty-three saw it as purely genetic. In comparison, only one focus group teacher saw intelligence as less than 50% genetically influenced, while four of the nine taking the focus group exit-questionnaire identified intelligence as more than 60% shaped by an individual's genetics.

Race

My dissertation was the first of its kind to assess the extent to which teachers see genetics playing a role in the construction of race. Teachers were largely careful not to equate race with cognitive ability in focus group discussions and survey responses. Race seemed to be an uncomfortable topic in the focus groups especially, likely due to the ugly history that associates IQ with skin color. Many teachers in both the focus groups and the survey openly acknowledged the role of bias and racism in American society. At the same time, however, there were instances in which teachers were hesitant to engage in ‘race-talk’ (Sue, 2016; E. E. Thomas, 2015). At the Jacobson School, for instance, teachers seemed more comfortable talking about culture and socioeconomic status than race.

Additionally, focus group teachers identified cartographies of race, tacitly pointing to the relationship between skin-color, geography, and privilege. They exhibited an awareness that race is associated with where you live and what resources you are given. In the survey, only 16.21% of respondents thought race was one of the top three (out of seven¹³⁸) most important factors affecting a child’s academic achievement and educational attainment. However, survey respondents considered the standalone concept of race, on average, to be more genetically influenced than either intelligence or socioeconomic status on a hundred-point sliding scale. White teachers were more likely than teachers of color to think the category of race was genetically influenced. Sixty-one of the 660 survey participants thought race was purely environmental while 197 thought it was purely genetic. Five of the nine teachers partaking in the focus group exit survey viewed race as more than 60% genetically influenced, with three of the five viewing it as 90% or more. Notably, none of the focus group teachers saw race as a purely environmental construct.

Socioeconomic status

Teachers generally saw socioeconomic status playing a bigger role in student achievement and educational attainment than either race or genetics. Forty-five percent (45.91%) of survey respondents selected socioeconomic status as one of the top three most important factors affecting a student’s academic achievement and educational attainment. Teachers in the focus groups also discussed income segregation, pointing to the spatial concentration of wealth and poverty and its effect on access to quality education.

¹³⁸ The seven factors teachers were asked to rank in order of importance were race/ethnicity; genetics; gender; socioeconomic status; parents/guardian and home environment; teacher/school quality; neighborhood environment.

No prior research has looked at the extent to which teachers see genetics playing a role in socioeconomic status. I found that teachers were less likely to see socioeconomic status as genetically influenced in comparison to race and intelligence. Only 13 respondents thought socioeconomic status was purely genetic whereas 108 thought it was purely environmental. In correspondence with the national survey, focus group teachers were also less likely to see socioeconomic status as genetically influenced, with only two of the nine taking the exit-survey viewing class as more than 10% genetically influenced. In the national survey, I did not detect any substantive relationship between a teacher's background characteristics and their views on the effects of genetics on socioeconomic status. Although teachers working in rural communities appeared more likely to think socioeconomic status was genetically influenced in comparison to the intelligence and race sliding scales, inter-group differences for socioeconomic status were relatively small, arguably making the findings on rural-area teachers nonsignificant.

As previously mentioned, the findings from both the survey and focus groups on how teachers think about race and socioeconomic status raise the possibility that individuals' views on the lesser role of genetics in socioeconomic status could be shaping their willingness to talk about and seek solutions to socioeconomic achievement gaps in comparison to race-based achievement gaps.

Genetics

The vast majority of teachers felt that children differ genetically with many referencing experiences in the classroom and with family and friends to support their beliefs. More than ninety-percent (91.68%) of teachers agreed with the statement "children differ, and they differ genetically." Interestingly, at the beginning of the survey only 29.09% of survey respondents put genetics as one of the top-three most important factors affecting student achievement and educational attainment. Later, when respondents watched a video of researcher Robert Plomin, 83.3% agreed to some extent with his statement: "Don't just automatically blame teachers, and schools, and parents. Realize that genetics is important." The different responses to questions attempting to ascertain how important teachers believe genetics to be, may be an example of deference to a perceived authority considered 'competent to speak truth' (Rabinow & Rose, 2003).

However, a key finding is that many teachers do not see genetics as the *most* important factor in a child's academic achievement and educational attainment. When teachers at the Jacobson School and West Elm spoke about the role of socioeconomic status or home

environment in a child's academic achievement, they agreed with the 56.36% of survey respondents who thought that "parents/guardian and home environment" was the single most important factor in a child's academic achievement and educational attainment. In short, what has emerged is that there is no 'nature vs. nurture' debate; for many teachers it is a matter of both nature *and* nurture.

Genetics-informed education research

Overall, teachers believe genetics-informed research could be relevant to US education policy. Focus group teachers wanted to learn more about incorporating genetics research into education and about what the field says regarding student learning and ability. They also saw benefits to personalizing education using an individual's genetics, although there were concerns from both focus group and survey participants over how feasible this would be in the overburdened American public education system. A majority of survey respondents (65.66%) felt that tailoring an individual education plan based on an individual's genetic profile would not change their views on personalized education. Nearly half (43.72%) felt adding a course in teacher training on the genetics of learning and education would be beneficial for practitioners. Seven out of nine teachers in the focus group exit-questionnaire said they wanted to learn more about the relevance of behavior genetics for PreK-12 education. When asked about 'precision education' and Asbury and Plomin's policy points for genetically-sensitive schooling, teachers in both the focus groups and survey saw promise and possibility. A majority of survey respondents (66.55%) felt these policies would have a positive impact on the US education system. Over seventy-percent (72.04%) felt these policies would positively affect low-income and ethnic minority children. It is possible that Asbury and Plomin's precision education policy points (Asbury & Plomin, 2013) were generally welcomed by teachers because they mix 'nurture' (e.g. providing free high-quality preschool) with 'nature' (e.g. creating individualized learning plans based on a child's genotype).

Dystopia and utopia

As the overlaps between behavior genetics and education policy are a big focus of this dissertation, I also wanted to reflect more deeply on teacher's thoughts about bringing genetics research into systems of education and how this emerged across the two data sets. I believe this is an element of my research that stands out. Previous research has looked at how teachers conceptualize intelligence (Fry, 1984; K. Lee, 1996; Pishghadam, Naji Meidani, & Khajavy, 2015; Slate, Jones, & Charlesworth, 1990; Walker & Plomin, 2005) but very little has been

done to explore whether teachers believe genetics research should have a say in how education policy and curriculum is created and structured. By merging the qualitative and quantitative strands, I was able to see the intricacies of and contradictions in teacher perspectives on genetically-informed research in education.

Although incorporating behavior genetics findings into education may seem like science fiction, the growing prevalence of academic literature on the topic suggests it is entering into understandings of what is possible (Gulson & Webb, 2017; Martschenko et al., 2018; Sabatello, 2018; Youdell, 2017). For some US educators, the idea of genotyping a student and creating a learning plan based on the results seemed far-fetched; others saw great promise in it. I found that teachers were mixed in their views on the role of genetics research in education outcomes and policy. For instance, one focus group teacher wrote in the exit-questionnaire:

In my opinion, genetics is a huge contributor to a student's academic achievement. The other factors can also impact the student's ability and drive for attainment, but I do believe that...there is a wall of attainment that does exist.

Another seemed to stand more in the middle stating: “genetics is important, but family life, parents' support, and the environment are also important.” A third felt:

We [society] make a mistake to focus on genetic background and race because these are factors we have no control over and this can allow people to relinquish responsibility for any gaps in test scores or whatever measure of achievement is used.

These mixed responses also appeared in my national survey. In support of incorporating genetics into education, one respondent wrote:

Genetics is a HUGE influence. Working in a highly affluent school points to this. Gifted parents have gifted students. Parents we deem as "problems" have students with "problems" also-mentally and behaviorally. Students with learning problems usually have a parent who then says that they had learning problems. I think if we can have individual learning plans for every child, we would be more productive.

– Respondent #501, White female suburban public school teacher

Another survey respondent was more ambivalent, sharing:

I support the idea of teachers understanding a child's challenges, but don't want to label someone as being limited. There is always a chance a student could do better than what was predicted. So this is dangerous territory if we link everything to genetics, or conversely, open everything up to everyone and drop standards and expect all educators and students to rise to the occasion.

– Respondent #11, White female suburban private school gifted teacher

At the other end of the spectrum, a third respondent explained:

This approach smacks of a backdoor approach to tracking students based on ethnicity and gender under the guise of science. Some individual students are more intelligent than others, and each student should be judged on his or her individual abilities, living conditions, and family integrity, but the inclusion of race and or ethnicity will necessarily invite bias, both by those who hate a particular group and by those who want to help a particular group.

– Respondent # 25, White male urban private school teacher

Therefore, while teachers in both the national survey and the focus group exit-survey seemed to believe genetics plays a role in education outcomes, there were mixed feelings about the extent to which it plays a determining role. Some agreed that genetics is critically important. Others exhibited a level of anxiety about potentially viewing student ability and achievement in a deterministic light. These mixed feelings contributed to the appearance of dystopic and utopic visions of a future world in which genetically-informed research informs education policy. For example, Petra, a Jacobson School teacher, talked about how incorporating genetics-infused research into education conjured reminders of Aldous Huxley's novel "Brave New World" where:

Petra: [In Brave New World] they actually damage their genes to make a certain subgroup of people – the Deltas or whatever – they had to clean up the trash. But they were ok with that because they actually damaged their genes to make them accept that and then they gave them drugs so that they didn't revolt. So that'd be great if every student could have an individualized learning plan, but what I see is: 'we tested your

genes, you showed no aptitude and now you don't even get to go to school.' (April 2017)

Echoing this dystopic vision, Cynthia shared at West Elm:

Cynthia: Maybe I've read too much science fiction but this [precision education] – I could see this going down an oddly science fictional path where it's very clean and very sterilized and like 'this is our wonderful school and your program is already planned out for you based on your parents and your grandparents and because this school has existed for 100 years.' So, your career path is chosen for you based on what your parents did. I watch too many movies I guess, but I've read science fiction books where it's something like that and I mean obviously that's taking it to a far extreme, but even things like that, how we started with the best of intentions for helping people and then things got out of hand. (March 2017)

References to science fiction also appeared in the survey. One respondent wrote:

Reducing students to genetic profiles only captures a part of who they are as human beings. I agree genetics are an important component in understanding how students learn but it is certainly not the only thing. I recommend watching the movie GATTACA to get a little nuance.

– Respondent #47, White male urban religious private school teacher

Another shared: “Who decides which genes are "good" and which genes are "bad"? Who decides which traits are desirable and which ones are not? This sounds very much like the thinking implemented by Adolf Hitler in the 1930's” (Respondent #31, Black/African American female urban private school teacher). A third stated:

I just don't think genetics is the best way to address the issues going on in schools. This sounds like Divergent or some other creepy utopian novel. I agree with the idea that teachers need to have freedom and be engaged in their subjects with less standardization, students need choice and voice, and teachers need to meet students' individual needs. I just don't think the connection to genetics is important for this.

– Respondent #5, White female private suburban school teacher

However, there were dystopic visions because there were utopic ones. Although Cynthia talked about a situation in which “we started with the best of intentions for helping people and then things go out of hand,” she also said: “I feel like when I read the pre-reading I was like: this would be an educational utopia almost – if all of these things were possible and implemented” (March 2017). While Petra talked about Huxley’s “Brave New World,” she also said: “If you’re like: ‘this person has this genetic marker and they have difficulty with this and this is how you treat it’ and as a teacher I can implement those strategies, I think that would be great” (April 2017). One survey respondent wrote:

I think in general teachers need to not only be aware of genetics but neurodevelopment. Since I've worked in special education for a while I've been an advocate that the IEP process for ALL children should exist. Teachers need information about maximizing a student's potential. There is a wide range of potential in people and teachers should have information so that they can facilitate what works given the human characteristics of their student. It is NOT a one size fits all. Documenting over a period of years, more than an A or B [grade], gives SO much more information, and this is power in education.

– Respondent #162, White female suburban public school teacher

Another explained: “I believe that teachers being aware of genetics is an important and valuable thing” (Respondent #236, White female rural public school teacher). At the Jacobson school, Jacqueline felt: “I would hope that or want for us to be able to personalize all of our curriculum towards each individual student” (April 2017). At West Elm, Juliet thought that when it came to genetics-infused research in education: “I see the benefits, I appreciate a lot of these policy points.” She went on to say:

Juliet: Those kids that do have disabilities...that is something that we as a school do not service as well as we could have or as well as we can. So, it [precision education] might give those students who really do need extra supports and really do need those really individualized education – I mean I can see that being a positive for a school like where we're at, where it's like, “well here it is [the genetic data], you can't really argue with it – whereas now it's like, ‘oh you don't know that.’” (March 2017)

Just as the pitfalls of genetics research caused teachers to feel anxiety, the promises and possibilities were attractive to them. Nuances in teacher responses to what behavior genetics

purports to be able to offer – their specific concerns and the particular elements that stood out positively – only became apparent by looking at the focus groups, focus group exit-questionnaires, and the national survey together. The focus groups suggest that for teachers a big appeal of behavior genetics research is the possibility to identify learning disabilities more effectively and earlier (as argued in: Kovas et al., 2016). Future research should look at whether teachers view genetics research on other educationally-relevant behaviors like ADHD or dyslexia differently to intelligence or educational attainment. Both the survey and focus groups show that teachers feel a ‘one-size-fits-all curriculum’ (as argued in: Asbury & Plomin, 2013) ignores that students are different; teachers seem to support some level of personalization. This alludes to a possible sentiment among teachers that personalization, regardless of whether genetics research findings are used, could be beneficial. Finally, increased flexibility for practitioners working in rigid and high stakes environments (as argued in: Asbury & Plomin, 2013) also seemed appealing to teachers, pointing to issues with a top-down approach in education policy that can be disengaged from education practitioners themselves.

What I contributed theoretically

The behavior genetics truth discourse

Has behavior genetics legitimized new ways of thinking? Has it re-asserted old ways of thinking in new ways? When do discourses become exemplified as truth? While I experienced limitations to using biopower (see end of chapter), I was able to see how behavior genetics research has become a truth discourse that tells us something about intelligence. Biopower helped me to understand why behavior genetics research could have profound implications for understandings of equity and difference. Perceptions of intelligence carry with them the ability to shape a person’s life trajectory. In the United States, being labeled ‘intelligent’ or ‘gifted’ signifies, in some sense, what your future will look like. In schools, students are ‘intelligent’ if they get good grades, take academically advanced courses, secure high SAT scores, and/or gain admittance into elite private higher education institutions. Intelligence, behavior genetics says, “spills over into many aspects of everyday life” (Plomin & Stumm, 2018, p. 1). It is partially responsible for differences in school performance “which in turn lead to social and economic opportunities such as those related to occupation and income” (Plomin & Stumm, 2018, p. 1). Behavior genetics findings on intelligence are manifestations of biopower and point to how social and economic opportunities might be re-imagined through a molecular gaze.

My analysis of behavior genetics as a truth discourse did not emerge through biopower alone. Throughout my dissertation I sought to bridge theoretical concepts, namely biopower and intersectionality. I combined biopower with intersectionality to redefine the notion of discriminate biopower (Fullwiley, 2004). Discriminate biopower clarifies the differential investment individuals and communities are given on the basis of categories like race, class, gender, (dis)ability, citizenship, and language; it includes an awareness of multiple facets of advantage and disadvantage that conjoin to create power or marginalization at the level of the body itself. Discriminate biopower answers: who benefits and who loses when intelligence becomes a form of biopower? It clarifies why providing recommendations for what should be done to prevent contemporary scientific research from harming disempowered groups is so important.

Genetically-informed research holds a level of authority that creates a delicate line between promise and pitfall. This authority extends beyond the human sciences and encompasses historical and sociocultural knowledge, experiences, and sentiments. According to Foucault, "...one of the current interests in the application of genetics to human populations is to make it possible to recognize individuals at risk and the type of risk individuals incur throughout their life" (Foucault & Senellart, 2008, p. 227). When behavior genetics researchers discuss the possibility of identifying learning disabilities more quickly and cost-effectively or ascertaining whether students are achieving to their potential, they are seeking to "recognize individuals at risk and the type of risk individuals incur" (Foucault & Senellart, 2008, p. 227). I believe behavior genetics, a field some consider full of transformational possibility, without careful regulation and oversight could, legitimize, rationalize, and regulate the body as a living species subdivided into 'races' or categories created around ideas about 'risk.' As Chapter Two mentioned, race has been used to categorize, separate, and differentiate between human populations. In its original application, it justified racism, becoming "a way of establishing a biological-type caesura within a population" (Foucault, 2003, p. 255). Using discriminate biopower, I have shown how a racialized discourse on intelligence linked to genetics might be legitimized. Science has been (mis)used to regulate the politics of race, class, equity, and education, serving as a convincing means through which to perpetuate the normalization of conceptions of race and class in schools and a society that intrinsically values particular bodies at the expense of others. The historical legacies of biosocial scientific research may live on today in education. Through discriminate biopower, the ways in which behavior genetics might threaten the dreams and necessities of equitable educational opportunity, policy, teaching, and practice become more apparent.

Policy-created borders and the formation of the New Borderland

One of my key theoretical contributions was the discussion on borders that emerged from the qualitative component of my dissertation. There were two ways in which I came to understand borders through this dissertation. The first was with regards to race, which I found to emerge differently in the focus groups from how race is talked about in traditional race research (e.g. Back & Solomos, 2000). While teachers at West Elm and the Jacobson School were reluctant to talk about race, supporting prior research on the complexities of ‘race-talk’ (Durrheim & Dixon, 2005; Sue, 2016; E. E. Thomas, 2015), they were not as anxious about intelligence, genetics, families, and place. This revealed something important about how race is visualized and understood. When teachers in the focus groups located and conflated people with a place, they were able to talk about race under the guise of the neighborhood, the city, and the family. In doing so, they evoked conversation on the radicalization of urban choice policies. The spatial vantage teachers used to talk about race and inequality are born out of segregationist policies that inform the make-up of cities.

The emergence of a discourse on borders led me to introduce the idea of a ‘New Borderland,’ after which I have titled my dissertation. The New Borderland is the formation of a techno-scientific border that maps onto existing socioeconomic and racial borders. This New Borderland is made possible because society spatializes race; maintains cultural, racial, and economic segregation; and sorts children on the basis of IQ. Within the confines of this new border the question ‘which genetic markers predict cognitive ability,’ is transformed into: ‘who possesses these markers?’

The latter question signifies a ramification of conducting research into the genetics of intelligence or educational attainment: the creation of another intersection through which to categorize individuals. There are behavior genetics researchers who are aware their work could widen social inequalities. In an interview with Kathryn Asbury, she shared with me her own experiences speaking with teachers who are “frustrated because they’d like to [implement IEPs], but there’s a lot of pressure from above and from the center to do certain things and [in a] certain way” (December 2015). She argued that “genetics research tells us to focus on individual differences and how we get the best out of every child and support every child in reaching their potential, learning as much as they can or finding what they’re good at and what they love.” Asbury is certain “that we will find more genes” because “people are working so hard to do this, that eventually they will succeed, and understanding will improve” (December 2015). However, she also went on to explain:

Kathryn Asbury: We need to be figuring out right now what the policies would be, how we would deal with them, what the regulatory frameworks would be, how we would protect the more vulnerable people, how we would make sure that the same opportunities were offered to everybody...because if it did prove a beneficial approach – if having bespoke education packages for all children so that you're planting them in correct soil for the flower that they are – then we would have a problem if, let's say, richer areas have the opportunity and poorer areas didn't. (December 2015)

As Asbury said, “we would have a problem.” The problem is a serious one, it would challenge the ideals of equity, meritocracy, and social justice not only from a sociocultural and socioeconomic position, but from a physiological one. Research in behavior genetics could produce forms of life that *actually* create inequitable differences in the body and its functions through technologies like in vitro fertilization or CRISPR-Cas9. As one behavior geneticist I spoke with mentioned in an interview: “can you, in principle, genetically engineer people for specific traits or can you do selective breeding exercises? Well yes, of course you can” (Clive, January 2016). This is a possible new iteration of biopower.

The New Borderland, therefore, entails two possibilities. One is simply how genetics research could be interpreted to categorize and differentiate between both individuals and populations. Similar to how teachers located identifies within a place, society might come to locate identities within the idea of the genome. The second is even more concerning: the creation of social inequality through genetic difference brought on by technological advancements in genetic engineering. These theoretical contributions come to inform the practical recommendations I make for the future.

My Reflections

American society already tracks and streams children for education programs according to ability – that is what gifted education and special education are. It is why some children enroll in ‘regular’ classes in secondary school while others take ‘Honors,’ Advanced Placement, or International Baccalaureate courses. This is a world where perceived intelligence is at present highly valued. These realities, I think, are what make behavior genetics research and what it asks of education both comfortable and uncomfortable to educators – they are what evoke utopic and dystopic reactions. The American education system currently labels children

and places them in different educational environments on the basis of their perceived ability and interests. As Petra mentioned: “we have tracking right here” (April 2017)¹³⁹.

However, genetics-informed research in education still has to contend with two broad problems that stand at opposite ends before it can truly be applied to schools. First, in order for behavior genetics to be useful to educators, measures of a genetic effect will have to be suitably large and practically measurable. Second, a genetic effect that is both large and measurable enough to be used, introduces the risk of determinism, essentialism, classism, or racism in its application; this possibility is a big concern especially when looking at the US context, both past and present. Although large and measurable genetic effects tied to specific genetic markers have yet to be found, my research demonstrates that American teachers believe behavior genetics research has something to offer education. This highlights an uncontrollable effect of behavior genetics research: how it makes its way into schools both implicitly and explicitly even without it being able to provide anything practical to educators. Genetic ideologies have long infused our ways of thinking about difference and ability – through my dissertation we can see how it is continuing to do so. Proponents of potentially dangerous ideas do not always appear as expected – many may be well intentioned. Ignoring this reality would be a disservice to children in schools taught by teachers who have a strong influence on their academic achievement and trajectory.

In short, behavior genetics is capturing the popular imagination. The power to predict the cognitive ability or educational attainment of an individual student is the power to predict how well one will do in life. Tailoring education plans to a child’s genotype fascinates “because it leads to the edge of the possible” (Turkheimer, 2015, p. S38). What makes this topic complicated is the very fine line between what could be helpful and what could be harmful.

What I Recommend for the Future

Challenge the political economies of research

What motivates research? What drives research on the genetics of education-related behaviors and outcomes? Literature on the funding effects of scientific research suggest that

¹³⁹ In an interview I had with UK bioethicist Ruth Chadwick she responded to the idea of precision education with: “We already have some kind of differentials in education...the idea of streaming in education is not a new thing. And one could say that [Asbury and Plomin’s] personalized education just takes that a bit further...it could be seen as just a more extreme version of streaming, and of course streaming itself is politically controversial because it’s held not to be in tune with certain ideas of equality. Then there are arguments about widening or narrowing the inequalities gap and how would that would be carried out and sadly the issues of resources” (November 2015).

research goes where the money is (Krimsky, 2005, 2006, 2013). Although science holds an authoritative position, it is embedded within a social context that “can influence the questions that get asked, the studies that get funded, the results that get published, and the biases that enter into scientific practice and its impartiality” (Krimsky, 2006, p. 61). It is therefore important to recognize the political economies of research, including how money becomes tied to perceived expertise. Doing so might remove scientific studies from the vacuum they are sometimes thought to reside in.

Research, in some ways, is a form of lobbying. Researchers must convince academic institutions and research organizations that their work is worthy of financial investment. A lobby group’s financial status has been shown to lead to more connections with politicians than the group’s level of expertise on a topic (Bertrand, Bombardini, & Trebbi, 2014). With regards to academic institutions, large endowments are coupled with a level of prestige that attracts researchers and students. For academics, obtaining large grants to conduct research is career-boosting and “seen as a salutary driving force” (M. S. Anderson, Ronning, Vries, & Martinson, 2007). In an effort to secure funding and produce publications, researchers have fallen prone to study publication bias and outcome reporting bias (Dwan et al., 2008; Fanelli, 2009). Competition for funding among researchers has been shown to decrease progress and the “integrity of science” (Anderson, Ronning, Vries, & Martinson, 2007, p. 437).

Drawing from the available evidence on how funding schemes affect the political economies of knowledge and integrity of research, raising the issue of how research gets funded, by whom, and for what aim is valuable; it would help ensure not only that honest quality research gets produced, but also that researchers’ claims are tempered. If research careers were not vitally dependent upon publications and grant funding, researchers might be less likely to make grand, emotive, or generalized statements. In challenging the political economies of research, we must “remain vigilant in differentiating between “science” as fact and ‘science’ as influenced by values and beliefs” (Belkhir & Duyme, 1998, p. 138).

Exploring the ramifications of political economies of research, and particularly in relation to genetics research, could help clarify the ways in which state institutions might continue to regularize racism or classism through behavior genetics research on intelligence. It is only by recognizing how research politics might encroach upon the knowledge economies of schools and teachers’ mindsets, that addressing these issues in an effective manner can begin.

Encourage adversarial collaboration

As the commercialization of genetics progresses, policy makers and educators will have to consider the implications of genetic testing (conducted both inside and outside of schools) for equity. Dorothy Roberts argues that behavior genetics researchers have a social responsibility to think about the context in which their work is produced (Dorothy Roberts, 2015). Due to its sensitive role in discourses regarding social inequality and individual differences, those in the field of behavior genetics need to partake in what is called ‘trustworthy research’ (Callier & Bonham, 2015) – tempering claims related to race and education in particular. Researchers must be attentive to the structural realities that trigger many observed educational differences between groups: intersections and context matter.

To facilitate more socially-responsible research, I advocate for ‘adversarial collaboration.’ Adversarial collaboration brings together individuals from different, and at times opposing, disciplines. The focus is not necessarily on results, but on encouraging a process that leads to a deeper understanding of an issue (Kahneman, 2003). I believe collaborations such as this will help move the conversation past critique to a more constructive process in which social scientists are in the ‘lab’ working alongside and challenging genetics researchers. In the current scenario, many in the social sciences who are concerned about the implications of scientific research are commenting on processes that have already begun or even been completed. The introduction of genetics into education could drive policy makers to table efforts aimed at tackling inequality, including racial and income segregation and stark differences in school funding and quality in the United States (B. D. Baker, Sciarra, & Farrie, 2014). Adversarial collaborations would work to ensure that equity remains a focus in educational policy; it involves a shift towards having social scientists and ethicists present from the very beginning of the research process, able to proactively raise and address concerns rather than retrospectively. As an example of where adversarial collaboration might have been useful “G is for Genes” had a chapter titled “Mind the Gap: Social Status and School Quality.” In it, the authors discussed the impacts of low-income status, poor parenting, and teacher quality on a child’s success in the classroom. Race was absent from the picture. Engaging in adversarial collaboration with social science researchers might have encouraged the authors to acknowledge the role of race and racism in education outcomes¹⁴⁰.

¹⁴⁰ Researchers need to recognize that racism and differential access to resources on the basis of race affects educational outcomes. However, this is markedly different from trying to study racial differences in the extent to which educational outcomes are influenced by genetics, which enables historically racist discourses.

A greater number of researchers are beginning to advocate for these kinds of collaborative discussions (Kahn et al., 2018) and projects (Harden, 2017) in order to combat the misinterpretation of research. I am heartened by the efforts I see researchers making on both sides of the debate to collaborate with counterparts and gain a better understanding of the implications of work on the genetics of social outcomes and behaviors (e.g. Harden, 2017; Social Science Genetic Association Consortium, n.d.). I myself have worked with educational scholars who are now researching in the field of sociogenomics; together we engaged in a form of adversarial collaboration to explore the promises and pitfalls of genetics-informed research in education (Martschenko et al., 2018). I found that this kind of work gave me a better understanding of behavior genetics and the scholars who comprise it.

Additionally, some scientific researchers are beginning to more publicly denounce research they believe to be methodologically or logically flawed and dangerous, particularly when it comes to genetic essentialism and race (Kahn et al., 2018; Turkheimer, Harden, & Nisbett, 2017). More direct discussion of the ethics of research and what it can and cannot say about charged concepts is growing. I see this happening in both academic spheres (D. J. Benjamin et al., 2012; Social Science Genetic Association Consortium, n.d.) and more publicly accessible news outlets (Kahn et al., 2018; E. Klein, 2018; Turkheimer et al., 2017). For example, the Social Science Genetic Association Consortium (SSGAC) compiled a list of FAQs pertaining to their GWAS on educational attainment. One question asked: “Did you find “the gene” for educational attainment?” to which the researchers responded:

No. We did not find “the gene” for educational attainment, cognitive function — or anything else. Educational attainment, like most complex behaviors and outcomes, is influenced by myriad genes, each with effects that are likely to be tiny (as well as a huge host of environmental factors). (Social Science Genetic Association Consortium, n.d.)

Education policy makers and teachers will need to engage with information that refrains from overly broad claims and is clear about what it can and cannot say; adversarial collaboration will help different disciplines recognize their blind-spots and produce more ‘socially-responsible’ research.

Enact ethical regulations

From a social policy perspective, policy makers ought to begin thinking about constructing ethical regulations and guidelines for behavior genetics research on education outcomes and to think critically about how this research is shared, at a general level, with the public and, more specifically, with education practitioners and policy makers. There are two primary reasons why it is important to begin the conversation on regulatory laws and practices when it comes to genetically-informed research.

First, there is a real possibility for genetic discrimination. Insurance rate setting as a function of genotype is one alarming example. This already happens to a certain extent in countries like the United Kingdom (Godard et al., 2004). In the United States, the 2008 Genetic Information Nondiscrimination Act (GINA) outlawed discrimination in health insurance based on genotype ("The Genetic Information Nondiscrimination Act," 2009). However, the law does not offer protections for long-term care, disability, or life insurance, creating an opening for genetic discrimination¹⁴¹.

Imagine if schools choose to discriminate against students with a genetic risk for an array of costly developmental disorders. As scientific and technological advancements continue, researchers and policy makers will need to proactively collaborate to prevent genetic discrimination in access to health insurance and healthcare and, by extension the workplace and schools. Within education, an over-reliance on genetic information could create systems that narrow rather than grow educational opportunity.

Second, inequality in differential access to genetic screening has the potential to translate social inequality into genetic differences. What happens if parents go beyond simply screening their children for learning disabilities, which my research suggests teachers may hold more favorable views towards, and choose to also screen unborn children for more socially-valued traits like intelligence? It is already commonplace for families to conduct genetic testing in-utero to identify disorders like Down syndrome, cystic fibrosis, and Tay-Sachs disease (Péter, 2015). Parents utilizing in vitro fertilization, in some instances, can even choose to select for specific attributes, like the sex of their child (Baruch, Kaufman, & Hudson, 2008). Screening unborn and newborn children for disease or genetic mutations has helped many

¹⁴¹ It is worth noting that forms of genetic discrimination already exist in places like the United Kingdom. While it is illegal to discriminate based on genotype, discrimination on the basis of family medical history continues. Say, for example, you come from a family in which many of the men have suffered from Alzheimer's. In some instances life-insurance companies are able to take this family history into account (Macdonald, 2003). In this instance, companies are actually engaged in a form of discrimination based upon your perceived likelihood of getting a disease.

families better manage pregnancies, mobilize finances and resources for children affected by genetic abnormalities, and allowed for safer termination of a pregnancy (Chandrasekharan, Minear, Hung, & Allyse, 2014). However, as research continues into the genetic influences of a wider range of characteristics, inequitable access to prenatal screening practices could create a new form of inequality: A New Borderland. If prenatal screening extends to the domains of intelligence or academic achievement, then public education's already fragile position as a force of opportunity would be strained by a lethal new combination of biological and social inequality.

The risk of widening racial and socioeconomic stratification in a future where special 'genetically sensitive schools' and 'designer babies' are essentials of an upper income lifestyle, are serious enough that lawmakers in collaboration with scientists and bioethicists ought to begin a conversation on ethical regulations. This conversation will also have to happen on an international scale. It is reasonable to suggest that some countries may be more open to the ideas of personalized education on the basis of genetic profiling or human genetic engineering than others. Should either prove actionable and beneficial, families with means and resources might be willing to travel abroad to seek these resources, preserving and even widening class disparities.

Promote teacher professional development

Most immediate, however, is how the essentialism of behavior genetics might trickle down to American educators. In behavior genetics the genome, not the environment or the epigenome, is the focus (Youdell, 2016). Behavior genetics continues to argue the genetic nature of intelligence (Davis et al., 2010; McGue & Gottesman, 2015; Plomin & Stumm, 2018) and educational attainment (Cesarini & Visscher, 2017; J. J. Lee et al., 2018; Sniekers et al., 2017). The field is also beginning to suggest that apparently social factors like social deprivation and household income (Hill et al., 2016) or social mobility are genetically influenced (Belsky et al., 2018).

My findings hint to the potential acceptance of "new biological rationalities for the constitution of education policy" (Gulson & Webb, 2017, p. 23). A field like behavior genetics, which carries with it the perceived empiricism and objectivity of scientific research and which is attempting to reach out to school-based education directly, could reinforce teacher perceptions of children from different racial and socioeconomic backgrounds in a way that might further entrench inequality and discriminatory practices in our schools. Behavior genetics could take an eye off of structural inequality, particularly as it relates to race and class.

The system has been set up to repeat past patterns, proactive measures will need to be taken to combat it.

As such, American society needs to more directly address teacher bias, whether implicit or explicit, by formulating and requiring better context-driven teacher training programs and regular professional development opportunities. I believe there is merit to creating and mandating professional development courses focused on dispelling myths around intelligence, race, socioeconomic status, and genetics. Milner and Laughter (2015) view teacher education curriculum “as a potential policy and practice site for centering the interconnections of race and poverty in the preparation of teachers” (p. 341). I agree with this sentiment but also advocate for explicit discussion of notions of race, genetics, and intelligence. Including teacher training in genetics will help practitioners interpret behavior genetics appropriately, avoid overly broad claims and assumptions, and recognize the illegitimacy of conversation on the genetics of group differences in intelligence. Prior research suggests that the less informed teachers are about genetics, the more likely they are to view it deterministically (Crosswaite & Asbury, 2018), which in turn leads practitioners to hold fixed views of student ability and achievement (M. M. Patterson, Kravchenko, Chen-Bouck, & Kelley, 2016). Research demonstrates that a teacher’s views on intelligence impact student achievement and referral for advanced academic programming (Blackwell, Trzesniewski, & Dweck, 2007; García-Cepero & McCoach, 2009). Confronting genetic determinism and sociocultural assumptions that rely on scientific discourses instead of avoiding them, might prevent teachers from adopting essentialist and/or fixed mindsets about student ability and achievement.

Diversify the teacher workforce

As American public education continues to expand its number of students from racially-defined minority backgrounds, the demand for teachers who come from similar and relatable backgrounds should also increase. Research demonstrates the importance of having teachers and administrators of color serve racially-defined minority students. Teachers of color hold higher expectation of their students of color (Gershenson, Holt, & Papageorge, 2016). In schools with higher percentages of teachers and principals of color, racial minority students are more likely to be referred for gifted programs (Grissom, Rodriguez, & Kern, 2017). In his memoir, New York teacher José Vilson talks about the importance of having teachers of color who are able to personally connect with their students – a foundation of the effective communication of culturally-relevant pedagogy (Vilson, 2014).

My survey results suggest that White teachers are more likely than teachers of color to see the category of race as genetically influenced. Diversifying the teacher workforce would enrich the perspectives of practitioners in the US education system, reduce the proportion of teachers who might view themselves as biologically different from their students, and provide more students with role models they can relate to on a more personal level. This call for diversification of the teacher workforce joins the recommendations of many other researchers (B. M. Brown & Ritter, 2017; Grissom et al., 2017; T. White, 2017).

Call for radical change

In the end, however, what is needed to avoid returning to eugenic practices, albeit in new forms¹⁴² is far more radical. I acknowledge that diversifying the teacher workforce, encouraging adversarial collaboration, and regulating research are cursory solutions to a much bigger problem that is structural and systemic. The United States was founded on racist and segregationist policies which have led many to believe that the problem lies with people of color or people in poverty, “not the policies that have enslaved, oppressed, and confined” them (Kendi, 2016, p. 10). Until the system is changed to recognize and, in turn, empower the ‘oppressed and confined’, solutions to racism, classism, segregation, sexism, ableism, inequality, and other ‘isms’ will be temporary: band-aids tacked over bullet holes. Grassroots activism is growing in the United States as evidenced by the Black Lives Matter (Black Lives Matter, n.d.) and #MeToo (Khomami, 2017) movements. Although I offer more immediate solutions that explicitly tie into my dissertation findings, I believe systemic change from the ground up will prove to be the best way forward in upturning systemic racism and structural inequality. Only then can the borders that have come to define our world be re-imagined in service of social justice.

Limitations and Avenues for Future Research

Theoretical limitations

I encountered a number of theoretical limitations in this dissertation. Firstly, biopower could not always adequately make sense of all I saw with teachers in the focus groups.

¹⁴² Gillborn (2016) and Gillborn & Youdell (2001) talk about “new genism”, “new eugenics”, and “new IQism” that arise out of behavioral genetics research in intelligence (Gillborn, 2016; Gillborn & Youdell, 2001). These are old patterns re-inscribed through new research methods and findings.

Biopower conveyed the symbolic weightiness of intelligence and genetics and how they register with race and the body; it helped raise the possible implications of genetics research on those most frequently marked and identified by phenotypic differences that are then (mis)associated with genotype. However, it couldn't adequately explain the inherited systems of understanding and meaning that affect teacher understandings of the world, nor could it properly elucidate the role of cultural reproduction in perpetuating inequality. For this reason, I sometimes brought Bourdieu in to help with analysis in Chapters Seven and Eight. In Chapter Five, I explained that the most common critique of biopower is that it does not consider the entire picture (Braun, 2007; Cheah, 2007; Fiaccadori, 2015); I found this to be a theoretical limitation that affected my qualitative analysis in particular and justified my bridging of theoretical concepts

Additionally, although I utilized a discriminate biopower framework, I focused primarily on race and class. This too was a limitation as there were other intersections I could have focused on that also shape individuals' educational experiences such as gender and (dis)ability. Moreover, within the category of race, I most often used the phrases 'racially-defined minority,' 'ethnic minority', or 'of color'. There many subpopulations of students that would fall under the umbrella of 'racially-defined minority' who suffer from discrimination within the US system. For instance, indigenous communities and subsets of the Asian community are more likely to be forgotten in discussions on racial minority experiences, despite the fact that they also encounter marginalization (Halagao, 2016; McCardle & Berninger, 2014; The Annie E. Casey Foundation, 2014a, 2014b). Even recognizing the realities of many Hispanic students does not acknowledge the subpopulations that compromise the term and who face different challenges to each other in the US education system (Garcia & Ozturk, 2017). There are many communities that are often forgotten in the Black-White binary that remains the focus of a lot of American educational research. To an extent, I fell in line with this binary. However, I recognize that the marginality, inequality, and injustice students of color tend to face in the American education system, is not universally expressed. Different communities can have different experiences.

In short, there are many intersections and nuances within intersections like race and class that affect the lived experiences of individuals and that I did not delve into. Future research would benefit from examining other aspects of marginality, including gender, citizenship, and disability. It is also possible that focusing on particular racially-defined groups, such as Black-African immigrant children or indigenous children instead of the blanket term

‘students of color’ would reveal nuances in how teachers think about the student ability and achievement of specific communities.

Methodological limitations

My dissertation also had its fair share of methodological limitations, many of which were detailed in Chapters Five, Six, and Nine. As I reflect on the journey I have undertaken, I am reminded of the difficulties, both anticipated and unanticipated, that I encountered along the way. I faced challenges gaining access to schools, disseminating my survey, and encouraging participation. Difficulties gaining access to schools and teachers resulted in a non-representative survey sample and introduced selection bias among the teachers who participated in the focus groups. In an ideal world, I would have secured a representative sample of teachers from across the US and gained access to public school teachers for focus groups in multiple schools. However, the US public education system is full of red-tape and bureaucracy, which made applying for and securing approval to conduct research difficult. On top of this, teachers in the public education system are overburdened, underpaid, and forced to teach with limited resources and supplies; this limited the time they were able to give towards participating in a project like mine. It is my hope that the wave of strikes across the US teacher workforce (A. Chang, 2018; Gabbatt, 2018; Goldstein, 2018) will result in real and meaningful change that improves, at a fundamental level, the resources teachers need to do their job well and, on a more abstract, the level of respect the teaching profession receives.

I had expected a level of access difficulty and devised a research design that spoke to the complexities of my research topics accordingly. Conducting a mixed-methods study on intelligence, socioeconomic status, race, and genetics provided multiple avenues for gaining entrance into charged terrain. If I had chosen to collect only quantitative or qualitative data, obtaining the perspectives of stakeholders would have been more difficult, and my findings would have provided a partial picture of the views of American educators. Focus groups with teachers in schools helped me contextualize the American education system and its relationship with eugenic, racist, and classist discourses. I was able to interpret teacher views on concepts heavily shaped by those discourses. However, on its own my qualitative data could not tell me much about the broader picture on teacher perceptions of historically-burdened concepts. My national survey identified more broadly which teachers might be more likely to think of intelligence, race, and socioeconomic status in terms of genetics. It also assessed the extent to which teachers saw genetics playing a role in student ability and achievement and the degree to which they agreed or disagreed with bringing genetics-informed research into education. On

its own, however, my quantitative data could not help me understand why teachers might think the way they do.

Each form of data collection has its own set of limitations. Combining different forms of data also has limitations. The key is to remain balanced in what these forms of data collection can and cannot say on their own and what they do or do not say when brought together. The survey informs us of the ‘what’ and the ‘who;’ the focus groups help answer the ‘how’ and the ‘why.’ While there are caveats to bringing together different forms of data in an examination of such a controversial topic, my dissertation was ultimately strengthened by a mixed-methods design that increased my accessibility to teachers and schools across the United States.

Avenues for future research

Acknowledging limitations directs possible avenues for future research. I hope my work will be taken up by others who will join me in scholarship focused on equity and justice in realms that oftentimes see themselves of ‘outside of politics.’ There are many possibilities for future research, particularly as this is a burgeoning field of interest where little has been done previously. I want to first outline future research possibilities that relate directly to the methodological limitations I faced over the course of this dissertation. In hindsight, there are changes I would have made to my survey structure that would have helped me to find more direct answers to the questions I sought to answer (for more refer back to Chapter Nine where I talk about Section Three of my survey). Future research would benefit from asking teachers more explicitly which elements of behavior genetics research they see as most beneficial to education policy, focusing in particular on educationally-relevant aspects outside of intelligence. It would also be interesting to see whether science teachers hold different views on genetics in comparison to other teachers.

Future research should also spend more time in schools working and speaking with teachers about these issues over an extended period. I would have benefited, for instance, from being able to interview teachers individually before and after the focus groups. Bringing teachers from different schools together for these conversations could have also revealed information in different ways and could have been an alternative approach to this project if given unlimited access and time to schools.

I also want to note the possibility that having a White moderator run these focus groups with mostly White teachers would have revealed different patterns to the ones I encountered while speaking with teachers. Perhaps being a researcher of color conducting this research put

me at a disadvantage and restricted the work I could do. I believe I may have been fortunate at times during the research process because my name sounds White European and initial contact was always over the phone or via email. Research suggests that those with ‘ethnic’ sounding names often face forms of discrimination in hiring practices (Bertrand & Mullainathan, 2003) and digitally (Edelman & Luca, 2014). It would be interesting to see whether different views emerge on the basis of the race of the moderator; this could help identify if particular individuals might be more effective in leading professional development workshops on dispelling myths and stereotypes with certain groups of teachers than others.

Additionally, future research could also examine teachers’ views on the relevance of genetics for education in a comparative context. Given that I was enrolled at a UK institution during the course of a doctorate on the US educational system, I see value in conducting cross-cultural work in the future. Similar research has been completed previously by Castéra & Clément (2014), which examined teacher conceptions on the genetic determinism of human behavior across 23 countries. However, no one has yet looked to see whether teacher attitudes towards incorporating genetics research into education or views on specific elements of genetically-informed education vary by country. For example, in a country like Germany, which has a fairly recent history of eugenics being used for large-scale genocide, practitioners may be less open to incorporating genetics-informed research into education than elsewhere.

Another avenue for future research would be to examine what parents think about the role of genetics in their children’s ability and achievement. While research has examined the impact of a growth mindset on teachers and students (Claro, Paunesku, & Dweck, 2016; Dweck, 1986, 2012; Rattan, Savani, Chugh, & Dweck, 2015), little has been done when it comes to parents and more specifically when it comes to parents’ understandings of the role of genetics in how their children perform in the classroom. Teachers in my dissertation identified parents/the family as one of the most important factors shaping a child’s academic achievement. It would therefore be valuable to look at what parents think of these issues.

Finally, I want to recommend that future research includes education practitioners in the research process itself. No one is better placed to understand how historically-burdened concepts enter schools and trickle into practitioner mindsets than educators themselves.

My Final Note

I began this dissertation wanting to explore how behavior genetics research might be interpreted by ‘laypeople’ and whether this posed a risk to the ideas of equity and social justice. I end this work having examined what teachers think about the role of genetics in intelligence, race, and socioeconomic status and their initial conceptions of the relevance of genetically-informed research for education. The shortcomings and limitations of this dissertation may be that much clearer because of my decision to engage with a topic as sensitive as this. I acknowledge that not everyone will agree with the conclusions I have drawn. However, I hope that those who consider themselves to be inequality scholars, scholars of resistance – I hope that they see the intention behind my work. I hope that those in behavior genetics also see my intention. It is important we talk about the ugly history behind behavior genetics and how its legacy endures today. At the end of this journey, I want my readers to view the work I have produced as socially-responsible. I want it to drive the conversation forward on what can, should, and needs to be done when it comes to safeguarding against the (mis)use of genetics-infused research in education.

Despite the limitations of this dissertation, I believe my findings have much to offer those in the field of genetics research in terms of demonstrating how their work is interpreted by education practitioners and showing the importance of engaging in forms of adversarial collaboration. Genetics-informed research in education will become a bigger topic of discussion and policy makers will be asked to make decisions about it. For example, in a New York Times opinion piece titled “Why Progressives Should Embrace the Genetics of Education,” scholar Paige Harden writes:

Our genes shape nearly every aspect of our lives — our weight, fertility, health, life span and, yes, our intelligence and success in school... Many progressives resist acknowledging this when it comes to education, fearing that it will compromise their egalitarian beliefs. But just like acknowledging the reality of climate change is necessary to ensure a sustainably habitable planet, acknowledging the reality of genetic differences between people is a necessary step for us to ensure a more just society. (Harden, 2018)

As the conversation on incorporating genetics research findings into education continues, facilitating constructive conversations across ‘party-lines’ will become more important than ever. My recommendations for next steps and future research cannot definitely

answer the question “what should we do?” when we find behavior genetics research at the school house door. However, it is my hope that for those in education, both practitioners and policy makers, this dissertation begins to answer the questions: “what will you want to know?”; and: “what can be done today to best prepare us for the problems of tomorrow?”

It starts with a conversation, a critical and open one between policy makers, educators, and researchers in the biological and social sciences. Creating space for awareness, debate, and engagement not only with academics, but also with the American public on the issues of genetically-informed research will need to be continued and advanced beyond current efforts (e.g. Columbia University, 2013; Emanuel, 1998; Personal Genetics Education Project, n.d.; University of California San Francisco, n.d.). These conversations should focus on education and education policy in addition to other aspects like human genetic engineering. How researchers approach and address contemporary and future developments in the field of behavior genetics will be of the utmost importance, especially when it comes to research on socially-valued concepts like intelligence and educational attainment. Expanding the conversation, as I hope this dissertation has done, is an initial step towards trying to ensure that racist, classist, and inequitable agendas are not further enabled within an environment that already regularizes them.

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APPENDICES

Appendix A: Focus Groups

Letter for Principals: Focus Group Research¹⁴³

To Whom It May Concern,

My name is Daphne Martschenko. I am a PhD candidate at the University of Cambridge in the faculty of education and writing to you to request your participation in a study entitled “Investigating Impacts of Behavioural Genetics Research on Cognitive Ability on Teacher Views on Genetics, Intelligence, Race, and Socioeconomic Status.” This letter outlines the research design, recruitment process, participant involvement, confidentiality/anonymity, risks/benefits, and uses for data. I am seeking to recruit teachers for this study. This letter outlines the details of project and the expectations and procedures for teacher participants.

Aim:

This research design gathers the working experiences of high school teachers and their philosophies on intelligence and education disparities within the United States. This project unpacks structures that contribute to how teachers conceptualize and define intelligence and make sense of student representation and achievement in the classroom.

This research seeks to answer the following questions:

How do teachers define intelligence?

- What factors and structures do teachers identify as influencing a child’s academic success?
- To what extent do educators see genes playing a role in a child’s success in their classroom and how much value do they place on behavioral genetics research that suggests intelligence to be a heritable trait?
- How might the ways in which teachers conceptualize intelligence, and the role they see genetics playing in this observed behavior, impact upon their understandings of low-income and ethnic minority underrepresentation in gifted education?

These questions will be asked in two different educational settings: teachers in private school settings and teachers in regular public schools. These groups have been established to assess how teachers in different working environments respond to and make sense of questions concerning intelligence, genetics, and educational disparities.

Format:

This project works with teachers in a focus group setting that also incorporates hands-on and interactive lessons in order to examine how teacher understandings of cognitive ability and academic achievement may impact upon the ways in which they interact with students. Participants will be asked to engage in semi-structured individual interviews as well as participate in a group discussion setting with 4-6 other teachers spread out over a period of three months beginning in January 2017.

¹⁴³ This was sent out via email to school principals to advertise the focus group component of my research and identify interested parties. Extracts from this document were used when schools were contacted through online information request forms on school website.

In total, there will be three hour-long group discussion meetings—specific timings for these discussions will be dependent upon teacher availability. Each discussion group is centered on a specific topic and includes some pre-reading materials, which will require no more than 15 minutes of outside preparation.

The first session deals with the concept of intelligence and looks to see how teachers define this word and the role they see genetics playing. The second session concerns itself with socioeconomic and ethnic disparities in the US education system as a whole and then narrows in focus specifically to the US gifted education system. This session studies how teachers understand the academic performance of low-income and ethnic minority students and their documented underrepresentation in gifted education. This discussion challenges participants to reflect on how data on socioeconomic and ethnic minority academic achievement manifests itself in their own observed experiences in the classroom. The final session is centered around the book “G is for Genes” by behavioral psychologist Dr. Kathryn Asbury and behavioral geneticist Dr. Robert Plomin. This discussion covers the eleven policy points for a genetically sensitive system of “personalized learning” put forth in “G is for Genes” and asks teachers to comment on potential benefits, challenges, and risks of a system that uses genetic information to tailor individualized student curriculum.

Participants and Data Security:

Participation is voluntary. Participants will receive a survey link through their principals or administrative co-workers asking them to indicate whether they are interested in participating in this study. Should the number of interested participants within each of the aforementioned educator pools exceed the 5-7 individual group size, interested participants will be randomly selected to participate. Participants may withdraw from any part of the study or from the study completely at any point. This study offers no compensatory benefits. However, it serves as a way for teachers to discuss freely topics that may shape the ways in which they engage with their students. It also offers an environment for educators to learn about the different experiences of other working professionals and to think collectively about some of the factors and structures that affect student performance; it can therefore be viewed as a professional development exercise and all participants will receive resulting research feedback and reports.

This research topic is sensitive in nature given its overlap with a growing area of research in behavioral genetics and its discussion of education disparities. Participants may find some questions challenging or uncomfortable but are given the option to abstain from participation throughout discussion meetings. Since the group discussion component involves interaction with other teachers, some of whom will have worked together, anonymity *within* the group cannot be ensured. However, each participant will be required to sign two documents prior to participation in this study: an informed consent and a non-disclosure agreement. The non-disclosure agreement is designed to guarantee that the identities of and discussions raised by members within the groups will not be shared with outside persons or parties.

With the permission of all group discussions will be audio recorded. These audio mp3s will be stored on a password-protected computer and accessible only by the principal investigator (Daphne Martschenko). Individual persons and schools will not be identified in this project. Participants will be asked to complete a brief entrance questionnaire at the start of this project which will collect information on age range, gender, ethnicity, length of career as an educator, and experience teaching in specialized high schools or schools considered “at-risk” or serving “underprivileged” communities. The entrance questionnaire and all group discussion protocols are in an addendum for examination.

Data collected will be included in my doctoral dissertation and may also be used in journal articles and other published materials. Participants will receive copies of any final, distributed, and published work.

Thank you for your interest in this study, I look forward to hearing from you and providing further information.

Best wishes,



Daphne Martschenko

Contact information:

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Focus Group Entrance Questionnaire

Q1. This survey is designed to gather background information on teachers who have agreed to participate in the external professional development discussions run by Daphne Martschenko from the University of Cambridge.

Please answer the following five-minute survey honestly, carefully, and thoughtfully. This survey will allow us to give you a Participant ID Number, which will be used from this point forward to anonymize you in this study. In order to assigned you an ID number, you will be asked for your name at the end of this survey. This is the only time you will be asked to share your name.

All responses gathered in professional development discussions are confidential. No participant names or the name of your school will be made identifiable. Chicago also will not be identified as a site for this study. Thank you for your participation, we look forward to working with you.

Teacher Background

Q2 What is your gender?

- ☐ Male
- ☐ Female

Q3 What is your age?

- ☐ Under 25 years old
- ☐ 25-34 years
- ☐ 35-44 years
- ☐ 45-54 years
- ☐ 55-64 years
- ☐ 65-74 years
- ☐ 75 or older
-

Q4 What grade(s) do you teach?
Select as many as apply.

- ☐ Pre-K
- ☐ Kindergarten
- ☐ 1st
- ☐ 2nd
- ☐ 3rd
- ☐ 4th
- ☐ 5th
- ☐ 6th
- ☐ 7th
- ☐ 8th
- ☐ 9th
- ☐ 10th
- ☐ 11th
- ☐ 12th

Q5 What subject(s) do you teach?
Select as many as apply.

- ☐ Math
 - ☐ English & Language Arts
 - ☐ Social Studies
 - ☐ Foreign Language
 - ☐ Elective
 - ☐ Art
 - ☐ Music
 - ☐ Special Education
 - ☐ Other
-

Q6 Which best describes you?
Select as many as apply.

- ☐ White (non-Latino)
 - ☐ Black or African American
 - ☐ Hispanic or Latino
 - ☐ Asian
 - ☐ Native American or Alaska Native
 - ☐ Native Hawaiian or Other Pacific Islander
 - ☐ Other
-

Q7 When it comes to politics, would you describe yourself as liberal, conservative, or neither liberal nor conservative?

- ☐ Extremely liberal
 - ☐ Moderately liberal
 - ☐ Slightly liberal
 - ☐ Neither liberal nor conservative
 - ☐ Slightly conservative
 - ☐ Moderately conservative
 - ☐ Extremely conservative
-

Q8 How long have you been working as a teacher?

- ☐ This is my first year
 - ☐ 1-2 years
 - ☐ 3-5 years
 - ☐ 6-10 years
 - ☐ 11-15 years
 - ☐ 16-20 years
 - ☐ More than 20 years
-

Q9 How long have you been working at your **current school**?

- ☐ This is my first year
- ☐ 1-2 years
- ☐ 3-5 years
- ☐ 6-10 years
- ☐ 11-15 years
- ☐ 16-20 years
- ☐ More than 20 years

End of Block

School Background

Q10 Part 1/2: In your career thus far, which of the following best describes the kinds of schools you have worked in?

Select as many as apply. Ethnic minority = non-White

- ☐ > 90% of students are from ethnic minority groups.
 - ☐ 60%-90% of students are from ethnic minority groups.
 - ☐ 40%-59% of students are from ethnic minority groups.
 - ☐ 20%-39% of students are from ethnic minority groups.
 - ☐ 10%-19% of students are from ethnic minority groups.
 - ☐ < 10% of students are from ethnic minority groups.
-

Q11 Part 2/2: In your career thus far, which of the following best describes the kinds of schools you have worked in?

Select as many as apply.

- ☐ > 90% of students are low-income.
 - ☐ 60%-90% of students are low-income.
 - ☐ 40%-59% of students are low-income.
 - ☐ 20%-39% of students are low-income.
 - ☐ 10%-19% of students are low-income.
 - ☐ < 10% of students are low-income.
-

Q12 Part 1/2: Which of the following best describes the school you work in **currently**?

Ethnic minority = non-White

- ☐ > 90% of students are from ethnic minority groups.
 - ☐ 60%-90% of students are from ethnic minority groups.
 - ☐ 40%-59% of students are from ethnic minority groups.
 - ☐ 20%-39% of students are from ethnic minority groups.
 - ☐ 10%-19% of students are from ethnic minority groups.
 - ☐ < 10% of students are from ethnic minority groups
-

Q13 Part 2/2: Which of the following best describes the school you work in **currently**?

- ☐ > 90% of students are low-income.
 - ☐ 60%-90% of students are low-income.
 - ☐ 40-59% of students are low-income.
 - ☐ 20%-39% of students are low-income.
 - ☐ 10%-19% of students are low-income.
 - ☐ < 10% of students are low-income.
-

Q14 Which of the following best describes the size of the student body at the school you work in **currently**?

- ☐ < 50 students
- ☐ ≥ 50 but < 250
- ☐ ≥ 250 but < 500
- ☐ ≥ 500 but < 1000
- ☐ ≥ 1000 but < 2000
- ☐ ≥ 2000 but < 5000
- ☐ $\geq 5000+$
-

Q15 I teach and/or have taught in the following environments:
Select as many as apply.

- ☐ Gifted-education only classroom in an ability-inclusive public school.
- ☐ A gifted and non-gifted mixed classroom in a public school.
- ☐ Gifted-education only public school.
- ☐ Entrance-exam selective public school.
- ☐ Gifted-education only classroom in an ability-inclusive private school.
- ☐ A gifted and non-gifted mixed classroom in a private school.
- ☐ Gifted-education only private school.
- ☐ Entrance-exam selective private school.
- ☐ I have not taught in any of these environments.
-

Q16 I teach and/or have taught the following courses:
Select as many as apply.

☐

Advanced Placement (AP)

☐

International Baccalaureate (IB)

☐

Honors

☐

I have not taught any of these courses.

Q17 What is your name?

End of Block

Focus group pre-reading

Session One



UNIVERSITY OF CAMBRIDGE

Intelligence

Meeting # 1

Pre-Meeting Materials

| TABLE 1 THEORIES, GOALS, AND BEHAVIOR PATTERNS IN ACHIEVEMENT SITUATIONS | | | |
|---|---|---------------------------|---|
| Theory of Intelligence | Goal Orientation | Perceived Present Ability | Behavior Pattern |
| Entity (Intelligence is fixed) | Performance (Goal is to gain positive judgments/avoid negative judgments of competence) | High | Mastery-oriented (Seek challenge; high persistence) |
| | | Low | Helpless (Avoid challenge; low persistence) |
| Incremental (Intelligence is malleable) | Learning (Goal is to increase ability) | High or low | Mastery-oriented (Seek challenge that fosters learning; high persistence) |

(Burhans and Dweck, 1995)

Views on Intelligence

William Shockley

1910-1986

1972

"...My own conviction about genetic dominance of I.Q... I believe that this is the cornerstone for all logical structures about human quality problems... intelligence is largely determined by the genes" (Shockley, 1972: 302).

Francis Galton

1822-1911

1869

"I have no patience with the hypothesis occasionally expressed, and often implied, especially in tales written to teach children to be good, that babies are born pretty much alike, and that the sole agencies in creating differences between boy and boy, and man and man, are steady application and moral effort. It is in the most unqualified manner that I object to pretensions of natural equality" (Galton, 1869: 12).

Arthur Jensen

1923-2012

1991

"This source of individual differences, or variance, that is common to all cognitive activity is known as Spearman's g... In other words, the g factor reflects whatever it is—presumably some attribute of the brain—that causes individual differences in performance on any indicator of mental ability to correlate positively with performance on every other such indicator, regardless of its specific information content, sensory modality, or form of response" (Jensen, 1991).

Carol Dweck

1946

1995

“Students’ mindsets—how they perceive their abilities—played a key role in their motivation and achievement...if we changed students’ mindsets, we could boost their achievement. More precisely, students who believed their intelligence could be developed (a growth mindset) outperformed those who believed their intelligence was fixed (a fixed mindset). And when students learned through a structured program that they could “grow their brains” and increase their intellectual abilities, they did better” (Burhans and Dweck, 1995).

Robert Sternberg

1948

1998

“Cultures designate as “intelligence” the cognitive, social and behavioral attributes that they value as adaptive to the requirements of living in those cultures. To the extent that there is overlap in these attributes across cultures, there will be overlap in the cultures’ conceptions of intelligence. Although, conceptions of intelligence may vary across cultures, the underlying cognitive attributes probably do not. There may be some variation in social and behavioral attributes. As a result, there is probably a common core of cognitive skills that underlies intelligence in all cultures, with the cognitive skills having different manifestations across the cultures” (Sternberg and Kaufman, 1998: 497).

Ashley Montagu

1905-1999

1999

“The truth is that no one really knows what the structure of intelligence is, and therefore there cannot be anything even approximating a quantitative measure of intelligence...what is quite clear...is that many conditions enter into the making of the capabilities we call intelligence...it would be a good working hypothesis to regard intelligence as constituted of a large assembly of highly varied, overlapping adaptive abilities or skills, rather than as a single faculty; that it is, indeed, largely the summation of the learning experiences of the individual” (Montagu, 1999: 100).

Howard Gardner

1943

2003

“As a species we human beings are better described as having a set of relatively autonomous intelligences...a fuller appreciation of human beings occurs if we take into account spatial, bodily-kinesthetic, musical, interpersonal, and intrapersonal intelligences. While we all have these intelligences, individuals differ for both genetic and experiential reasons in their respective profiles of intellectual strengths and weaknesses” (Gardner, 2003: 4-5).

Robert Plomin

1948

2015

“Intelligence is a core construct in differential psychology and behavioral genetics, and should be so in cognitive neuroscience. It is one of the best predictors of important life outcomes such as education, occupation, mental and physical health and illness, and mortality. Intelligence is one of the most heritable behavioral traits” (Plomin and Deary, 2015).

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Session Two



UNIVERSITY OF CAMBRIDGE

Intelligence & Race

Meeting # 2

Pre-Meeting Materials

"Biological and social environmental factors associated with social class, race, and family background account for most of the variance in intellectual ability and school performance..." (Jensen, 1968: 2) "...If we fail to take account either of innate or acquired differences in abilities and traits, the ideal of equality of educational opportunity can too easily be interpreted so literally as to be actually harmful, just as it would be harmful for a physician to give all his patients the same medicine" (Jensen 1968: 3).

1968

"It seems highly likely to us that both genes and the environment have something to do with racial differences. What might the mix be? We are resolutely agnostic on that issue; as far as we can determine, the evidence does not yet justify an estimate" (Herrnstein and Murray, 1994: 311).

1994

"Although studies using different tests and samples yield a range of results, the Black mean is typically about one standard deviation (about 15 points) below that of Whites. The difference is largest on those tests (verbal or nonverbal) that best represent the general intelligence factor g." (Neisser et al, 1996:93)

1996

"...There is no valid reason to expect that there should be average differences in intellectual ability among living human populations... When average group differences in "intelligence" test scores are encountered, the first conclusion to be drawn is that the circumstances under which intellectual capabilities are nurtured and developed are not the same for the groups in question. Where such tests show different "racial" averages in test scores, this should be taken as an index of the continuing effects of "race" prejudice and not of inherent differences in capability" (Brace, 1999: 245).

1999

"...The mean Black-White IQ difference in the United States is about 80% heritable...race differences are most pronounced on the more g-loaded subtests (g being the general factor of mental ability); race differences are most pronounced on the subtests whose scores show the most heritability; and racial differences in brain size parallel the IQ differences" (Rushton and Jensen, 2006: 921).

2006

"I am inherently gloomy about the prospect of Africa. All our social policies [to Africa] are based on the fact that their intelligence is the same as ours- whereas all the testing says not really...there is no firm reason to anticipate that the intellectual capacities of peoples geographically separated in their evolution should prove to have evolved identically" (Watson, 2007).

2007

"There are those who contend that it does not benefit African Americans to get them into the University of Texas where they do not do well, as opposed to having them go to a less-advanced school, a slower-track school where they do well. One of the [legal] briefs pointed out that most of the black scientists in this country don't come from schools like the University of Texas. They come from lesser schools where they do not feel that they're being pushed ahead in classes that are too fast for them" (Scalia, 2015 in Dan Roberts).

2015

"The very meaning of intelligence is disputed and some people perform poorly on widely accepted tests for social reasons, research and tests privilege dominant social groups. Our society is deeply stratified along race and class lines, which affects not only the information children learn, but their very habits of thought, ways of thinking, and responses to stereotypes"(Dorothy Roberts, 2015: S52).

2015

Illinois:

“NAEP testing data as well as state assessment results reveal substantial excellence gaps for Black, Hispanic, and Free and Reduced Lunch Eligible (FARM) students. According to NAEP proficiency data, the already substantial Excellence Gap between White and both Black and Hispanic students in Math further increased between 2003 and 2011. Another substantial, though relatively unchanged, gap has existed between the same students in Grade 4 Reading. Similarly, wide, though relatively unchanged gaps in scores above average have continued to exist since 2003 between White and both Black and Hispanic students in Grade 4 Reading. Significant Excellence Gaps between FARM and non-FARM Math students in both grades have continued to widen since 2003. In 2011, the widest gap was between FARM and non-FARM students in Grade 4 Reading. However, a considerably smaller gap between those two groups exists in Grade 8. The gap between FARM and non-FARM students in scores at the above average level actually decreased from 2003 to 2007 before increasing again in 2011. The widest gap in above average scores in 2011 existed between FARM and non-FARM Reading students in Grade 4.”

(UConn Center for Evaluation & Education Policy: Excellence Gap State Profile, Illinois, 2012)

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Session Three



UNIVERSITY OF CAMBRIDGE

Education Policy: “G is for Genes”

Meeting #3

Pre-Meeting Materials

Behavior genetics is a relatively young science. Researchers in this field are interested in determining not only how much genes influence behaviors and outcomes like cognitive ability and educational attainment, but also which genes predict these behaviors and outcomes. Most recently, twin studies have estimated cognitive ability and educational attainment to be between 40 and 70% heritable (Belsky et al., 2016; Domingue et al., 2015; Plomin et al., 2013; Rietveld et al., 2013). Heritable means the extent to which differences between people (e.g. in their ability or personality) can be explained by differences in their genes. Using Genome-Wide Association Studies (GWAS), a research method that compares DNA markers across the entire genome, researchers have begun searching for the genetic markers associated with cognitive ability and educational attainment. So far key studies have only been able to identify genetic markers that account for up to 9% of differences between individuals in educational attainment (Selzam et al., 2016) and 1.2% of cognitive ability (Benyamin et al., 2014). Despite these low percentages, aggregate or combined effects of common genetic variations (SNPs) has been shown to explain 22-46% of differences between individuals in childhood intelligence (Benyamin et al., 2014).

The past five years has seen an increase in the number of behavior genetics researchers advocating for applying their research to K-12 systems of education (Asbury, 2015; Stanford University Center for Education Policy Analysis, 2015; TES Resources, 2015; Thomas, Kovas, Meaburn, & Tolmie, 2015). The following arguments and policy proposals come directly from the book “G is for Genes: The Impact of Genetics on Education and Achievement” and represent the views of two researchers: a behavioral psychologist and behavioral geneticist who are interested in bringing knowledge of genetics to systems of education and approaches to education curriculum and policy.

“Schools can promote individual fulfillment and achievement, and prepare cohorts of young people who know their talents and have been educated to use them. Society will surely benefit from generation after generation of young people with a firm grasp of core skills underpinning a wide range of specialist abilities and interests. By personalizing education, schools, through embracing the process of genotype-environment correlation, should draw out natural ability and build individual education plans for every single child, based on pupils’ specific abilities and interests rather than on arbitrary hoops set in place by partisan, vote-courting governments” - Asbury and Plomin, 2013

| 11 Policy Points: | Why should we care? | What do we do? |
|---|---|--|
| 1. Minimize the core curriculum and test basic skills | We are all genetically different. | Mandatory subjects to a minimum, restrict to a Basic Skills examination. |
| 2. Increase choice | Genotype-environment correlation depends on choice. | Increase the range of subject options available to all students and give teachers more freedom in their lessons. |
| 3. Forget about labels | The abnormal is normal. | If a child needs extra help give it, instead of labels and bureaucracy. |
| 4. Teach the child, as well as the class | Genetic continuity and environmental change can be monitored. | Each student has an Individual Education Plan, which should be reviewed and revised each year. Every child should receive a personalized school-leaving certificate at the end of their compulsory education. |
| 5. Teach children how to succeed | IQ and self-confidence may mediate the relationship between the school environment and achievement through a process of genotype-environment correlation. | Introduce a weekly Thinking Skills session for all pupils (no National Curriculum or public examinations for this, but schools will commit to an hour per week on Thinking Skills and implement as they see best). |
| 6. Promote equal opportunities from an early age as a foundation for social mobility in the future | Preschool children are especially susceptible to the effects of shared environment. | Offer free, high-quality preschool education to disadvantaged children from age 2, free, high-quality preschool to all children from age 3 to 4, and extra support to children in low-SES families from birth. |
| 7. Equalize extracurricular opportunities at school | Genotype-environment correlations depend on access to choice. | Level the playing field for extracurricular activities by providing extra support to pupils from families with fewer resources. |
| | | |

| 11 Policy Points: | Why should we care? | What do we do? |
|--|---|---|
| 8. Create a two stage Physical Education program | Shared environmental experiences have a significant impact on fitness for children in primary school, but genes then become more influential. | Set a standardized PE program for all children in primary school and Year 7 and then in Year 8 and above allow them to choose the form of exercise they will undertake. |
| 9. Change the destination (increase the # and range of options available for work- and college-based vocational training) | Realizing genetic potential across a nation requires a variety of opportunity beyond secondary education. | Increase the number and range of options available for work-and college-based vocational training; make apprenticeships more affordable for and attractive to employers; and educate students so they have mastered basic skills, found their true interests, and are more attractive to employers. |
| 10. Train new teachers in genetics and give them the tools to put it into practice | Personalizing education is the best way to realize the potential of individual children who are “naturally” different. | Add a course in the genetics of learning and education for all in teacher training and issue a call for tender for groups and individuals who wish to design and pilot practical approaches to the personalization of education. Successful techniques, training, and resources should subsequently be made available to all schools. |
| 11. Big is beautiful | Genotype-environment interplay and non-shared environmental influence depend on choice. | Size makes choice viable. Make our schools bigger and the links between the different levels of schooling stronger. |

(Asbury & Plomin, 2013)

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Focus Group Lesson Protocols
Session One: Defining Intelligence



FIVE MINUTES: (3:00-3:05 West Elm; 3:10-3:15 The Jacobson School)

Thank you so much for your participation in this workshop and welcome to our first group discussion! I am hopeful we will all come away from our time together having been challenged and having grown from these experiences.

- Before we begin, I want to briefly go over the informed consent forms and non-disclosure agreements and make sure everyone is ok with everything outlined in those and is comfortable with this session being audio-recorded? As I mentioned before all participants will remain anonymous as will Catalyst Rock and Chicago. Does anyone have any questions?
 - o Great, so just a reminder that these discussions can be challenging or uncomfortable. We've tried to create a safe and open space of respect and learning where we can have these conversations and hear from our peers who may hold views different to our own. It's intended as an opportunity to give all of you time to think about some challenging questions and to also be challenged by others.

THREE MINUTES: (3:06-3:09 West Elm; 3:16-3:19 The Jacobson School)

"The topic of today's discussion is intelligence. I've provided some materials for you to look over prior to our meeting today to start you thinking on the topics we'll be covering today. I'm going to give a couple minutes for everyone to look over it again in case you didn't get the chance to. When we come back together, I'm going to start by asking some open-ended questions about what you've read. We'll then move to an activity that requires some movement.

FIFTEEN MINUTES: (3:10-3:25 West Elm; 3:20-3:35 The Jacobson School)

1. Has everyone had enough time to look over the materials? Let's start by getting general thoughts on this document.
 - a. What were your initial impressions reading this document?

- b. Were you familiar with some of the individuals? Which ones? In what context?
- c. Were there certain elements that stood out to you? In either a positive or negative way?
 - i. What were they? Why did they stand out?
- d. Thank you for your reflections. Is there anything else anyone would like to share before we move on?

FIFTEEN MINUTES: (3:26-3:41 West Elm; 3:35-3:50 The Jacobson School)

- 2. Our next activity requires some movement. You'll notice that in each corner of the room is a sign: "Agree", "Disagree", "Undecided", and "Abstain." I'm going to read a series of statements. After I've finished reading out a statement, please go to the corner of the room that best describes your response to the statement. Once I read the statement and everyone has moved to an area of the room, I will pause, at this point anyone who wants to share why they've chosen to stand where they are may do so. You do not in any way have to. Some questions I may verbally ask if anyone wants to share, but for others I will be silent. Is everyone ready? We'll start with everyone standing in the middle of the room. We'll start with some lighter questions to get into the groove.
 - a. I've lived outside of the United States.
 - b. I've been a teacher for more than 10 years.
 - c. All children are blank slates, born into the world with equal abilities that are then affected by the environment.
 - d. Some children are Orchids, meaning they flourish in nurturing environments with the right set of circumstances, but would be particularly sensitive to challenging or adverse situations.
 - e. Some children are Dandelions, meaning they are strong and resilient and can pull through in even the most disadvantageous circumstances.
 - f. Some children are just smarter than others.
 - g. A student's socioeconomic status plays an important role in their success in the classroom.
 - h. A student's race plays an important role in their success in the classroom.
 - i. A student's genetics plays an important role in their success in the classroom.
 - j. Gifted and Talented programs contain children who are more cognitively able than their peers in regular school environments.

“Thank you so much for your participation and all that you’ve shared so far. You can take your seats now. The document I had you read before today’s discussion and the exercise we just completed include the ideas of both social scientists and behavioral geneticists. I asked you some statements that may have been quite challenging or difficult for you to answer so thank you for being so open to this discussion.”

Researcher gives a short oral summary of the key questions and main ideas that have emerged through the discussion.

Does anyone have anything they would like to share or add before we move on to the final component?”

FIVE MINUTES: (3:42-3:47 West Elm; 3:52-3:58 The Jacobson School)

3. Before we end I’m going to ask that you take a piece of paper and jot down some words that describe how you’ve felt after today’s conversations, it could be a few adjectives, a couple of sentences describing how you feel now in relation to when we started, or a few sentences on how you understand intelligence. Please turn you index cards in to me once you’ve completed them. *Hand out index cards

When you finish feel free to go and if you have any questions or anything you want to talk about feel free to come up to me afterwards and do so, we are always looking for ways to improve our workshops so if you have any feedback or any areas you wish we could’ve discussed further do let me know. I will see everyone for our next meeting on _____ at _____. There will be some pre-reading materials that I will send out a week before and then again three days before. Thanks everyone!

TOTAL TIME: 43-47 min

Session Two: Socioeconomic Disparities in Student Achievement

“Today’s discussion is centered around student underperformance or underachievement in the classroom and the kinds of factors that may contribute to this phenomenon. This discussion can be sensitive in nature- we’ll be talking about race and socioeconomic status, so I ask that we discuss these topics honestly and openly, but also with an awareness and respect for the differing opinions that might emerge. Before we get started with the discussion, I’m going to pass out a document I’d like you to complete. This is known as the Color-Blind Racial Assessment Scale, or Cobras. It is a scale that was developed to test theory on color-blind racial attitudes. This final version was completed in 2000 and has been tested, replicated, and found to be a reliable measure. All responses are anonymous, as always, so please answer honestly. When you’re finished, please turn the page over.

1. Thank you for completing the initial assessment. It just provides some supplemental data to the project. We’ll touch on some of the areas the scale brought up throughout our talk today. But let’s discuss it explicitly first. Had anyone taken this before? What were initial impressions?
 - a. I want us to work with a couple particular statements. Let’s look number 6 on the scale “Race is very important in determining who is successful and who is not.” In these sessions we’re looking at different factors that contribute to a child’s success in the classroom, what kind of role, if any, do you see race playing in this process?
 - b. I also want us to look at number 8: “Racial and ethnic minorities do not have the same opportunities as White people in the US.” We briefly touched upon the themes of access and opportunity in our last session. What were people’s thoughts on this statement?
 - c. Were there any other statements in the CoBRAS that anyone would like to discuss or elaborate upon? For example, it could deal with the way a statement is phrased or it could be a statement you found particularly challenging to answer?

2. We're going to start now with a brief brainstorming activity before we move into the reading. I've set up some poster paper around the room with different headings: "When I hear the terms "struggling academically" or "under-performing" I think of...", "When I see "struggling academically" or "under-performing" I observe...", and "When I encounter a child "academically struggling" or "under-performing" in the classroom I..."
3. I'm going to pass out sticky-notes again, you can write anything on these - it can be your feelings, descriptions, physical observations on what each topic looks like, factors you think play a role, etc. You'll notice there are two phrases, "struggling academically" and "under-performing"; these are not necessarily synonymous, so I've divided the poster into two sides, one for each term. If you have written something that you believe is applicable to both, you can put it right on the line in the middle. Is this clear to everyone? I will allow 10 minutes for this activity and then we'll sit down and discuss.
 - a. First, how was it to distinguish between the two phrases, "struggling academically" and "under-performing"? What made you write what you wrote and what do these two terms mean to you?
 - b. What was it like to distinguish between the "hearing" the two phrases and "seeing" them? Did you notice that you felt differently at all?
 - c. "When I encounter a child academically struggling in the classroom I..." and "When I encounter a child underperforming in the classroom I..." what differences, if any, did you put down between how you approach these two situations?
 - d. Now I'm going to have you thinking about if we change the "I" to a "we." Here, "I" represents you as an individual, "we" represents US teachers as a general term- each of you will define this we a bit differently based on your personal experiences within the profession. Does replacing "I" with "we" change any of your answers? What if I had asked "When we see a child "struggling academically" we observe:"?
4. Thank you for such rich discussion surrounding the brainstorming activity. I'd like to talk now about the pre-reading materials I sent out. I'll give everyone a few minutes to read over it again before we start our discussion.... *give 5 minutes*. Did everyone get enough time? Let's start, like last time, with first impressions of the reading. We'll start with the first page before moving on to the graphs.

- a. What were your initial impressions reading this document?
 - b. Were you familiar with some of the individuals?
 - i. Which ones? In what context?
 - c. Were there certain elements that stood out to you? In either a positive or negative way?
 - i. What were they? Why did they stand out?
 - d. I want you to reflect on your experiences in the classroom and our discussion last time on intelligence. Last time we discussed the role that genes might play in a child's intelligence. What other factors might affect a child's cognitive ability and performance in the classroom?
 - e. We're going to turn now to the graphs on the following two pages. Think about your own experiences teaching in a classroom. Does the data reflect your experiences in the classroom?
 - i. Why do some groups of children struggle more than others?
 - ii. I'm going to handout a document that breaks down certain areas of achievement by ethnicity * Hand out fact sheet on Ethnic groups academic achievement and gifted education* The back page is more focused, it breaks down participation in Gifted and Talented programs in this state by ethnicity. We've talked a bit about factors that contribute to a child's success or struggles in the classroom, lets narrow it a bit and talk a little bit about gifted education- low-income and ethnic minority youth tend to be underrepresented in this area. Why do we think that might be?
5. Thank you, yet again, for such a rich discussion. Before we end I'm going to ask that you take a piece of paper and jot down a few words that describe how you've felt after this conversation. It could be a few adjectives, a couple of sentences describing how you feel now in relation to when we started, or a few sentences on how you understand the phenomenon of socioeconomic and racial disparities in the US and the US education system. Please turn your index cards in to me once you've finished. *Hand out index cards*
- Researcher gives a short oral summary of the key questions and main ideas that have emerged through the discussion.
6. We're now going to move on to the reflection component. I'm going to put up three papers around the room: "Things I liked in this discussion" "Things I wish we could've

discussed more” “Areas for improvement.” *Hand out sticky notes* On a sticky note write anything to go under those areas. You can use as many as you’d like. When you finish feel free to go and if you have any questions or anything you want to talk about feel free to come up to me afterwards and do so. I will see everyone for our final meeting on _____ at _____. There will be some pre-reading materials that I will send out a week before and then again three days before. Looking forward to seeing everyone soon!

Session Two In-Session Handout



UNIVERSITY OF CAMBRIDGE

United States Education System:

Ethnic Demographics: 50.3% White, 15.6% Black, 24.8% Hispanic, 4.8% Asian (Fall, 2013)

| Education | National Average | African American | American Indian | Asian and Pacific Islander | Hispanic | Non-Hispanic White | Two or More Races |
|---|------------------|------------------|-----------------|----------------------------|----------|--------------------|-------------------|
| Children not attending preschool | 54% | 52% | 59% | 48% | 63% | 51% | 53% |
| Fourth graders not proficient in reading | 66% | 83% | 78% | 49% | 81% | 55% | 61% |
| Eighth graders not proficient in math | 66% | 86% | 79% | 40% | 79% | 56% | 63% |
| High school students not graduating on time | 19% | 32% | 32% | 7% | 24% | 15% | N.A. |

Free Reduced Price Meals: 48.1% of students eligible (2010-2011 school year) (From: NCES)

(Taken from: Annie E Casey Foundation, 2015: Kids Count Data Book)

| Reporting Groups | % Of Students | Avg. Score on NAEP Math | % At or Above Proficient | | % At Advanced |
|-------------------------------|---------------|-------------------------|--------------------------|------------|---------------|
| | | | Basic | Proficient | |
| School Race | | | | | |
| White | 8 | 246 | 86 | 52 | 9 |
| Black | 41 | 217 | 55 | 13 | # |
| Hispanic | 44 | 223 | 65 | 17 | 1 |
| Asian | 5 | 246 | 85 | 50 | 12 |
| Gender | | | | | |
| Male | 51 | 224 | 65 | 22 | 2 |
| Female | 49 | 223 | 63 | 18 | 1 |
| National School Lunch Program | | | | | |
| Eligible | 88 | 221 | 61 | 16 | 1 |
| Not Eligible | 11 | 246 | 86 | 51 | 10 |

Illinois Education System:

Ethnic Demographics: 49.9% White, 17.6% Black, 24.6% Hispanic, 4.5% Asian (Fall, 2013)

Free Reduced Price Meals: 46.7% of students eligible (2010-2011 school year) (From: NCES)

Chicago Education System:

= Rounds down to 0%

Overview:

- In 2011, Black students had an average score that was 29 points lower than White students.
- In 2011, Hispanic students had an average score that was 23 points lower than White students.
- In 2011, students who were eligible for FRPM, an indicator of low family income, had an average score that was 26 points lower than students who were not eligible.

(Taken from: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress NAEP, various years 2003, 2011 Mathematics Assessments.)

Gifted Education: United States vs. Illinois

% Of public school students enrolled in gifted and talented programs, by sex, race/ethnicity, and state: 2011-12

| State | 2011-2012 | | | | | | | | |
|---------------|-----------|--------|----------------|-------|----------|-------|------------------|-------------------------------|-------------------|
| | Sex | | Race/Ethnicity | | | | | | |
| | Male | Female | White | Black | Hispanic | Asian | Pacific Islander | American Indian/Alaska Native | Two or more races |
| United States | 6.2 | 6.4 | 7.6 | 3.6 | 4.6 | 13.0 | 5.0 | 5.2 | 6.8 |
| Illinois | 3.4 | 3.4 | 4.4 | 1.6 | 1.7 | 9.8 | 5.0 | 2.0 | 5.0 |

(Taken from: National Center for Education Statistics, 2015 Digest of Education Statistics)

Overview:

Growing opportunity gap in gifted and talented education:

- Black and Latino students represent 26% of the students enrolled in gifted and talented education programs, compared to black and Latino students' 40% enrollment in schools offering gifted and talented programs.
- White and Asian American students make up 70% of the students enrolled in gifted and talented education programs, compared to 55% of white and Asian-American enrollment in schools offering gifted and talented programs. Latino and black students represent 26% of the students enrolled in gifted and talented programs, compared to 40% of Latino and black student enrollment in schools offering gifted and talented programs.

(Taken from: U.S. Department of Education Office for Civil Rights 1 Civil Rights Data Collection: Data Snapshot (College and Career Readiness) March 21, 2014)

“Since **tests** were constructed to predict school achievement, which determines entry in the job market, there is an inevitable correlation between test scores and occupational and social status. The purpose of identifying whether or not individuals are predisposed to some particular level of intelligence must be to fit them in some socially salient category.”

Richardson, K. (2011). Wising Up On the Heritability of Intelligence.

<http://www.councilforresponsiblegenetics.org/genewatch/GeneWatchPage.aspx?pageId=388>

“General intelligence is an important human quantitative trait that accounts for much of the variation in diverse cognitive abilities. Individual differences in intelligence are strongly associated with many important life outcomes, including educational and occupational attainments, income, health and lifespan ... Our results unequivocally confirm that a substantial proportion of individual differences in human intelligence is due to genetic variation and are consistent with many genes of small effects underlying the additive genetic influences on intelligence...The latent trait of general intelligence ranks people very similarly, irrespective of the group of **cognitive tests** used to extract it.

Davies, G., Tenesa, A., Payton, A., Yang, J., Harris, S. E., Liewald, D., Luciano, M. (2011). Genome-wide association studies establish that human intelligence is highly heritable and polygenic. *Molecular Psychiatry*, 16(10), 996–1005.

Session Three: Personalized Education



WHILE WAITING FOR EVERYONE TO ARRIVE

FIVE MINUTES (The Jacobson School: 3:10-3:15, West Elm 3:00-3:05)

As people walk in: I'm going to give you a few minutes to look over the pre-reading again in case you didn't get the chance to. When we come back together, I'm going to check-in and see if anyone has any questions or initial reflections on the pre-reading. We'll get into the policy-points more in more detail as well later in today's discussion.

I'll give everyone a few minutes to look over the materials again now. Please flip over the document when you've had enough time, so I know when we can all begin!" *Wait until all documents are flipped over face down*

INTRODUCTION:

TEN MINUTES (The Jacobson School 3:16-3:26, West Elm 3:06-3:16)

"Hello everyone. Thank you so much for such engaging conversations so far- it has been a pleasure working with all of you and discussing together the different factors that contribute to student performance, achievement, and success in the classroom. To recap quickly: [GO TO SLIDE 2] we began by talking very broadly about intelligence, we looked at different voices with different views on the topic and then moved on to discussing how each of us might understand intelligence and where it comes from. In the second session we looked at how conceptualizations of intelligence have been linked to race and SES and looked at some data on socioeconomics and race in relation to student achievement and performance in the United States education system.

The topic of today's discussion is about the growing field of behavior genetics. [GO TO SLIDE 3]. The general aim is to have open-ended discussion and to give you the opportunity to share your views, reflections, and opinions on the materials and videos we will be going over today. I want you to think about the US education system (we took a look at some data on it in our

last session) and draw upon your own professional experiences and the context of your current school as we move through today.

[GO TO SLIDE 4]

So, the pre-reading gives some background on this field of scientific research. Researchers in this field are interested in determining not only how much genes influence behaviors and outcomes like cognitive ability and educational attainment, but also which genes predict these behaviors and outcomes. As the pre-reading mentions, the most recent twin studies have estimated cognitive ability and educational attainment to be between 40 and 70% heritable. Is everyone familiar with what twin studies are? They examine similarities and differences between MZ and DZ twins, or identical and fraternal twins. Assuming that twins grow up in similar environments, twin studies try and estimate the extent to which differences between people (e.g. in their ability or personality) can be explained by differences in their genes. MZ twins are 100% genetically similar while DZ twins are supposed to share about half their genes. If MZ twins are more similar than DZ twins when looking at a certain behavior, say academic performance or educational attainment, then that greater similarity is attributed to genetics.

The past five years has seen an increase in the number of behavior genetics researchers advocating for applying their research to K-12 systems of education (Asbury, 2015; Stanford University Center for Education Policy Analysis, 2015; TES Resources, 2015; Thomas, Kovas, Meaburn, & Tolmie, 2015). Today we'll be looking at some of those arguments and the policy proposals that come directly from the book "G is for Genes: The Impact of Genetics on Education and Achievement" written by a British behavioral psychologist named Kathryn Asbury and Robert Plomin, a behavioral geneticist who was born and raised in Chicago and who attended an "inner-city" Catholic school. Asbury and Plomin are interested in bringing knowledge of genetics to systems of education. They advocate for acknowledging the role they see genetics playing in student performance differences and for thinking about how we might use genetic information to shape the ways in which educators teach their students.

Today's topic is also theoretical in nature, in the sense that the field is continuing to develop and still searching for more of the genetic markers that are needed to make implementation of the policy points Asbury and Plomin are advocating for possible. This means that we aren't yet able to accurately predict someone's cognitive abilities or educational attainment based on a cheek swab. However, researchers like Asbury and Plomin believe this will soon be a reality

and want to begin to get school-based (K-12) systems of education to think about the relevance of genetics for education. For today, I would like you to suppose that from a science standpoint the genetics research is all there and a system of ‘personalised learning’ or ‘personalised education,’ that uses a child’s genetic information to identify cognitive strengths, or weaknesses, could be brought to education systems tomorrow. Hopefully, today’s discussion will bring together some of the things we’ve talked about in earlier sessions.

[GO TO SLIDE 5]

1. Ok, so let’s just check-in and see if anyone has any questions or initial thoughts or reflections. What are your impressions of all this material?

VIDEO CLIPS:

FIFTEEN MINUTES (The Jacobson School 3:27-3:42, West Elm 3:17-3:32)

As I mentioned, we’re going to go into more detailed discussion of the policy points, but first I’d like to show you two video clips, each is about two minutes. One is of Robert Plomin, who I introduced earlier, and the other is of Ben Domingue from Stanford University’s Graduate School of Education, both will be talking about their work in relation to education.

[GO TO SLIDE 6]

[GO TO SLIDE 7]

1. What do you think about the arguments these researchers are making? To summarize [GO TO SLIDE 8] researchers like Robert Plomin and Ben Domingue believe these are potential benefits an increased knowledge of genetics might bring to schools. [READ OUT BENEFITS]

POLICY POINTS:

FIFTEEN MINUTES (The Jacobson School 3:43-3:58, West Elm 3:33-3:48)

4. I want to dive in to the policy points. [GO TO SLIDE 9/10] Were there certain elements or policy points that stood out to you?
5. As a whole (that is if we were to implement all 11 policy points) what are potential benefits of a system like this?
6. As a whole (that is if we were to implement all 11 policy points) what are potential concerns for a system like this?

7. I want us to think about how different students might operate within a system like this. Last session we talked about racial and socioeconomic disparities in the US education system. What kinds of positive or negative effects might these policy points have specifically on students who are underserved in our education system right now (i.e. come from low-income or ethnic minority backgrounds?)
8. As a whole (that is if we were to implement all 11 policy points) how would a system like this affect your role as an educator or your ability to teach?

POTENTIAL QUESTIONS BASED ON FLOW OF CONVO:

9. There are a couple of policy points I want to discuss in particular.
 - a. Let's look at 1 & 2. Together they give more freedom to teachers and loosen up or offer more flexibility to curriculum implementation and requirements. Asbury and Plomin seem to advocate for the increased agency a system like this would give teachers. What about your role as educators? How would an education system like this one affect your role in the classroom and the ways in which you engage with students?
 - i. What do you think about keeping mandatory subjects to a minimum and only having a Basic Skills examination?
 - b. Let's take a look at Number 5: We've discussed soft skills and emotional intelligence a bit throughout our discussions. We've also talked about a growth mindset. What do you think of implementing classes that work to develop these "soft skills"?
 - c. Number 6 and Number 7 touch upon the phenomenon of racial/socioeconomic disparities in systems of education. What do we think of these two policy points, are they adequate measures for addressing some of the issues we discussed last session?
 - d. I'm also interested in Number 9: We often think of higher education as key for success in life, particularly economic success. Education is seen as an equalizer. Here Asbury and Plomin are offering alternatives to higher education as we think of it. My first question is what do you think of increasing vocational training or apprenticeships? *give participants time to discuss* The second question is: we value some professions more than others. For example, engineering professions tend to pay higher than jobs considered "blue collar" like plumbing. If individuals are identified based on their genetics for vocational

training or apprenticeships, or jobs that mainstream society tends to see as less economically valuable, how might this also play in to socioeconomic or racial structures?

- e. Let's also look at Number 10: I'm interested in how you guys respond to this-teaching teachers genetics. What are your thoughts?

Researcher gives a short oral summary of the key questions and main ideas that have emerged through the discussion.

CONCLUSION:

FIVE MINUTES (The Jacobson School 3:59-4:04, West Elm 3:49-3:54)

Thank you everyone. Before we move on the individual reflection, does anyone have anything they would like to add? It could be general feelings on this topic, it could be questions you might have, or something you want to discuss further?

Thank you, yet again, for such a rich discussion. We're now going to move on to the final individual reflection component now. [GO TO SLIDE 11] Like always, I'm going to ask you take a piece of paper and jot down a few words that describe how you've felt after this conversation, just a sentence or two on what you think about the relevance of genetics for education. I wanted to thank you all for your participation, and for taking time out of your packed schedules to discuss topics I find very important. I've learned so much from all of you and am looking forward to any and every opportunity to continue to do so. It has been an absolute pleasure. Later this evening, you'll be receiving an online reflections survey to collect your thoughts on this experience. If you could fill that out as your last obligation for this workshop series, it would be much appreciated! It should only take 5-10 minutes and would really help me get feedback on how this experience has been for you and your final thoughts.

TOTAL TIME: 55 Minute

Focus Group Exit Questionnaire

Thank you for participating in these professional development workshops and furthering academic research! We hope you found the experience to be challenging, informative, and beneficial to your professional development. This brief survey is designed to gather your reflections on this experience.




Q1 Please rank **in order of importance** factors that may contribute to a student's academic achievement and educational attainment.

This is designed to gather your **personal opinion**. Please mark one choice in each row. Column selections can only be used once. 1 is most important, 7 is least important.

- ☐ Race/Ethnicity
 - ☐ Gender
 - ☐ Socioeconomic Status
 - ☐ Parents/Guardians & Home Environment
 - ☐ Genetics
 - ☐ Teacher/School Quality
 - ☐ Neighborhood Environment
-

Q2 If you would like to elaborate on your selections to the above question you may do so here: (Optional)

Q3 Please use the sliding scale to show the extent to which you think the following are shaped by Nurture/Environment (0) or Nature/Biology (100)

| | |
|----------------------|--|
| Intelligence |  |
| Socioeconomic Status |  |
| Ethnicity/Race |  |

Q4 To what extent do you **personally agree** or **disagree** with the researcher's views in this video clip?

- ☐ Strongly Agree
- ☐ Agree
- ☐ Somewhat agree
- ☐ Neither agree nor disagree
- ☐ Somewhat disagree
- ☐ Disagree
- ☐ Strongly disagree

Q5 During our final workshop we discussed eleven policy points taken from the book "G is for Genes." The next few questions are related to that professional development experience.

The following question includes excerpts from the above video. Please indicate the extent to which you **personally agree** or **disagree** with each of these statements.

| | Strongly Agree | Agree | Somewhat agree | Neither agree nor disagree | Somewhat disagree | Disagree | Strongly disagree |
|---|-----------------------|-----------------------|-----------------------|----------------------------|-----------------------|-----------------------|-----------------------|
| Research that explains genetic and environmental influences on cognitive ability and educational attainment could be useful for teachers. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| The science of behavioral genetics has a role to play in K-12 education. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I would like to learn more about behavioral genetics and its relevance in education. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Q6 The following question includes excerpts from the above video. Please indicate the extent to which you **personally agree** or **disagree** with each of these statements.

| | Strongly Agree | Agree | Somewhat agree | Neither agree nor disagree | Somewhat disagree | Disagree | Strongly disagree |
|---|-----------------------|-----------------------|-----------------------|-------------------------------------|-----------------------|-----------------------|-----------------------|
| "Children differ, and they differ genetically" | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| "Don't just automatically blame teachers, and schools, and parents. Realize that genetics is important." | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| "Not only do they [children] differ in how easily they learn but it's sort of in what they learn and what they like to learn" | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| "We ought to be providing the opportunities for children to discover their strengths and minimize their weaknesses." | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Q7 Please take a few minutes to refresh your memory on Asbury and Plomin's proposed policy measures. Please use this table to answer the next few questions. If you are having trouble viewing the image, please refer below for a downloadable file.

| Proposed Policy: | Proposed Policy: |
|---|--|
| 1. Keep mandatory subjects to a minimum, restrict to a Basic Skills examination | 7. Level the playing field for extracurricular activities by providing extra support to pupils from families with fewer resources. |
| 2. Increase the range of subject options available to all students and give teachers more freedom in their lessons. | 8. Set a standardized PE program for all children in primary school and Year 7 and then in Year 8 and above allow them to choose the form of exercise they will undertake. |
| 3. If a child needs extra help give it, instead of labels and bureaucracy. | 9. Increase the number and range of options available for work-and college-based vocational training; make apprenticeships more affordable for and attractive to employers; and educate students so they have mastered basic skills, found their true interests, and are more attractive to employers. |
| 4. Each student has an Individual Education Plan, which should be reviewed and revised each year. Every child should receive a personalized school-leaving certificate at the end of their compulsory education. | 10. Add a course in the genetics of learning and education for all in teacher training, and issue a call for tender for groups and individuals who wish to design and pilot practical approaches to the personalization of education. Successful techniques, training, and resources should subsequently be made available to all schools. |
| 5. Introduce a weekly Thinking Skills session for all pupils (no National Curriculum or public examinations for this, but schools will commit to an hour per week on Thinking Skills and implement as they see best). | 11. Size makes choice viable. Make our schools bigger and the links between the different levels of schooling stronger. |
| 6. Offer free, high-quality preschool education to disadvantaged children from age 2, free, high-quality preschool to all children from age 3 to 4, and extra support to children in low-SES families from birth. | |

Asbury, K., & Plomin, R. (2013). *G is for genes : the impact of genetics on education and achievement*, xii, 197 pages.

Q8 In general, what kind of impact do you think these proposed policies would have on the US education system?

- ☐ Positive impact
 - ☐ Neither positive nor negative
 - ☐ Negative impact.
-

Q9 What kind of impact do you think these proposed policies would have on the US teaching profession?

- ☐ Positive
 - ☐ Neither positive or negative
 - ☐ Negative
-

Q10 What kind of impact do you think these proposed policies would have on ethnic minorities and low-income students in the US education system?

- ☐ Positively
 - ☐ Neither positively or negatively
 - ☐ Negatively
-

Q11 The following lists some potential benefits researchers believe an increased knowledge of the role of genetics in cognitive ability and educational attainment could bring to schools. Please select as many as you believe would be beneficial to your professional practice.

- ☐ Ability to target interventions more specifically to each child.
- ☐ Ability to decide on streaming/tracking of students more precisely.

- ☐ Earlier identification of children who might need special input.
- ☐ Increased focus on personalized learning.
- ☐ Ability of parents to request special education interventions for their child based on the child's genetic data.
- ☐ Ability to individualize extra-curricular activities based on identified genetic strengths.

Q12 If you would like to add any additional comments on Asbury and Plomin's policy points/recommendations or to elaborate on any of your answers for this section you may do so here.

End of Block

Q13 This final section is about gathering your final reflections on these three professional development workshops.

Q14 I found these discussions:

- ☐ Not at all challenging
- ☐ Slightly challenging
- ☐ Moderately challenging
- ☐ Very challenging

Q15 These discussions... (1/2):

- ☐ Did not change my philosophies on intelligence
 - ☐ Slightly changed my philosophies on intelligence
 - ☐ Moderately changed my philosophies on intelligence
 - ☐ Completely changed my philosophies on intelligence
-

Q16 These discussions... (2/2):

- ☐ Did not change my views on structures like race and socioeconomics and their role in student achievement
- ☐ Slightly changed my views on structures like race and socioeconomics and their role in student achievement
- ☐ Moderately changed my views on structures like race and socioeconomics and their role in student achievement
- ☐ Completely changed my views on structures like race and socioeconomics and their role in student achievement

Q17 If any of your views were changed, in what ways where they changed?

Q18 The most challenging part of this experience was:

Q19 The part of this experience I enjoyed the most was:

Q20 An area of discussion I would like to explore further is:

Q.21 If given the opportunity, I would participate in workshops like this again.

☐ Yes

☐ No

Thank you so much for your energy, attention, reflections, and views. We hope you benefitted from this experience and encourage you to reach out if you have further questions, comments, or concerns about this experience and the topics covered.

Sample Focus Group Transcript

The Jacobson School: Focus Group Session Two

DM:

I'm giving everyone time to look over the pre-reading and I've added on two more perspectives that focus in particular on testing and they were both given in the same year but they're both very different, and I have extra copies if anyone doesn't have the pre-reading... I'll give you about one more minute. Alright has everyone had enough time? Great! So, thank you everyone for joining me again today for our second meeting. We're going to be building off of a lot of the topics we talked about last time and as a refresher last time we were talking about the general question of "what is intelligence" and we saw that there are a very wide array of perspectives and definitions for this single word and we each thought about how we personally define this term and student ability and achievement and the factors we think contribute to these factors. So, we're going to build off of that today and we're going to be asking "what is intelligence when we think of it in relation to society and culture" and more specifically "how has intelligence and academic performance been linked to race and socioeconomic status." And throughout all of this I'll be asking you to draw upon your professional experiences and in particular when we look at some data in the second portion of today and discussing whether those, what we see in the data reflects your own professional experiences in the classroom. These can be difficult topics and conversations to have because we are looking at race, socioeconomic status, and intelligence so I ask that we're just respectful and open and also recognize that there might be differing perspectives that emerge. So, like last time we're going to start with the pre-reading and just getting general perspectives similar to last time on the reading and if there was anything that stood out to you in either a positive or negative way that you had more questions about.

ERIN:

I was confused on the 1968 one, maybe somebody could help me. Because it seemed like there were two different quotes by the same person, but they seemed to be saying different things.

DM:

What in the two things—

ERIN:

So, the first part basically said, 'non-hereditary' traits seem to account for most of the variance in intellectual ability and by, I assume he means, test scores, but then the second one said we shouldn't fail to take into account hereditary factors.

RICHARD:

1968?

ERIN:

Yeah

HENRY:

It says innate or acquired? Yeah, innate or acquired, right.

ERIN:

Innate or acquired, so if we fail to take..

HENRY:

So—

ERIN:

--Into account either... oh if we fail to take account one. If we don't consider both, right that makes more sense.

JACQUELINE:

I felt like the 1999 was most positive and differing opinion of the others, but it was also very optimistic that you know there's no reason to expect that there is any differences in their intellectual abilities based off of race and so that might be, I wonder if that's, a little too optimistic to think that way but I think ideally you would hope that that would be the case but I don't think it is.

ERIN:

Well and I think we're kind of missing the whole concept of cause and effect, so if you ever determine in any way that there are racial differences, it doesn't mean that race caused the difference or that, because it's a difference, difference in race is also inherited, that there must be something inherited that caused the difference. That doesn't seem true to me.

HENRY:

And also, along with that same idea is that you can have differences that look like they're due to race but it's because the test doesn't speak, the way the test is constructed it's always going to be biased in a test no matter how hard a person tries not to.

ERIN:

Or other—

HENRY:

--So what counts for intelligence in that culture could be different and the test just doesn't assess that.

JACQUELINE:

That was what the 1996 person was saying?

ERIN:

Test bias

JACQUELINE:

Test biases.

PETRA:

No but that one says that it doesn't matter what test you give, that African American or I don't know if they're American or what but people of African descent have lower points on tests than White people do.

HENRY:
That was...

PETRA:
'96

JACQUELINE:
The '96

PETRA:
And this one too "different tests samples of different range of results." Still saying their mean is lower.

ERIN:
So, what about the 2007 one? "I'm gloomy about the prospect..."

PETRA:
Yeah that's disturbing.

ERIN:
--"Of Africa, there's no reason to anticipate capacities in geographically separated areas evolve the same." I've read something that says the widespread killing off of generations over there because of AIDS is meaning that they don't even, the orphans and the children don't even have the benefit of the nurture environment because they're missing a whole generation of parents and that people have predicted how many generations it will take for them to reacquire the same basic level of knowledge and culture and you could consider that intelligence if you were testing it that way.

RICHARD:
Well 2015 one was interesting was saying that the African American population did better in a school that wasn't the University of Texas whether it was whatever slower paced or whatever, that kind of stuff, and it's interesting they're saying according to African Americans because I think the same thing with us. I think some people will excel in what's a big huge environment like the University of Texas whereas I graduated from little old William Penn college and I excelled because of how that college did things so I think it's essentially that they're immediately saying that African American race—population couldn't do as well at the University of Texas as smaller schools and I think I was a product of that very same thing and I think I was more successful because I didn't go to a big school but—

HENRY:
And it may not be, because that author wrote it might not be because the school didn't push you and it was slower than any other class it was just how it was structured the size of the school, the other kinds of students who were with you, the way the professors, you know there are lots of factors besides the speed of a class so there's an assumption made it seems in that quote.

RICHARD:

Well and again...right. At the University of Texas or Iowa or Michigan you know you're with 150 kids in a class and they're not going to give you the guidance, whereas a smaller school will.

ERIN:

But he didn't describe the types of people that would be better at a small school versus a large school, he's picking one whole race and that didn't feel good reading that one.

PETRA:

Right

JACQUELINE:

And I think at the bottom it talks about the Illinois differences or gaps and it just popped in my head would we find the same gaps if we were talking about possibly the African American population in like DC or wealthier neighborhoods where there is a lot of African American—

PETRA:

--Oh, a higher?

JACQUELINE:

Of a higher, upper class, yeah. So, I don't know, but I feel like yeah this part primarily generalized the group and a specific group.

ERIN:

I have to say it shocked me to read the 2006 one too, where he talked about racial differences in brain size.

PETRA:

Yeah I found that disturbing as well.

ERIN:

I felt like I immediately wanted to see his proof, like you need to prove that one to me.

JACQUELINE:

Like how old is that thought?

BRIDGET:

Yeah, like let's go back to the 60s or something.

RICHARD:

I think 2015's kind of on the money too right. Society is deeply stratified along race and class lines which affects not only information children learn but their very habits of thought, ways of thinking, how they are sort of taught to learn, whether being exposed to, in terms of, wow isn't this great, what do you think this does, you know whatever in that whole engagement process.

DM:

Were you familiar with any of the names of these individuals?

ERIN:
Well was that Justice Scalia?

DM:
Yes

PETRA:
Yeah I was thinking that too

BRIDGET:
Yeah that's what I was...

ERIN:
That's it.

DM:
What about Watson?

HENRY:
I was just looking up to see, which Watson it is.

ERIN:
There's the DNA... Francis Crick

HENRY:
I didn't know who

ERIN:
--And Watson were their names

HENRY:
That's what I thought it was.

DM:
That's who it is.

HENRY:
Is that who it is? Ok, I thought it was the DNA. I didn't know...

DM:
Had any of you heard the Bell Curve?

** agreement from many participants ** mhm

DM:
Herrnstein and Murray the 1994, those are the, that's from that book.

HENRY:
Oh

RICHARD:

Oh yeah.

DM:

So, if you could summarize what elements in this document stood out to you...

BRIDGET:

A lot of generalizations, just “all people that are African American” whatever, can’t do well at the University of Texas, or their brain size is lower or something like that, there was like crazy generalizations.

RICHARD:

I think sort of one generalization is that, they’re going to say African American race as a whole or like as they exist aren’t as well prepared as others that with environment, what they’re exposed to, whatever how they think of learning and such is different for various reasons than say White or other races, that as a whole, they’re.

ERIN:

There’s a cultural component?

RICHARD:

Something, that the cultural component is that they’re not as prepared or able to be as successful or labeled as ‘intelligent’ as those who have maybe more ability to expose them to that and, I don’t know if that made sense...

JACQUELINE:

And to be blunt they are kind of racist remarks

ERIN:

Yeah

RICHARD:

Mine? Or the

JACQUELINE:

No ****laughs****, not you! The reading

RICHARD:

Yeah

ERIN:

It’s couched in objective scientific language but I felt a pretty big shock of several of them, yeah. Maybe just in the fact that they don’t seem to be looking at the other factors or other—

PETRA:

Right a lot of missing historical information.

JACQUELINE:

I guess it is just like a snippet ...

ERIN:
True

PETRA:
Like I don't understand how Africans are geographically separated in their evolution. Does that mean, what does that mean? They didn't evolve at the same rate?

BRIDGET:
Which one?

PETRA:
As people in Europe and Asian in an evolutionary standpoint of homo sapiens because that's like scientifically not true, it's the same DNA structure and so I don't understand.

DM:
And what about this extra handout and the two perspectives.

ERIN:
Are we also talking about the part that says Illinois on it?

DM:
Yeah we'll get to that one as well.

JACQUELINE:
Well in the first paragraph I think that they also have to consider the type of preparation that also comes into play with predicting their school achievement and where they will end up in the job market and such.

RICHARD:
And fitting them into some category.

PETRA:
Well I'm curious because when we started this whole thing you said that brains scans and genetic testing can reveal genes or brain activity that may point to giftedness so I'm curious about the idea that it's genetic, but I don't think it's tied to race. So, I'm curious to see how, is it just something that's across all races that has these sort of brain patterns or whatever, I'm not sure how you phrased it to us, but it was like a physical genetic characteristic right?

DM:
Right, yeah we're going to get to that in the next session, but if you look at the second thing on the extra handout that is taken from a behavior genetics research paper.

PETRA:
So, I'm curious to see that if the studies across all races reveal the same average amount of giftedness or...

ERIN:

I also got out of that that when it said that “a substantial proportion of differences in intelligence is due to many different genes with different small effects.” It kind of differs from the other comments because it implies, it talks about how complex and complicated and how many various possibilities of genetic combinations there are and it puts intelligence on more of a scale, a spectrum. So, you could inherit you know small bone structure after generations of families that don’t eat well or something and does that impact your intelligence or any of those kinds of social emotion, socioeconomic factors?

HENRY:

Both of these comments seem to lead to, if you read them as they’re written neither of them strikes me as ‘oh watch out’, but both of them could then be used in dangerous ways. The one on the left, the Richardson, ‘the purpose of identifying whether or not individuals are..’ that’s a sort of like 1984 kind of thing where like you can use these tests and then ok that type of person goes in this category and that’s their path of life and in a sense I think we do do that now, where we do test people and it might not be because of their intelligence that they end up on a certain track, but just because they have that score, that score puts them on a track and that’s I think kind of dangerous.

ERIN:

I wondered if maybe he wasn’t warning us that that was the way. —

HENRY:

--right right exactly. And the same thing with the one on the right, like PETRA was saying that the one on the right is kind of saying ‘smart parents smart kids’ chances are, mathematically ‘smart parents smart kids.’ But it doesn’t mean that all smart parents from one part of the world, that all the people part of the world are going to necessarily have those genetic traits as opposed to people from another part of the world. It’s important to be careful about how you then, it would be easy to write a newspaper article about this study and turn it into something it’s not.

ERIN:

Yeah, yeah.

HENRY:

What was that one that says Illinois on it?

It’s on the back (from everyone)

PETRA:

It just says there’s scores of...

RICHARD:

Let me understand this, “our results unequivocally confirm that a substantial portion of individual differences in human intelligence is due to genetic variation and consists of many genes with small effects and additive genetic influences.” Meaning what?

DM:

Yes, so we’re going to talk about this in the next session, but I’ll give you a brief preface, there is a growing area of behavior genetics research, which is interested in finding the

genetic markers or alleles that are associated with cognitive ability and educational attainment. And these studies are based off of high heritability estimates from twin studies. So, the idea of twin studies is they look at identical twins, compare them to fraternal twins, if identical twins are more similar, then because identical twins are genetically more similar, there is a genetic influence. So, heritability estimates for cognitive ability and educational attainment are between, have been estimated to be between 40 and 70 percent, and right now these researchers are in the process of trying to find the specific markers that will predict how far someone gets in education or their cognitive abilities.

JACQUELINE:

Well I am an identical twin so you can test me!

**** laughter ****

DM:

So, this second perspective here is from one of these behavior genetics research papers that was published in 2011 and in this paper they were able to find, when they say “many genes of small effects” that means that there are, as you pointed out ERIN, there are many different genes that each influence cognitive ability and educational attainment, just a very small amount. So, they’ve found a couple of these so-called markers but they have not yet been able to find the ones to be able to predict, that match up with the high heritability estimates. So, we’ll be touching a little bit upon that in the next session because some of these researchers have proposed some education policies that they believe would benefit teachers and students based on their research and I decided to introduce this one today because many of these pieces of research use IQ tests are measures for intelligence and so I wanted to provide two different perspectives on IQ tests and their reliability I suppose. Are there any thoughts on that or any questions?

RICHARD:

Well I see some positives and I think there could be some dangerous territory treading into, ‘you’re only going to go this far’ right?

PETRA:

Well, but so much social is needed, I’m just thinking about, is it Outliers? Where, I don’t know if you’ve read that book, it’s kind of like pop

JACQUELINE:

I like that book

PETRA:

Anyway, so he tracks, I think it’s Outliers, so he tracks super, this man was super intelligent but he never got anywhere because he didn’t have the social conditions set up to help him. Whereas these other people, you know like Bill Gates had access to computers before anyone else had access to computers. So, he could learn to program before anyone else could learn to program.

RICHARD:

And you know I'm going to bring literature in. There's a series I've been reading where depending on where you test, you're in the upper echelon of, and you might be in the government and have a high ranking position, or you're just going to be mired in-and you're only going to go so far in school and I think is that something that could come out of this? "Well you get to go college or you don't" because we're telling you, you can only get this far. You know that's the thing it's what is intelligence? Ok IQ but IQ doesn't mean that they're going to work really hard but you got the ones that maybe don't have the high scores by IQ but work and work and work and are extremely successful students where is that going to fit in with that kind of scientific research and what they do with it.

DM:

Ok so we're going to move on to looking at some of the data which includes this little piece on Illinois on the back and I'm going to hand out another handout which basically summarizes some statistics on the US education system as a whole, in the state of Illinois, and then more specifically Chicago and on the back you will find some data on gifted education comparing Illinois to the US. So, I'll give a couple minutes to look over that but as you go through it I again want you to be thinking about how this reflects your professional experiences as teachers. **gives about three minutes** ...

BRIDGET:

Can I ask a question?

DM:

Sure

BRIDGET:

The percent at or above a proficient does that mean if I'm at the advanced I'm also the basic level.

DM:

Yes. So, at or above is yeah

BRIDGET:

Ok, or if I'm proficient I'm already at the basic level. So, if I'm advanced I'm in all three categories but I could also be only basic as well and only be in that category. I'm like it's not adding up to 100. It's a good think to ask about cultural differences because when I had kids like everybody went to pre-school, everybody sent their kids to pre-school and you're going wow half the people don't send their kids to preschool.

PETRA:

I'm more disturbed with the overall numbers that 88% of students are eligible for Free Reduced Meals.

HENRY:

Yeah

BRIDGET:

Is the Chicago education system?

PETRA:

In Chicago 88% are eligible for Free Reduced Price Meals

BRIDGET:

88% of all kids? Or 88% of a sample

DM:

No 88% of all kids in the Chicago Public Schools.

PETRA:

88%, that's almost 90%, which means only 10% of students...

BRIDGET:

And it's probably a really low amount of income that you have to have to get in there, anyway, you know what I mean? Like if you're making \$35,000 a year they're probably like 'oh that's too much money.'

HENRY:

It's pretty intense when you look at—

PETRA:

Illinois versus Chicago?

HENRY:

Or Chicago versus the country—oh yeah right. Illinois versus Chicago, oh year right, it's only about half the state [on FRPM] that's clearly....

BRIDGET:

Oh, half the state.

PETRA:

Which is still shocking to me.

HENRY:

Yeah

ERIN:

Which one was that PETRA?

PETRA:

I'm just shocked at the amount of students eligible for free lunch

ERIN:

That, yeah, saw that too.

BRIDGET:

So that's in Chicago public schools.

DM:

Chicago public schools.

BRIDGET:

So, if you were well to do in Chicago and you sent you kid to the private elementary school--

JACQUELINE:

--You're not included

BRIDGET:

You're not included or whatever, ok.

JACQUELINE:

If you're not in CPS then...

BRIDGET:

Ok gotchya

DM:

Right exactly.

PETRA:

But CPS contains a whole bunch of—

JACQUELINE:

--Charter schools?

PETRA:

And like those selective enrollment schools.

BRIDGET:

Right right

DM:

So, as I'm sure you've noticed we're looking at this data in terms of race and socioeconomic disparities and I just wanted to cover gifted education and how the state of Illinois defines it, which I'm sure you're familiar but, it's as "Children and youth with outstanding talent who perform or show the potential for performing at remarkable high levels of accomplishment when compared with other children and youth of their age, experience, and environment. A child shall be considered gifted and talented in any area of aptitude, and, specifically, in language arts and mathematics, by scoring in the top 5% locally in that area of aptitude." In the pre-reading we looked at there was a big focus on test scores and in particular we saw a lot of focus on the Black-White test score gap which is given a lot of attention in the US, because the state of Illinois defines gifted and talented as, by scoring in the top 5% locally in that area of aptitude" I'm challenging of us to think of test score disparities not just generally but specifically with how that might affect representation in gifted education which is an environment that contains children that are supposed to be more intelligent or more cognitively able. I also bring this up because the National Association for Gifted Children did a survey in 2015 and teachers in Illinois put down that "the inclusion of underrepresented

students in gifted education” so that would be low socioeconomic status, ethnic minorities, disabled, English language learners, or children from rural environments was an area that was ‘most in need’ of being addressed in gifted education. So yeah we’re basically just going to continue the conversation that you guys have already started with the data and your reflections on it, whether it reflects you own personal experiences in education and any questions or surprises that were there.

RICHARD:

I was surprised at the percentage across the board not attending preschool. That it’s relatively equal, I mean it’s higher Hispanic, American Indian, but even non-Hispanic Whites 51% don’t attend, I thought it was a lot lower than that.

BRIDGET:

Yeah

PETRA:

The proficiency levels is... scary bad. 44% are proficient in 4th grade in the nation?... National average and not...

BRIDGET:

Yeah I always thought they should have free preschool because you have to—

RICHARD:

Funny it

PETRA:

What are we doing?

BRIDGET:

--Pay for preschool or whatever.

ERIN:

And I’m pretty sure the standards aren’t all that high.

BRIDGET:

Meaning?

ERIN:

To be proficient in the fourth grade level—

BRIDGET:

Yeah

PETRA:

Yeah it’s so low across the board.

RICHARD:

Not proficient. 81% Hispanic, 83% African American, 78% American Indian.

PETRA:

The math stinks!

BRIDGET:

Yeah

JACQUELINE:

And that's a majority

RICHARD:

And is that they don't have access to reading materials as much too.

BRIDGET:

At least more people are graduating

PETRA:

And everybody's graduating. Well but is that, if they're not even proficient.

BRIDGET:

Yeah are you graduating and don't have a sixth grade reading level? Or whatever.

ERIN:

Well the impact of poverty is just huge and it's necessarily, I don't know, I personally would love to see much more studies about poverty and solutions to poverty, and I get that there's a huge overlap there between all kinds of other factors in school success but if you don't attend a school that has any books, how do you get proficient in reading? If you don't have a family with a car to take you to a public library that exists that is well funded, you know—

HENRY:

If you can't get breakfast because there's no grocery store within two miles

ERIN:

Right right

HENRY:

--and it takes 7 bus rides to get there.

BRIDGET:

Or when you get there the box of Cheerios is \$7 and you can't afford it or something.

ERIN:

Right, and if you're not well fed, if you're suffering from poverty then you've got other, more basic concerns on Maslow's Hierarchy of Needs

BRIDGET:

--Right, than learning how to read

ERIN:

--Right.

JACQUELINE:

When I was in college I tutored for a lot of the Chicago Public School and literally we would go tutor and their resources was like a Basil set [Basil H Johnson] from like the 70s and that was it and we were supposed to like teach or work with the students based off this one set of books that were so outdated and not interesting whatsoever because they don't have real authentic books, you know these Basil Readers and so I'm not surprised.

ERIN:

It's just sad. The racial differences are noticeable; I mean you can see significant statistical differences in these, in this data,

BRIDGET:

But still, half of the White and Asian kids are not proficient in reading.

JACQUELINE:

Mhm, which is also surprising to me because with the Asian kids I don't feel like English is their first language also but they are still somewhat scoring a tiny bit higher than those who are speaking English as a first language.

ERIN:

I mean we see it in our school too, we see it in economically advantaged you know, dominant race kids that grow up speaking English but their parents are not speaking English as their first language, even if they're fluent in English at this point you can see differences in their language arts ability because their parents don't have the same language arts ability let's say, in English that is.

BRIDGET:

So is this a due to, the fourth graders not being proficient in reading, is that due to the parents speak another language or is that due to just lack of access to books and reading and instruction.

ERIN:

That's what kind of bothers me about charts like this that lay it out by race it is important to make sure we're not overlooking racial prejudice or ignoring it as an issue but it's just so much more of a complicated issue to determine what causes these statistics.

HENRY:

Yeah that's the big question is when you look at this data what are the assumptions you make and I think I try to figure out, there may be more, but I think there are four large groups of I guess causes for lack of a better word that can lead to the data looking the way it does. The first one could be actual racial differences, if we believe that DNA some of the DNA quotes over there, maybe your ancestry in the physical make up of your cells does affect on average where you'll be. I don't particularly believe that, but it's possible. So racial. Then cultural which is just what is valued in that culture. When I was living in New Orleans we talked a lot about how verbal language is more important in the community, in the black community in New Orleans than written language. Stories are passed down verbally which doesn't mean the kids aren't as intelligent and there were some studies and I wish I could point to what they were, where the black kids had stronger abilities in verbal language, although it wasn't White

English, but their ability to communicate in a language that they knew, it was English, but it was a different style of English, than the White testers were doing, they actually had higher skills in verbal than the White kids so just that's the second one, cultural is what's valued in the culture. Third one is SES which we already pretty much covered which is so huge and then the other one is testing bias I think you {DM} alluded to it earlier, just the fact that you're using a test to assess somebody, the fact that it is a test, going back to what I was saying like about verbal, if you gave, there was a study done, and again I can't point to it now, where they gave the test verbally to the kids and then they gave the same test written and the scores weren't the same because they have different ways of thinking and different things are valued in their culture, so just the fact that it is a test then if it is a test how that test is written and how the test is given and how the test is scored because you have bias on the part of the assessor. Whoever is looking, whoever is observing, 'oh I know that kid's from this culture.'

RICHARD:

You don't know that though—

HENRY:

--Pardon?

RICHARD:

We don't necessarily know that they know who they're grading.

HENRY:

No, we don't but in any test we don't know—

RICHARD:

--But if guess if it's the school system

PETRA:

You're saying if it's written

RICHARD:

Written yes, but the assessor then if it's a school system they may or may not know who they are

HENRY:

Yeah and if it's computer done then it would be only how the test was written, but in any kind of assessment not just these specific ones. So those four categories are things that I think everyone who looks at these numbers has to think about before making assumptions about what it all means, testing bias, racial differences if there are any, cultural differences, and SES.

PETRA:

I would also add historical context which it might mean culture but like the immigration patterns for different races is very different and the level of education immigrants obtained before the immigrated to the United States and the conditions with which they came to the United States.

ERIN:

Yeah that's a good point too.

RICHARD:

Well I think too it's like is it's environment and schooling where the exposure to reading, the amount of books that they can read, how emphasized is it to read, depending on if someone's working on three jobs they're not going to have time to read to their kids or say, 'hey are you reading,' that kind of stuff. Is that part of this too? I think my kids aren't as strong of readers as they could be because I haven't been as active and say 'hey we're going to read and you're going to like reading. I'm going to read to you!' because then I think that some of these numbers are reflected in that whole idea, you know, what makes some of our students read seventy books in a month, well what makes some students read three, is that exposure, is that I'm showing you my love of reading, you know they're seeing me read all the time and my wife read all the time but that hasn't got to them, so is the environment in terms of exposure, the amount of resources, the amount of books that they can get to at the library or whatever, is that a factor in those numbers too.

ERIN:

It would be interesting to see some of those studies that the other quotes were based on to see how they compared Whites to Asian because if we're looking at some of these scores, like the Illinois Education one, the average scores on the math, Whites got a 246 Asians got a 246, kids that didn't have to have their lunch got a 246, just coincidentally they all got the exact same score, what are those little genomic things they're looking at, what are those markers they're trying to find the size of their brains too. What are the differences between Whites and a different race, not Black.

DM:

What about the data on gifted education?

JACQUELINE:

Well if our school's any indicator it makes sense that there's a high percentage of Asians that are in gifted programs.

RICHARD:

What is Pacific Islander?

HENRY and BRIDGET:

That's Hawaii, Samoa,

JACQUELINE :

Philippines

RICHARD:

So....

JACQUELINE :

But Laura and I were saying we're actually shocked that there's five percent of Pacific Islanders in Illinois.

PETRA:

Well the Illinois standard said you had to put the top 5% of the local community in the gifted education program, so it should be 5% across the board.

JACQUELINE:

You're right

PETRA:

Because unless you have a really heterogeneous community somewhere.

ERIN:

Well no I think the percent of the public school students

RICHARD:

So, the five percent of that population

PETRA:

No but they said 5% of local populations.

ERIN:

So, if you look at the Illinois category it doesn't add up to give percent and not every single one of them is 5%.

BRIDGET:

I envision that they just took the top 5%

PETRA:

Right, but the local, what is considered local? All of CPS? I don't think so, I don't know, I really don't know.

ERIN:

You would want it to average to 5% then

PETRA:

Wait is that what the standard is

DM:

It's saying that within a school district if a child scores within the top 5%.

PETRA:

Of all of CPS?

DM:

Yeah

PETRA:

Oh, ok.

ERIN:

So basically, if you lump them all together and you say what percent of public school students were enrolled in gifted and talented programs, but the total overall average

should be 5%. But then when you break it down by sex, race, and ethnicity, you could get different, a different breakdown.

PETRA:

Because the CPS schools I was in were almost 50% African American, 50% Hispanic so if it were just 5% of that school then you would have a good chance of being the minority in the gifted program but if you're all CPS..

JACQUELINE:

Yeah I wonder how many schools had students from that 5% like was it, were they only the top charter schools that are part of the CPS program?

PETRA:

Yeah they're probably all in the select enrollment and if you're Asian and White you're going to put your kids in the select enrollment and if you don't get in the select enrollment you're going to send them to private school.

BRIDGET:

Yeah [school name omitted] or whatever

ERIN:

So, it's hard to draw any conclusions from the data, the top chart I find because you don't know what the breakdown of the total population by race is.

PETRA:

Right

ERIN:

But the overview where it's telling you Black and Latinos make up 40% of enrollment in the schools but when they pull the 5% off they don't make the percentage of the 5% they're only 26% of the 5%.

PETRA:

Right

ERIN:

So that's showing a definite disparity.

DM:

And the bottom part, the opportunity gap within gifted that's in the United States as a whole that's not Illinois specific. So, I'm sure, as you know, every state, there is no comprehensive national system for gifted education, so every state and even locally within a state there are different identification and screening procedures for gifted education.

BRIDGET:

That's true

DM:

So, every state has a different system and in many states different school districts have different systems.

ERIN:

When my kids were in public school their system included recommendation of the teacher and so, right there you've got what could easily be a very subjective decision based on whatever prejudices or biases the teacher may have.

HENRY:

It's hard to interpret this without knowing where the, how the SES crosses over.

ERIN:

Yeah

PETRA:

Yeah

DM:

Would you say in general all the data that we've looked at is surprising, not surprising?

BRIDGET:

Surprising

ERIN:

Depressing

PETRA:

Yeah across the board for every student it's pretty sad.

BRIDGET:

It's pretty unfortunate

HENRY:

That was the only surprise that I expected the differences to be there the way they are unfortunately, but the magnitude of them, it's like you said [to PETRA]

PETRA:

Yeah

HENRY:

That's where I was like 'oh really?'

BRIDGET:

It makes you want to, I mean why don't lawmakers do, make preschool free or whatever or improve the schools so you can get like Jaqueline was saying, have good quality reading materials for lower school and things like that.

ERIN:

The overview has a heading that says "growing opportunity gap in gifted and talented education"

DM:
Mhm

HENRY:
There's something else that said that gap is increasing each year.

DM:
The Illinois on the back of the pre-reading, the Illinois section describes how within the state of Illinois there are increasing gaps. And although that's referring to national trends, the Illinois data is reflecting that as well.

PETRA:
OK

DM:
And when it says excellence gaps that's referring to children that are testing at the advanced level, which at least in the state of Illinois would be more likely to place in a gifted and talented program.

PETRA:
I will say I have a bias. So, when you see the kids that are the advanced even though they're like getting the school lunch, like this one percent, I think they must be complete rock stars because they made it through, they were at a disadvantage but they made it through somehow to this advanced percentage, so I would actually be more impressed with them than I would be with the other percentages that get there like that they have to overcome more or something.

ERIN:
Yeah. Like obstacles. You just can't ignore the fact that the data shows we really need to be looking at the racism that can easily be explaining a lot of this. I agree with what HENRY and PETRA said about other things to look at, but definitely have to look at racism... it's hard to do.

DM:
Thank you guys so much, are there any final reflections before we move onto the final reflection part.

PETRA:
I don't know I feel kind of inadequate because we're not with these populations, you know, we're not in a public school, this is a very select population so I don't know if I have any better knowledge about this than a person you might find on the street. I did, I student taught in a Chicago Public School that was almost entirely African American and Hispanic but that's my only knowledge of even Chicago Public Schools. So, I hope it's helpful what we're saying and...

DM:
Well to put it back to you I hope that this was helpful for you also.

PETRA:

Well it's interesting, but hopefully we are relevant to your goals...

DM:

I mean to push back a little how would you situate your school and Quest Academy's environment in relation to some of the trends in gifted education even say if it's not, if you know you're a private school, how might the fact that you're a private school also feed into these kinds of trends.

PETRA:

Well I feel like anyone who is eligible for a school lunch program would never apply to our school because they probably wouldn't have the resources to even apply or be able to do the research to find out about it. They would have to get transportation here somewhere, I mean in [name of suburb school is located in omitted] I know there are students that get free lunch, but it would require a whole of things they probably couldn't get, but I think we would welcome them if we could figure out, kind of, we're [PETRA and HENRY] on the diversity committee so we're trying to figure that out.

HENRY:

It would be interesting to do, we could actually analyze the data that we have and find out, not this one, the proficiency in reading, but there are some data analyses we could do that would, that we could look at culture or race without SES coming into it because most, but not all, most of our families are within a narrow SES. So, then you could look at that and say well if we found out that all the Indian kids were scoring this way and all the White kids were scoring this way and the very few African American kids we have score this way, then you could, it would be interesting because you might be able to see a narrow SES and that might provide further information about what these numbers might mean.

ERIN:

Like controlling for all the factors before we draw a conclusion on one.

HENRY:

Yeah exactly, you kind of have to control for SES a little bit.

PETRA:

Right, that's interesting. That's a good point. I think it would be hard to study anything besides Asian and White though because I think the subset is too small and it would skew your data.

HENRY:

Yeah we only have one Hispanic family, two Hispanic families, it isn't enough.

PETRA:

But it would be interesting to look and ask them, their motivation for being here in such a, being such a minority in such an unusual circumstance. You know what conditions brought them here that could maybe help us attract more.

DM:

Yeah I have some data on [name of suburb omitted] and 80% of children who are enrolled in private schools in [name of suburb omitted] are White. So regardless of it

being a gifted education private school, most kids who are enrolled in private schools here are White—

PETRA:

So, it's mostly like--

HENRY:

That's much higher than I thought.

BRIDGET:

And that would include the religious schools?

DM:

Yes. Versus as a whole, demographically, [name of suburb omitted] is about 63% White.

HENRY:

Oh, I'm sorry, you said 80% in private schools?

DM:

Yes

HENRY:

Ok ok

PETRA:

And 63% in Palatine

HENRY:

It would be interesting to see the next town over, [name omitted of city B], I think [name omitted of city B] is now about 45% Hispanic families, close to that, and the SES on average is lower than Palatine so it would be interesting to see just one town to the next, if those same numbers for as [name of suburb omitted] were repeated over there.

PETRA:

Well do you know, you don't know the racial breakdown from students from [name of suburb omitted] who are in gifted and talented in the Palatine public schools?

DM:

No unfortunately there is very limited data on gifted and programs in general. So, for example the last slide when it was looking at gifted and talented in Illinois and the US by race, I could not find any data on socioeconomic status breakdowns for that so, it doesn't appear that the National Center for Education Statistics has really looked into that as a standalone concept.

PETRA:

Well it sounds like we have enough problems, right? Like if you're a lawmaker I don't think, I got to be honest, gifted and talented would not be my priority looking at this, I would be like 'oh my gosh, let's get everyone to 100% proficiency in reading in fourth grade.'

BRIDGET:

Mhm, No Child Left Behind!

DM:

Well thank you guys so much, we're going to do the same thing as last time with the index card, reflection if you want to take one and pass it around and then I have like a two minute, less than a minute, less than two minute video clip that you can just listen to as you fill it out.

RICHARD:

You know [name of city C omitted] is 62% White, 16% Asian, 15% Hispanic.

PETRA:

[Name of city F omitted] is like 100% White

HENRY:

Oh, up in the [name omitted] area.

BRIDGET:

I was thinking the same thing about [name of city D omitted]

PETRA:

[City D] is very White

RICHARD:

Well [city D's] high school is 99% White right?

HENRY:

One guy

PETRA:

--One guy who has kids

HENRY:

--One guy, can you imagine being that one guy? So, it'd be like me living in the South Side of Chicago [to PETRA]

ERIN:

Can we start over [in reference to video]?

DM:

We can start over! It's just about a minute.

RICHARD:

I do think they're definitely trying to get more exposure to more minorities in gifted programs. My oldest was not in the gifted program in primary school, k-6 and that may very well have been because of those numbers, which I think is great, he's in it now at his middle school I think because they have a bigger program. I mean I do think they're

trying to make an effort I think to make sure everybody's getting exposure to the gifted program if they don't...

END

Appendix B: Survey

Template: Email Advertisement of Survey

Header: The University of Cambridge Education Department

Hello,

My name is Daphne Martschenko. I am a doctoral candidate at the University of Cambridge in the Department of Education. I am conducting a research survey designed to improve our understandings of teacher views on student achievement and the role of genetics in academic performance and success. What teachers believe about an issue matters. It can influence how that issue is addressed in the education system. The purpose of this study is to gauge and identify teacher opinions on potential education policies and to collect their experiences and views on student ability and achievement. We hope this research will ultimately contribute to possible solutions to inequalities in the US education system.

I am interested in surveying teachers in private/public/charter¹⁴⁴ schools in the United States about these topics.

I would like to administer this survey to teachers at your school and am happy to share a copy of this online-survey for your approval if you are interested. This survey is completely anonymous and volunteer-based. Neither the individual, the school, or Chicago will be made identifiable through this study. All survey participants will have the option to enter into a drawing to receive one of several \$50 Amazon gift-cards.

I look forward to hearing from you.

Best,

Daphne Martschenko

¹⁴⁴ The type of school (private/public/charter) was selected based upon who the email was reaching. I sent out emails to private and public schools separately because there were two different survey links: one for private schools and one for public schools.

Benefits of Survey Participation¹⁴⁵



UNIVERSITY OF CAMBRIDGE

Why this research benefits your community.

This research focuses on challenging topics and is designed to improve our understanding of teachers' views on student achievement and the role of genetics in academic performance and success.

What teachers believe about an issue matters. It can influence how that issue is addressed in the education system. The purpose of this project is to gauge and identify teacher opinions on proposed education policies and to collect their experiences and philosophies on student ability and achievement. The proposed education policies originate from the UK and focus on measures intended to re-design school systems in a way that might alleviate the high-stakes environment teachers work and operate in while also better serving students. We are interested in how teachers in private and public schools in the United States view these policies and the impact they believe it may have on their students.

We hope this research will ultimately contribute to possible solutions to gaps and inequalities in the US education system.

Participation in this survey is:

- Online, anonymous, and volunteer-based. 15 minutes with option to enter into a drawing for one of several \$50 Amazon gift-cards.

This survey:

- Openly addresses issues of race, ethnicity, socioeconomic status, genetics, and student achievement. It is designed to collect teacher philosophies on these challenging and charged topics in hopes of illuminating how teachers think about student ability and achievement in relation to policy.
- Gathers educator opinions on 11 proposed education policy points that focus on addressing the high-stakes environment teachers and students operate in.
- Protects anonymity of participants.
- Distributes findings to all stakeholders and participants with a commitment to longer-term engagement through the dissemination of relevant national and local policy measures, popular media articles, and/or academic journal articles.

About the primary researcher:

Daphne Martschenko is a PhD candidate at the University of Cambridge. She holds a Master's Degree in Education from the University of Cambridge, where she studied

¹⁴⁵ This document was included as an attachment in the emails sent out to schools and teachers advertising my survey.

gifted education programming and implementation in the state of Virginia and the representation of historically underserved groups in gifted education. Her current interests lie in education policy intended to address education disparities and improve quality of education for all students. Daphne also holds bachelor's Degrees from Stanford University in Medical Anthropology and Russian and spends her summers working at an education camp that combines academics with the outdoors.

Template: Survey Dissemination via Email¹⁴⁶

Header: The University of Cambridge Department of Education

Hello,

Thank you for your interest in participating in a survey run by the University of Cambridge Education Department. This survey is designed to improve our understandings of educators' views on student achievement and ability and the role of genetics in the classroom. We are also interested in collecting teacher perspectives on a number of education policies originating from the UK that some academics believe should be implemented widely in the future.

If you are a PUBLIC SCHOOL teacher please access the survey using this link:

http://cambridge.eu.qualtrics.com//SE/?SID=SV_cNn40BIPTEImU9D

If you are a PRIVATE SCHOOL teacher, please access the survey using this link:

http://cambridge.eu.qualtrics.com//SE/?SID=SV_eaj4gOxH32HrKNn

Please forward the link widely to your peers. If you have any questions do not hesitate to ask. This survey link will remain live through mid-March at which point you will be notified if you have won one of the Amazon gift-cards. We will send periodic reminders about taking this survey throughout this period and notify you once the survey has been closed.

Thank you for helping to further academic research. We hope this project will contribute to possible solutions to gaps and inequalities in the US education system and will share final results with you as soon as analysis is complete.

In solidarity,

Daphne

¹⁴⁶ This was sent out to teachers and schools who had registered their interest in participating in this survey after receiving the advertisement of the study and the research benefits.

Template: Survey Dissemination via Social Media¹⁴⁷

Header: The University of Cambridge wants your thoughts, teachers!

Sub-line: Take a brief survey and enter into a drawing for a \$50 Amazon gift-card!

The University of Cambridge Department of Education is conducting research on challenging topics designed to improve our understandings of educators' views on student achievement and ability and the factors that contribute to student performance in a classroom. Systems of education are at critical crossroads throughout the world. We hope research like this will highlight how teachers are feeling and their opinions on some possible changes to education systems.

What teachers believe about an issue matters. It can influence how that issue is addressed in the education system. The purpose of this project is to gauge and identify teacher opinions on some education policies coming from the UK that could be possible in the future. We are interested in gathering teacher perspectives on these policies and the impact educators think they might have on their professional practice and their interactions with their students. As an example, one of these policies advocates for keeping mandatory subjects to a minimum and restricting required testing to Basic Skills.

We hope this research will ultimately contribute to possible solutions to gaps and inequalities in the US education system. This survey takes 15 minutes, allows participants to save answers and come back to finish the survey later, and is anonymous. At the end of the survey, you may enter into a drawing to receive one of several \$50 Amazon gift-cards.

If you are a PUBLIC SCHOOL teacher please access the survey using this link:

http://cambridge.eu.qualtrics.com//SE/?SID=SV_cNn40BIPTEImU9D

If you are a PRIVATE SCHOOL teacher, please access the survey using this link:

http://cambridge.eu.qualtrics.com//SE/?SID=SV_eaj4gOxH32HrKNn

Thank you for helping to further academic research.

¹⁴⁷ This text was used to advertise my survey on social media platforms like LinkedIn and Facebook. It also was posted in educator blogs.

Copy of Survey¹⁴⁸

Teacher Philosophies on Student Achievement Comprehensive Question List

Teacher Background

Q1 This research is designed to improve our understandings of teacher views on student achievement and the role of genetics in academic performance and success.

What teachers believe about an issue matters. It can influence how that issue is addressed in the education system. The purpose of this survey is to gauge and identify teacher opinions on proposed education policies and to collect their experiences and philosophies on student ability and achievement. We hope this research will ultimately contribute to possible solutions to gaps and inequalities in the US education system.

Please answer the following fifteen to twenty-minute survey honestly, carefully and thoughtfully. All responses are anonymous and confidential. You may save your responses and come back to finish the survey at a later time if you cannot complete it all at once. Chicago will not be identified as a site for this study.

At the end of this survey you may enter in a randomized drawing for several \$50 Amazon gift-cards to be used towards school supplies.

Page Break

¹⁴⁸ Note that the survey does not ask teachers if they are private or public school teachers. This was because the survey had two separate iterations- one link was for private school teachers and the other was for public school teachers. In hindsight not including this question introduces the possibility that some teachers may have accidentally taken the wrong survey.

Q2 What is your gender?

- ☐ Male
 - ☐ Female
-

Q3 What is your age?

- ☐ Under 25 years old
 - ☐ 25-34 years
 - ☐ 35-44 years
 - ☐ 45-54 years
 - ☐ 55-64 years
 - ☐ 65-74 years
 - ☐ 75 or older
-

Q4 What grade(s) do you teach?
Select as many as apply.

- ☐ Pre-K
 - ☐ Kindergarten
 - ☐ 1st
 - ☐ 2nd
 - ☐ 3rd
 - ☐ 4th
 - ☐ 5th
 - ☐ 6th
 - ☐ 7th
 - ☐ 8th
 - ☐ 9th
 - ☐ 10th
 - ☐ 11th
 - ☐ 12th
-

Q5 What subject(s) do you teach?

Select as many as apply.

- ☐ Math
 - ☐ English & Language Arts
 - ☐ Social Studies
 - ☐ Foreign Language
 - ☐ Elective
 - ☐ Art
 - ☐ Music
 - ☐ Special Education
 - ☐ Other
-

Q6 Which best describes you?
Select as many as apply.

- ☐ White (non-Latino)
 - ☐ Black or African American
 - ☐ Hispanic or Latino
 - ☐ Asian
 - ☐ Native American or Alaska Native
 - ☐ Native Hawaiian or Other Pacific Islander
 - ☐ Other
-

Q7 When it comes to politics, would you describe yourself as liberal, conservative, or neither liberal nor conservative?

- ☐ Extremely liberal
 - ☐ Moderately liberal
 - ☐ Slightly liberal
 - ☐ Neither liberal nor conservative
 - ☐ Slightly conservative
 - ☐ Moderately conservative
 - ☐ Extremely conservative
-

Q8 How long have you been working as a teacher?

- ☐ This is my first year
 - ☐ 1-2 years
 - ☐ 3-5 years
 - ☐ 6-10 years
 - ☐ 11-15 years
 - ☐ 16-20 years
 - ☐ More than 20 years
-

Q9 How long have you been working at your **current school**?

- ☐ This is my first year
- ☐ 1-2 years
- ☐ 3-5 years
- ☐ 6-10 years
- ☐ 11-15 years
- ☐ 16-20 years
- ☐ More than 20 years

End of Block

School Background

Q10 Part 1/2: In your career thus far, which of the following best describes the kinds of schools you have worked in?

Select as many as apply. Ethnic minority = non-White

- ☐ > 90% of students are from ethnic minority groups.
 - ☐ 60%-90% of students are from ethnic minority groups.
 - ☐ 40%-59% of students are from ethnic minority groups.
 - ☐ 20%-39% of students are from ethnic minority groups.
 - ☐ 10%-19% of students are from ethnic minority groups.
 - ☐ < 10% of students are from ethnic minority groups.
-

Q11 Part 2/2: In your career thus far, which of the following best describes the kinds of schools you have worked in?

Select as many as apply.

- ☐ > 90% of students are low-income.
 - ☐ 60%-90% of students are low-income.
 - ☐ 40%-59% of students are low-income.
 - ☐ 20%-39% of students are low-income.
 - ☐ 10%-19% of students are low-income.
 - ☐ < 10% of students are low-income.
-

Q12 Part 1/2: Which of the following best describes the school you work in **currently**?
Ethnic minority = non-White

- ☐ > 90% of students are from ethnic minority groups.
 - ☐ 60%-90% of students are from ethnic minority groups.
 - ☐ 40%-59% of students are from ethnic minority groups.
 - ☐ 20%-39% of students are from ethnic minority groups.
 - ☐ 10%-19% of students are from ethnic minority groups.
 - ☐ < 10% of students are from ethnic minority groups
-

Q13 Part 2/2: Which of the following best describes the school you work in **currently**?

- ☐ > 90% of students are low-income.
 - ☐ 60%-90% of students are low-income.
 - ☐ 40-59% of students are low-income.
 - ☐ 20%-39% of students are low-income.
 - ☐ 10%-19% of students are low-income.
 - ☐ < 10% of students are low-income.
-

Q14 Which of the following best describes the size of the student body at the school you work in **currently**?

- ☐ < 50 students
 - ☐ ≥ 50 but < 250
 - ☐ ≥ 250 but < 500
 - ☐ ≥ 500 but < 1000
 - ☐ ≥ 1000 but < 2000
 - ☐ ≥ 2000 but < 5000
 - ☐ $\geq 5000+$
-

Q15 I teach and/or have taught in the following environments:
Select as many as apply.

- ☐ Gifted-education only classroom in an ability-inclusive public school.
- ☐ A gifted and non-gifted mixed classroom in a public school.
- ☐ Gifted-education only public school.
- ☐ Entrance-exam selective public school.
- ☐ Gifted-education only classroom in an ability-inclusive private school.
- ☐ A gifted and non-gifted mixed classroom in a private school.
- ☐ Gifted-education only private school.
- ☐ Entrance-exam selective private school.
- ☐ I have not taught in any of these environments.

Q16 I teach and/or have taught the following courses:
Select as many as apply.

- ☐ Advanced Placement (AP)
 - ☐ International Baccalaureate (IB)
 - ☐ Honors
 - ☐ I have not taught any of these courses.
-

Q17 I currently work in gifted education.

- ☐ Yes
 - ☐ No
-

Q18 I currently work in a charter school.

- ☐ Yes
 - ☐ No
-

Q19 I currently work in a religiously affiliated or faith-based school.

- ☐ Yes
 - ☐ No
-

Q20 I currently work in a special needs school.

☐ Yes

☐ No

End of Block

Teacher Philosophies

Q21 The purpose of this section is to gather your **personal** beliefs on factors that affect student achievement and learning. Please answer honestly.

Q22 Please indicate how much you **personally** disagree or agree with each of the following statements.

Please mark one choice in each row.

| | Strongly agree | Agree | Somewhat agree | Neither agree nor disagree | Somewhat disagree | Disagree | Strongly disagree |
|---|-----------------------|-----------------------|-----------------------|----------------------------|-----------------------|-----------------------|-----------------------|
| A student's genetics plays an important role in their success in a classroom. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| A student's race plays an important role in their success in a classroom. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| A student's socioeconomic status plays an important role in their success in a classroom. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Most children are blank slates, born into the world with equal abilities that are then affected by the environment. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Some children are "Orchids", meaning they flourish in | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

nurturing environments with the right set of circumstances, but would be particularly sensitive to and affected by challenging or adverse situations.

Some children are "Dandelions," meaning they are strong and resilient and can pull through in even the most disadvantaged circumstances.

☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

Q23 If you would like to elaborate on your selections to the above question you may do so here:
(Optional)




Q24 Please rank **in order of importance** factors that may contribute to a student's academic achievement and educational attainment.

This is designed to gather your **personal opinion**. Please mark one choice in each row.
Column selections can only be used once. 1 is most important, 7 is least important.

- _____ Race/Ethnicity
- _____ Gender
- _____ Socioeconomic Status
- _____ Parents/Guardians & Home Environment
- _____ Genetics
- _____ Teacher/School Quality
- _____ Neighborhood Environment

Q25 If you would like to elaborate on your selections to the above question you may do so here:
(Optional)

Q26 Please use the sliding scale to show the extent to which you think the following are shaped
by Nurture/Environment (0) or Nature/Biology (100)

| | |
|----------------------|--|
| Intelligence |  |
| Socioeconomic Status |  |
| Ethnicity/Race |  |

End of Block

Education Policy

Q27 Please watch the ninety-second clip below and use it to answer the next few questions.

Q28 To what extent do you **personally agree** or **disagree** with the researcher's views in this
video clip?

- ☐ Strongly Agree
 - ☐ Agree
 - ☐ Somewhat agree
 - ☐ Neither agree nor disagree
 - ☐ Somewhat disagree
 - ☐ Disagree
 - ☐ Strongly disagree
-

Q29 The following question includes excerpts from the above video. Please indicate the extent to which you **personally agree** or **disagree** with each of these statements.

| | Strongl y Agree | Agre e | Somewha t agree | Neither agree nor disagre e | Somewha t disagree | Disagre e | Strongl y disagree |
|---|-----------------------|-----------------------|-----------------------|---|-----------------------|-----------------------|-----------------------|
| "Children differ and they differ genetically" | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| "Don't just automatically blame teachers, and schools, and parents. Realize that genetics is important." | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| "Not only do they [children] differ in how easily they learn but it's sort of in what they learn and what they like to learn" | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| "We ought to be providing the opportunities for children to discover their strengths and minimize their weaknesses." | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Q30 Please take a few minutes to read the table below, which outlines some proposed policy measures. Please use this table to answer the next few questions.

| Proposed Policy: | Proposed Policy: |
|---|--|
| 1. Keep mandatory subjects to a minimum, restrict to a Basic Skills examination | 7. Level the playing field for extracurricular activities by providing extra support to pupils from families with fewer resources. |
| 2. Increase the range of subject options available to all students and give teachers more freedom in their lessons. | 8. Set a standardized PE program for all children in primary school and Year 7 and then in Year 8 and above allow them to choose the form of exercise they will undertake. |
| 3. If a child needs extra help give it, instead of labels and bureaucracy. | 9. Increase the number and range of options available for work-and college-based vocational training; make apprenticeships more affordable for and attractive to employers; and educate students so they have mastered basic skills, found their true interests, and are more attractive to employers. |
| 4. Each student has an Individual Education Plan, which should be reviewed and revised each year. Every child should receive a personalized school-leaving certificate at the end of their compulsory education. | 10. Add a course in the genetics of learning and education for all in teacher training, and issue a call for tender for groups and individuals who wish to design and pilot practical approaches to the personalization of education. Successful techniques, training, and resources should subsequently be made available to all schools. |
| 5. Introduce a weekly Thinking Skills session for all pupils (no National Curriculum or public examinations for this, but schools will commit to an hour per week on Thinking Skills and implement as they see best). | 11. Size makes choice viable. Make our schools bigger and the links between the different levels of schooling stronger. |
| 6. Offer free, high-quality preschool education to disadvantaged children from age 2, free, high-quality preschool to all children from age 3 to 4, and extra support to children in low-SES families from birth. | |

Asbury, K., & Plomin, R. (2013). *G is for genes : the impact of genetics on education and achievement*, xii, 197 pages.

Q31 In general, what kind of impact do you think these proposed policies would have on the US education system?

- ☐ Positive impact
 - ☐ Neither positive nor negative
 - ☐ Negative impact.
-

Q32 What kind of impact do you think these proposed policies would have on the US teaching profession?

- ☐ Positive
 - ☐ Neither positive or negative
 - ☐ Negative
-

Q33 What kind of impact do you think these proposed policies would have on ethnic minorities and low-income students in the US education system?

- ☐ Positively
 - ☐ Neither positively or negatively
 - ☐ Negatively
-

Q34 Which of the 11 policy points do you think is the **most important**?

- ☐ 1
 - ☐ 2
 - ☐ 3
 - ☐ 4
 - ☐ 5
 - ☐ 6
 - ☐ 7
 - ☐ 8
 - ☐ 9
 - ☐ 10
 - ☐ 11
-

Q35 Which of the 11 policy points do you think is the **least important**?

- ☐ 1
 - ☐ 2
 - ☐ 3
 - ☐ 4
 - ☐ 5
 - ☐ 6
 - ☐ 7
 - ☐ 8
 - ☐ 9
 - ☐ 10
 - ☐ 11
-

Q36 Would tailoring an Individual Education Plan based on an individual's genetic profile and the identified specific abilities and interests change your views on these proposed policies? If so, how?

- ☐ My views would not change.
 - ☐ Positively change
 - ☐ Neither positively or negatively change
 - ☐ Negatively change
-

Q37 Do you thinking adding a course on the genetics of learning and education in teacher training courses would be beneficial to teachers?

☐ Yes

☐ Maybe

☐ No

Q38 If you would like to comment on any of the above policy points or to elaborate on any of your answers for this section you may do so here.

End of Block

Thank you!

Q39 Thank you for your participation in this survey! If you would like to be entered into a randomized-drawing for a \$50 Amazon gift-card please enter your email address below.

End of Block

Table 26 Variable Notations and Controls

| Notation in R | Meaning |
|---|--|
| Teacher Characteristics | |
| Gender | |
| female | Female |
| <i>Control</i> male | Male |
| Ethnicity | |
| pure.white | Identifies as Caucasian only |
| <i>Control</i> non.white | Identifies as multi-racial/race other than White |
| Age | |
| very.young.teacher | Under age of 25 |
| younger.teacher | 25-34 years old |
| just.above.avg.age | 45-54 years old |
| older.teacher | 55-64 years old |
| retirement.age.teacher | 65 or older |
| <i>Control</i> avg.age.teacher | 35-44 years old |
| Political Orientation | |
| extreme.conservative | Respondents identify as “extremely conservative” |
| extreme.liberal | Respondents identify as “extremely liberal” |
| moderately.conservative | Respondents identify as “moderately conservative” |
| moderate.liberal | Respondents identify as “moderately liberal” |
| slightly.conservative | Respondents identify as “slightly conservative” |
| slightly.liberal | Respondents identify as “slightly liberal” |
| <i>Control</i> slightly.political | Identifies as “neither liberal nor conservative” |
| Career Length | |
| experienced.teachers | Teaching for more than 20 years |
| more.experienced.teachers | Teaching 16-20 years |
| less.experience.teachers | Teaching 3-10 years |
| new.teachers | Teaching only 1-2 years (could be first year) |
| <i>Control</i> avg.experience.teachers | Teaching 11-15 years |
| School Characteristics | |
| Teaching Environment | |
| gifted | Currently teaches in gifted education |
| gifted.experience.teachers | Has experience working in gifted education |
| advanced.course.teachers | Has experience teaching academically accelerated courses |
| <i>Control</i> gifted.enviro.Ihavenottaughtinanyoftheseenviron ments. | Has no experience teaching academically advanced courses |
| public.teacher | Public school teacher |
| alternative.schl.teacher | Teaches at a school for special needs children |
| religious.aff | Teaches at a religiously affiliated private school |
| <i>Control</i> private.teacher | Private school teacher |

| | |
|-------------------|-----------------------|
| primary.teacher | Teaches grades PreK-8 |
| <i>Control</i> | |
| secondary.teacher | Teaches grades 9-12 |
| illinois.teacher | Teaches in Illinois |
| chicago.teacher | Teaches in Chicago |

School Characteristics

School Racial Demographics

| | |
|----------------------|---|
| minorities.extreme | School is over 90% ethnic minority |
| minority.majority | School is 60-90% ethnic minority |
| less.forty.minority | School is less than 40% ethnic minority |
| less.twenty.minority | School is less than 20% ethnic minority |
| majority.extreme | School is less than 10% ethnic minority |
| <i>Control</i> | |
| minority.middle | School is 40-59% ethnic minority |

School SES Demographics

| | |
|-----------------------|------------------------------------|
| minority.middle | School is 40-59% ethnic minority |
| lowincome.extreme | School is over 90% low-income |
| lowincome.majority | School is 60-90% low-income |
| less.forty.lowincome | School is less than 40% low-income |
| less.twenty.lowincome | School is less than 20% low-income |
| high.income.extreme | School is less than 10% low-income |
| <i>Control</i> | |
| lowincome.middle | School is 40-59% low-income |

Other (no control)

| | |
|-----------|--|
| schl.size | Based on a scale where >5000 students = 7 and <50 students = 1 |
| rural | Teaches in a rural environment |
| urban | Teaches in an urban environment |
| suburban | Teaches in a suburban environment |

Appendix C: Qualitative Interviews

Individual Interview Protocols¹⁴⁹



Thank you for taking time out of your busy schedule to answer some questions. As I mentioned earlier, I'm not entirely sure at this point whether I will use your answers, or in what way I will write my research findings up. These questions are related to the conversation we had on the phone a few weeks ago, just on the record now for my notes.

1. First, how did you get involved in looking at genetics research on education outcomes like cognitive ability or educational attainment?
2. Could you share a bit about your experiences on sabbatical, how your ideas about
3. Behavior geneticists often find themselves in the middle of heated debates when it comes to their work. More specifically, there *seems* to be a political split between those on the left who think this research should not be conducted and is meaningless and those on the right who believe the social sciences are blind to reality.
 - a. What have your experiences been conducting research within such a 'hot' field? How do you see the history of your field and its ties to eugenics informing how current research in behavior genetics is interpreted?
 - b. If you don't mind, some critics of behavior genetics research on cognitive ability or educational attainment believe this research is fundamentally incompatible with ideas of equity or justice, how do you think of your own work in relation to equity and justice?
 - c. How do you think of your work in terms of the current political situation in the US?
 - d. How would you define inequality? (I.e. we talked about whether unequal levels of cognitive ability were a form of inequality or whether socioeconomic status is the best indicator of inequality. We also discussed inequality of opportunity vs. inequality of outcomes)
4. What kind of impact do you see genetic data having on the social sciences? (E.g. Gene X Environment interactions).

¹⁴⁹ These protocols are for interviews with behavior genetics researchers. Note that these are just guidelines and that questions may have been worded differently or not asked at all depending upon timing. Additionally, there are likely other questions that were asked in response to comments already made. The sample interview transcription provided shortly provides an example of how questions have been changed but the fundamental protocol outline remains.

- a. What benefits do you see genetic data having on the US education system? (E.g. teachers, education policy, students, underserved students, etc.).
5. The book “G is for Genes” advocates for ‘genetically sensitive learning,’ and suggests implementing individualized education plans based on an individual’s genetic strengths and interests. What would your view on an education system such as this one be (if we were to already to have the scientific research findings to be able to determine enough of an individual’s genetic strengths in education to roll out such a system)?
 - a. Do you think its impact in the US might be different from elsewhere in the world?
6. I’m thinking about how historically research on intelligence has been used to assert group differences. The field of behavior genetics largely does not engage with this topic today.
 - a. Why do you think behavior genetics has moved away from studying group difference when it comes to cognitive ability (though, of course, there are those who still do)?
 - b. Do you think behavior genetics researchers having a social responsibility for how their work is interpreted or used? Or if it’s even possible to combat misuse?

Closing:

1. These are my primary questions, given the information you’ve received about me and my interests are there any persons of interest you can think of that I should contact? Likewise, any pieces of literature that I should make sure to look at?
2. Do you have any final thoughts or reflections to add?

Thank you so much!

Sample Interview Transcription

DM: Hello?

CLIVE: Hello! Daphne!

DM: Hi

CLIVE: Hi!

DM: Thank you

CLIVE: I'm glad we finally found a time to meet. [laughs]

DM: Yes, yes thank you so much for taking time out of your busy schedule to speak with me.

CLIVE: Yeah no worries, I uh I gather this is important that we talk about these things, it it's cool that you and others are sort of watching over what we're doing.

[Both laugh]

DM: Uh could we start a little bit by you talking about how you entered the field of genoeconomics and how you came to form SSGAC?

CLIVE: Sure sure, Um, so actually, um I was sort of driven by the just by curiosity. So back in the days I was working on basically understanding entrepreneurship and why people do that it doesn't seem to make a lot of sense economically but it's quite important for societies and there seemed to be a lot of dead ends with, you know, established theories and data that we had and then, you know, there was all this stuff coming out showing that doing things like entrepreneurship were partly heritable and then we figured out that we could actually look at the underlying genetic architecture by working together with medical folks so this is how I sort of got drawn into this field and then very quickly we realized, first of all everything is much more complicated than we ever thought and uh you know the effect sizes that we would be dealing with, they're just so tiny that even with the large that we had originally, we already had a sample of 10,000 or so when we started, there was just nothing, absolutely nothing right? And then it was clear, you know, that once you want to do this seriously you need to keep increasing the sample size. Um, and then we were basically just following the footsteps of the medical community who basically had the same insight for a lot of, you know, complex traits and medicines, a lot of cancers and psychiatric diseases, they're all complex traits and then people needed to form these large scale consortia to study these things. Um, well and then we decided that's the way to go and so we set up a first consortium basically um to study entrepreneurship and again nothing came out and the sample was 50 or 60 thousand and then I met with Dan and David who basically from a very different angle, so who had the same insight and also, they also realized well, you know, all these small studies don't lead anywhere so, you know, then we had this crazy idea and we said, ok so how about if we set up a consortium with the goal to have a sample of 100,000 individuals and we're going to study something that has been shown to be you know heritable that is quite relevant for a lot of different things and

that everybody has measured and so we said ok let's study educational attainment, I mean the original goal was to show, well if, actually it was just pure curiosity, we wanted to know if we have such a gigantic sample, would we find something or not. And that was a completely open question and if you would've asked me 5 years ago I probably would've put my money on us just coming up with a gigantic no result even in a sample of 100,000. And this is basically how we started, so, you know, we thought that it's worthwhile to do this rigorously with a very large sample and even if we don't find anything that—that is it still worth knowing. And then to our big surprise we actually found something- Oops [laughs] so, yeah. Ok. So, this is how this whole thing started.

DM: And one thing I've noticed, so the SSGAC is a fairly new uh organization or consortium but it talks about the potentially transformative impact—

CLIVE: yeah

DM: -- that genetic data could have on the social sciences.

CLIVE: Yeah

DM: Could you maybe explain a little bit about that? Some of the other interviews I've done with members of SSGAC talked about how it can make social science more robust

CLIVE: Yeah, yeah. And I think that's really what it boils down to. So, I, I'm not sure if it's going to be transformative in the end or not but the way I see it is that um, we can add just to the toolbox that social scientists have, and that they use for answering the questions that they're interesting in. So, it's really, so I would really think of it just as, you know, one additional thing that we can do to increase the precision of our estimates and to also just understand causal effects much better. So, you know, we can eventually we may be able to study gene-environment interactions, which are potentially very interesting. We may be able to exploit the fact that the genetic endowment of an individual is sort of the result of a natural experiment, so conditional on your parents—of course you're the result of a genetic lottery draw and you know that sort of exogenous variation can in principle be used to identify causal effects and, you know, in that sense I think it's going to be very very useful, if you're going to call it transformative or not, well I don't want to judge, but I think it's definitely going to improve what we can do in the social sciences, it's going to allow us to just come up with more precise answers also about the effects of the environment actually.

DM: And going back specifically to the study on educational attainment, I've heard some talk of the Orchid-Dandelion theory as you know a kind of thing that could be supported with the educational attainment study, or the idea of looking at plasticity. And I know that you said it originally started as just, more curiosity, but now that you've found something, where where do you see that taking us?

CLIVE: Yeah. So honestly I mean so if I, I don't really know anything about this Orchid Dandelion theory, and we haven't really looked at plasticity yet. So, this is actually something that I was discussing with Dalton recently, he's quite interested in that and we may want to look into that in the future but at this point I cannot really say anything specific about it, but you know what really motivated us originally when we started

was, well we basically just wanted to know if this works. Right? So, I mean, people have done it for medical trades for BMI, for height for a bunch of other things and there it seemed to work, but by the time we started it just was not clear if it would work on a complex social behavior or socioeconomic outcome. And then, you know, we were interested in the effect sizes, so people had just drastically different expectations about the effect sizes, there were people running around claiming that there were 1 or 2 genes that have a huge effect and then on the other end of the spectrum we had people that said, well that's just complete bullocks, you know, these genes they must have a 0 effect, right? So, I mean, [laughs] we needed to know just what are we really dealing with and then we wanted to know actually also something about, you know, conditions, you know, we wanted to know how do these findings relate to biological processes and also to other traits so this was really, this is more the spirit in which we were thinking. And I don't think any one of us actually thought of, you know, using these results immediately for educational purposes or for policy or anything like that. I think we were quite adamant about that in our original FAQ where we said, well, you know, what are the policy implications of this? Well there are none, at least not directly.

DM: Yeah actually so the Hastings Center Report that came out earlier in the fall mentioned the SSGAC study as, it says "maybe one of the best example of prophylaxis against hyperbole" so the idea that you were very very clear about what your research was able to show and what it couldn't, what it could not be used for. And I wonder whether conversations were happening as you were conducting this research about the importance, because educational attainment or cognitive ability, which are fairly linked, is, has a very contested history underpinning it, whether it was important those conversations were happening?

CLIVE: Absolutely. I mean we, we knew that this is extremely sensitive material from the very early days when we started discussing this type of work, and we had dozens if not hundreds of really really serious conversations about this. Basically, even the original workshop that we held, I think in Washington, in 2011. Where we sort of invited a bunch of people to discuss if there is, you know, if there is a need for something like the Social Science Genetic Association Consortium. Even there we had long long discussions about this and people were really worried about, you know, social scientists starting to mingle with genetics and doing all sorts of crazy things. And I think a lot of the worries, they were totally warranted and if anything, we came into this saying, or thinking, that you know, if we do this type of work right and we do it rigorously, maybe we can put an end to that debate by just showing a big null results. [laughs] we actually ended up with there was no null result, so you know, and then we thought, ok so now that we have something, so how do we deal with that and again it, we took a lot of time to think through the potential impact of the study and we were extremely concerned about how people may perceive this and also the potential of misinterpretation and you have no idea, but Dan and David and I we had so many nightmares about this, we had so many worst case scenarios playing through our minds while we were doing this study and preparing its publication, you know, we basically decided that we wanted to take a proactive approach to sort of make sure that, you know, things are not getting out of hand, that our words aren't being twisted around and that people really understand what they can and cannot conclude from our results and you know we also brought Michelle Meyer, a bioethicist, on our advisory board and we really tried to channel the communication in a professional way and I think an important part of this was this FAQ document that we wrote, so these frequently asked questions

which really just try to explain in Layman's language what, you know, why we did this study and what we found, what we did not find and that's sort of, that really helped people a lot to put our findings into context and of course we try to be super super careful how we worded the results and what we, you know, how exactly we're framing things and we were trying also to manage media contacts in a professional way, but basically just having one or two spokespersons for the consortium that would take care of, you know, interview requests and things like that and that these people would then be very aware of, you know, potential things that may happen if this gets misinterpreted and that's always, I think that was probably most difficult of the entire process, dealing with the media because the media at that case was really not our friend, right? So, the journalists, what they want is, is for headlines that you know, that are breathtaking or sensational or, you know, 'gene for x has been found' and we basically, we spent a lot of time talking to journalists trying to convince them that they shouldn't write such a paper or such a story and usually we considered it a success when, you know, after talking to us for an hour they decided not to write about it. [laughs] so, yeah I don't know if you can call it best practice but this was basically what we did.

DM: And I noticed that SSGAC was also very clear in that educational attainment study to use the term 'cognitive performance' rather than 'general intelligence' and part of that, if my understanding is correct, is that you didn't want the rigidity that is associated with 'g' as a fixed concept. Could you discuss your views on g?

CLIVE: Yeah. So actually, I don't really have strong views on 'g', I mean for me, 'g' is just a variable that comes out of the principle component analysis and then that's basically it. The problem is, or you know, what concerned us what that, is that a lot of people associate intelligence with all sorts of, you know, things that are stigmatizing to specific groups and so I think that it was rather that the term 'intelligence' that made us tread very very carefully. And also, we had a lot of discussions internally about this and the consortium and, you know, people basically said well, you know, what you do is all perfectly fine but, you know, just do not call it intelligence. Just come up with something that's not so loaded. And then we said, well ok, so then let's just stick to cognitive performance or general cognitive ability or something like that. And, yeah, it's, I don't know, so personally I always feel a little bit that this twisting of words is actually, this is getting a little bit too far for me. So, it was literally that we sometimes had conversations where, you know, we were presenting one analysis we called it intelligence and people would go berserk and then we just, literally, we replaced intelligence with general cognitive ability and all of a sudden everything was OK. I think that's also just insane, right? I don't know, I mean it's, but it just, I think it just goes to show how sensitive the entire topic is and really how careful you have to be when you're studying anything related to cognition.

DM: And educational attainment is predicted by intelligence or cognitive performance—

CLIVE: Sure

DM: --Whatever term you want to use, but also by a range of other factors, right? Including motivation.

CLIVE: Yeah

DM: I was really interested when I had a talk a few weeks ago with someone else who's engaged in the field and they talked about how there's actually heritability of educational attainment than studies on general intelligence and—

CLIVE: Honestly, I've never seen something like that. So so which study is this person referring to? As far as I know, it's actually the other way around and quite robustly so.

DM: I can get back to you with the name of the study, but they just said that they see that educational attainment has higher estimates of heritability than general intelligence.

CLIVE: So I would be very surprised about that, so there is a, there was a really large scale data analysis of basically all the twin studies that had ever been conducted, this got published last year in Nature Genetics, and so there they had meta-analysis results of all these heritability studies on basically all of the traits that have ever been studied including education and cognitive, you know, general cognitive ability or cognitive performance, and as far as I know, there is no doubt that, you know, g is more heritable than educational attainment. So, it may be that if you look at a particular study, a particular small sample, that you know, you may get a point estimate that, you know, in that particular study the point estimate may be a little bit higher for education than for 'g' but then very likely the confidence intervals are so large that you cannot rule out the alternative hypothesis as well so I would be really surprised if that were actually to be true.

DM: Well I will look into that and get back to you.

CLIVE: [laughs]

DM: But, going back, I had been really interested because I, when I posed that question had seen educational attainment as something that potentially could be much more influenced by environmental factors and so it was interesting when I was kind of given another perspective on that, but, I'm thinking of the role especially of teacher expectancy or stereotype threat, things that on an individual level we know influence student achievement. And I know behavior genetics looks at population level, but I wonder whether these variables are taken into consideration when, you know, results are published.

CLIVE: Sure, you know, absolutely. I mean, so absolutely these things are taken into account, I mean, in the heritability studies basically what you're describing just ends up either in the unique or in the shared-environment component and we know that for educational attainment that these components are much more important than the genetic component, but the science that, so our study, if anything, it has actually shown that any sort of deterministic piece about the, you know, genetic role of educational attainment are completely inadequate. So just to give you one example and that's, that's pretty cool, so a colleague of mine he recently did a study, it's still under review, but I can tell you a little bit, the main concept results, so he looked at the, whether there's evidence for genetic selection for specific factors in the US population the last 100 years or so. And he actually found that for, you know, for most traits where we do have a sense for which genetic markers are actually involved, they're not really related to reproductive success. But educational attainment was THE number 1 exception to that,

so there was actually selection for, educational SNPs, but exactly the other way around as you would expect, so it's actually, you know, there was selection against education increasing genetic variance in the US population. So it's basically, this is this was for various reasons but this strongly runs against, you know, what you actually see in practice which is that, you know, educational attainment has drastically, drastically improved in the US population over the last 30-40 years, so the number of college graduates has skyrocketed during that time period and that just goes to show that when you look at educational attainment the environment is just, it's such a, it's so much more important factor than genes or genetic selection, but I'm actually very very skeptical about a lot of claims that people have made, so you know, just, the bottom line of that story was that, you know, there is evidence that there was negative genetic selection for education increasing genes and yet exactly the opposite occurring in the population, you know, these environmental effects they were just dwarfing all this genetic selection in a sense. I mean, it's pretty striking actually, so I mean, related to your question, I mean I think there is no doubt that the environment plays an absolutely, absolutely crucial role for educational attainment and of course this relates to things that happen in schools, so teacher experiences, motivation, but I think also about, you know, what sort of job market opportunities people have, right? So what sort of expectations they have about potential future income and also their potential to actually complete education successfully, and all these things they turn out to be incredibly important.

DM: This is really interesting because a couple of days ago I read an article in the New York Times about childrearing within socioeconomic status and how that, the childrearing techniques basically, the gap is widening among socioeconomic strata and children are being taught skills that are confined to the socioeconomic environment in which they're raised and not necessarily learning skills that are going to help them make the jump. And as we know education has a documented link to socioeconomic status, and you, coming from a geneoeconomics background, look at differences that create observed or that influence economic behavior, so when you're looking at the educational attainment study, I guess what if any links are you observing with regard to economic behavior.

CLIVE: Well, I mean in a way, economic I mean educational attainment, economists would accept, would actually consider education attainment as an economic behavior, right? So basically, it's just a, it's, from an economics point of view, it's just an investment decision into your future earning potential [laughs]. Right? So that's basically what it is, it's a, it's delaying gratification from higher salaries for the benefit of higher salaries later on, right? So, so in that sense yes it is an economic behavior and obviously education is directly linked to income, and income potential, income earning potential. So, in that sense yes it's clearly linked although this, establishing this link between you know, genetic variance associated to educational attainment to specific other economic outcomes such as, you know, occupational choice or income or these sorts of things, we haven't done yet, so you know, I could only speculate about that, it's quite likely there would be some, some relation but we just haven't tested it yet.

DM: In the Hastings Report there was a piece by Eric Turkheimer, and he raises suspicions that there's an assumption that genetic differences will create observed differences in ways that are additive. So basically, saying that adding up small effects

of a myriad of individual genetic variants is, he doubts that it'll be able to predict much about observed differences. What is your take on that?

CLIVE: Well, I mean so for one part. I mean I always have trouble, I mean I'm I know Eric and I know his arguments and I've heard them several times and I always have trouble wrapping my head around it, so I think there is a level of confusion that I, yeah it just bothers me a little bit. So, I mean statistically, even when you just look at just the data evidence there's just no doubt that, you know, that the large bulk of heritability is due to additive genetic effects, right? So, there are techniques that you can use for estimating only the additive genetic effects of currently observed common genetic markers in terms of, you know, explaining variation of a particular trait and there's just no doubt that this, you know, for most traits it's really the additive effects of the common genetic variants that explains the bulk of the heritability. Now I think where Eric starts to get confused is when he says well it's just it's not predictive. Well it's not predictive for a lot of different reasons, one of them is that the effect sizes are just so small that the genome wide association studies that have been carried out on behavioral traits- we're simply not well-powered yet to find these things right? So our education report was basically the first one that worked and in that paper we had a polygenic score which is basically just what Eric was pointing about, it's just, polygenics or it just takes all these small effects and adds them up to one specific score for an individual and then checks whether this specific score is correlated with the outcome the way you would expect and so then this polygenics core explains or captures about 1-2% of the variance in educational attainment in our first paper. Now, two years later we have basically we have tripled our GWAS sample size our most current estimates, they allow us to construct scores that capture about 4-5% of the variance in educational attainment, now what I don't know if, how Eric would feel about this. So, I mean, so I think that this is actually what you would expect given that education or just cognition or a lot of other things that are genetically extremely complex genetic traits, so if you just do the power calculations and all these things, this is exactly what you would expect, so in that sense I don't really understand his critique, or maybe his critique is well that, even a score of 4 or 5 percent is not meaningful for predictive purposes, and that is something I would agree with, so I mean, if you're actually interested in early diagnosis or in sort of trying to sort people into bins or whatever, then yes of course if you have a variable that only captures 4% of the variance, well you better not make strong conclusions based on that, right? So, there must be a bunch of other things that are much much more important in terms of classifying or diagnosing or you know, whatever- trying to figure out what potential people have. I'm quite skeptical that genes will help us much with that and actually in, in psychiatric genetic there are a lot of people who say, well, you know, all these genetic insights, they're all very interesting, but in terms of clinical diagnosis or actually helping patients, they haven't done much. And I agree with that, right? I mean if you have a polygenic score that explains 5% of the risk of schizophrenia, well, are you going to diagnose people based on that score? Well of course not, right? So, there are a lot of other things that are much more predictive that you would look at if you actually wanted to do that. I think that's very very smart.

DM: And this, also reminds me of the book "G is for Genes" by Kathryn Asbury and Robert Plomin, which brings up the idea, I mean they acknowledge very clearly that obviously the technology, the research has not yet gotten to the point where they can do what they're proposing but they talk about the idea of personalized education, so

you know, to be able to look at a child's genetic makeup and find and apply pedagogical practices that would be more, would be most effective towards getting a child to reach their full potential. What is your take on that?

CLIVE: Yeah I mean again I'm a little skeptical about this, so I think, I mean it, so my point of view is that there are a lot of other things that are potentially much more predictive of a child's potential success or problems in school than their genes. So, I mean if you're interested in that, then, it just makes a lot more sense to observe what the child is currently doing or to look at the socioeconomic background and, you know, the situation at home, and the parents. So, things that are already being done, right? And I think they're much much more predictive than our polygenics scores. So, you may, you know, eventually you may, you know, in rich societies you may have possibilities to offer individualized education, so this will sort of, it will certainly be like a luxury thing, but so for most parts of the world, we would be glad if people would have any education whatsoever, right? But ok, so this is like a luxury debate. So, if you engage in that luxury debate, well maybe polygenic scores may help us, but I think they will certainly, I mean in the distant distant future they will only play a small part. There will always be the other factors that will be much much more predictive.

DM: My next set of questions are a little bit more theoretical and they deal specifically with my interests coming into this area of research. So, I look at the context of the united states where there are very clearly documented test score differences between like low-income ethnic minorities and white majority and oftentimes there will be studies that will, for example, take into account socioeconomic status but then still argue that there are still differences between say black children and white children.

CLIVE: Yeah, Yeah

DM: Would you care to comment on that?

CLIVE: Well I mean, so I'm not an expert on these things, but, I mean if you're sort of suggesting whether I think that genes may play a role in that, I really doubt it, I mean maybe they do, but I think that the large bulk of these differences are probably due to environmental factors, right? The things that you talked about earlier, right? I mean that there are a lot of of household specific differences in terms of how children are raised and what sort of expectations they grow up with and how their parents interact with them. There's a lot of, you know, maybe you can even call it like cultural factors that actually are different across different groups and in America where different children are just raised with different expectations and parents also implant different ideas and different values in them and all these sorts of things, I think they're probably in the end much more important. Also, you know, how well are they going to do in terms of actually getting into a good college, is there discrimination at that level. Is the labor market discriminating based on that? On skin color and things like that, and all of these things, all these expectations that people form, they will influence, you know, how serious they will take education and, you know, how motivated they will be and what other alternatives they will consider so I would, you know, if it comes to explaining these sorts of differences between these groups I would put most of my money definitely on environmental factors not on gene factors.

DM: And another question that I had which I posed to another researcher was, so I noticed the SSGAC study only takes applicants or samples from those who have European ancestry and part of it, as I understand, is that the greater variability within, say African populations, make it more difficult because it's a less homogenous pool, my question was whether, you know, the markers you found, even if they have small effect size, whether those could possibly be ancestry specific and whether that can, you know, be applied to other groups, so to speak.

CLIVE: Well, so ok. So that's a complex question and a very good one. It has several parts, so the first one is why we're doing that and basically why we're doing that is because we want to avoid finding sort of like chopstick genes, I'm not sure if you're familiar with this concept of the chopstick gene, so that's sort of like, that's a nice example to illustrate what happens if you do not control for basically for cultural or environmental differences among different groups, so let's say, so let's say you want to know what is the genetic architecture of using chopsticks instead of cutlery. So, you take a US population sample, you run a GWAS and you find a bunch of things that are significant well chances are what you've actually found is just genetic differences between Asians and non-Asians because in your set up you haven't controlled for that right? So that's what we call a chopstick gene, right? It's a gene that doesn't have an actual causal influence on the outcome of interest, it's a gene that only pops up because it's spuriously associated because you haven't controlled for environmental or cultural factors and that's exactly the reason why, you know that's the main reason why we and basically most other genetic association studies have restricted genetic discovery to European samples because, you know, that really helps you to get rid of potential confounds that come from basically unobserved differences in more different ethnic groups that are actually environmental and not genetic ok? So that's number 1 reason, so then the question do our, are our results actually informative about ethnic background and do they actually replicate in different populations? So, if they replicate honestly I don't know. So, we haven't looked into that, chances are that they will replicate so I would be very surprised if they don't, maybe they replicate better in some populations than others, but are they informative about ancestry? And here, so actually that's an interesting a very interesting question that a lot of, actually we had a long conversation with other geneticists about this that actually said, well, you know what we found are basically just confounds because, you know, there may be ancestry specific effects that we haven't specifically controlled for, and basically we could show that this is not the case, so this does not explain our association results, and, you know, any claims that people have made so far that markers are ancestry informative, they only hold if they , if they like pick like one or two markers, so if you just take a very small number of our markers that we found to be associated with educational attainment, you can probably make a claim, that yes this particular marker is more expressed in this population than that population but you know given that educational attainment or cognition is such a genetically complex trait, actually what you would have to do to make such a claim is you could have to look at all these variants that are actually associated with the trait and check if they're actually ancestry informative. And we haven't done it yet but I would be very surprised if we would find strong effects. I would be very surprised about that.

DM: So, Dr. Steve Hsu who's associated with BGI and the Cognitive Genomics Lab, he's written that, you know, in the future where human genetic engineering could become a possibility, there is the possibility that those sorts of technologies would only

be available to a global elite as some countries will allow this kind of technology to exist others will forbid it.

CLIVE: yeah. Yeah.

DM: So, I wonder 1. Do you think one day it would actually be possible to genetically engineer an individual with, you know, higher cognitive performance, say.

CLIVE: So, like I said, I think so when you look at educational attainment, I think environmental factors, you know, it's clear that they are much more important so I would be skeptical about that. Can you, in principle, genetically engineer people for specific traits or can you do selective breeding exercises? Well yes, of course you can. The question is do we want to, right? And this is something that I think is actually, it's a very difficult question and my guess is that, you know, the answer that will people will come up to that question, will actually vary quite a bit across cultures. So, I can very well imagine, for example, if you would poll that question in say Germany, people would be strongly extremely strongly against it. Right? So, any sort of genetic selection or genetic engineering, the Germans would go completely berserk, so they would see that as a crime on humanity, whereas if you go to China and you ask the same question they would say well yes of course. You know, so you know, I think the bottom line is that, ideally we would want to have an informed social dialogue about, you know, who should have access to genetic data, what should be done with genetic insights and, you know, for what sort of purposes do societies say this is ok and this is not ok, and I think societies will probably differ quite a bit on where they draw the line and I think Steven, as far as I understand Steven, he was basically just, he would agree with me on that and he was just thinking because very probably societies will come up with very different answers to that question, there will be people, say very rich Germans or very rich Swiss persons who for whatever reason, believe that their children should have specific traits that aren't allowed to do selection on genetic factors based on these traits in their home country, they may go to Singapore or to China and do it there, right? And, well is that going to happen? I'm afraid so. You know, I'm not sure what the consequences of that will be in the long term, and I'm not sure if this is desirable or if it's actually going to be working or not, I think it's actually going to work much better for, you know, monogenetic disorders where in principle you could get rid of a particular medical problem from one generation to the next if you really, if you would face this problem head on, if you would be willing to do a basically selection of you know, fertilize x and these sorts of effects, but for genetically complex traits I think first of all, if it would actually work in practice is a totally open question it's totally open if for example selection based on things like intelligence or something like that would actually be desirable. It could be, you know, that if you select for that trait even if it would work, it could be that there are going to be so many bad side effects that people would stop doing it after a while, and, you know, finally I think it's, you know, basically it's an ethical question basically whether you want that or where you draw the line, that ideally democratic societies would have an open and informed debate about it and basically make a, you know, decision that as the society about where they want to draw the line.

DM: Yeah, it's also interesting to me because I'm thinking there's a certain popular culture belief that perhaps those with higher intelligences might be more predisposed to certain mental illnesses or have lower—

CLIVE: Well of course, right? It depends on which illness you're looking at, but yes—

DM: -- or lower, say lower socio-emotional skills and so the idea of if you're selecting for something, since cognitive performance is affected by so many different markers, whether you're impacting other areas and so I guess I wonder whether you think research should be conducted that kind of examines that before—

CLIVE: Absolutely, I mean that's exactly what we're doing at the moment. The way I sort of think about educational attainment is primarily as a proxy phenotype for just mental health generally, and with a proxy phenotype I mean that, it's basically a variable or a trait that can be measured very cheaply and can be studied in extremely large samples and then you can sort of use these results to come up with, you know empirically, informed hypodissertation about other traits that you cannot study on such large studies yet but that are genetically related. So, you know, in our more recent study that we did on educational attainment we actually see a lot of genetic overlap between educational attainment and mental health, right, so there's strong negative genetic correlation with Alzheimer's and dementia there is actually also negative correlation with neuroticism and there is, there are very very interesting genetic overlaps going on between education, autism spectrum disorder, schizophrenia, bipolar, so all of these things that are actually related to each other and we can use the educational results to actually gain more insights about, you know, underlying, the etiology of these diseases, right? So that's actually, that's I think one of the one of the best applications of our research is actually not so much directly related to education but more, you know, as a tool to help psychiatric research to make progress and yeah so I mean so one of the interesting things that we see is that for, it looks like there's specific types of autism spectrum disorder and also schizophrenia where people that are very intelligent and also most likely to go to college for example, they're also, they have a higher risk, they have a genetically higher risk to develop these types of disorders than people that don't have the same genetic variance that are actually performing lower on cognitive skill tests, so it just shows you how incredibly this entire thing is, right? So, we also had a study recently that showed that people that genetically have a higher risk of schizophrenia and bipolar, they actually are more creative, right? So again, you know, there's this, very often these are two at sorts. So, it could very well be, you know, that if you would literally try to increase the prevalence of these genetic markers in the population through whatever means of selection or you know selective mating or whatever may happen, that actually over a long time or through one way or another it could be that, you know, that you get a lot of side effects that you didn't think about and that you really don't want. The brain is just an incredibly complex organ and my sense is that we would be better off not screwing around with.

DM: Thank you so much for your time, those were my main questions.

CLIVE: Yeah, ok.

DM: Is there anything you'd like to add?

[REDACTED TO PROTECT ANONYMITY OF PARTICIPANT]

DM: OK, thank you so much.

CLIVE: Alright

DM: Have a wonderful day, I will send you a transcript of our conversation to look over as soon as I've completed it.

CLIVE: Ok, alright, thanks, bye bye.

DM: Thank you.

Appendix D: Informed Consent Documentation

Focus Group Non-Disclosure Agreement



Declaration of Non-Disclosure

I acknowledge that as a participant in the focus group research conducted by principal investigator Daphne Martschenko, I will have access to certain sensitive information. This information includes the identities, words, reflections, and statements of other participants in my group and may be oral, written, or electronic.

I understand that all members in my focus group must sign a Declaration of Non-Disclosure when engaging in this research. Under this declaration, members agree to keep all matters to which they are privy during focus group discussions confidential.

I agree that during my association with the focus group research and afterwards, I shall not disclose to any other person, organization, or institution the identities of other participants or any confidential information other than my own personal experiences, thoughts, and reflections.

By signing and returning a copy of this document to Daphne Martschenko, I confirm my understanding and acceptance of the above and will comply with the above. I also agree that my obligation to adhere to the above will be carried out to protect the identities, including names, likeness, and identifiable phrases of other participants. I also have been made aware that other participants have signed Declarations of Non-Disclosure and in doing so have agreed to protect my own identity and participation in this project.

Print Name of Participant _____

Signature of Participant _____

Date _____
Month/day/year

Informed Consent Form—Teachers



Informed Consent

This informed consent document is for teachers participating in a study titled “Investigating the Impacts of Behavioural Genetics Research on Cognitive Ability on Teacher Views of Genetics, Intelligence, Race, and Socioeconomic Status.” This study involves qualitative focus group research concerned with gathering the working experiences of teachers and their philosophies on intelligence. The primary aim of this research is to examine how teacher understandings of cognitive ability and academic achievement may impact upon the ways in which they interact with students. These participants have been invited to participate in semi-structured qualitative interviews and three focus group research sessions for the research dissertation of doctoral candidate Daphne Martschenko.

The general aim of this research is to unpack structures that contribute to how teachers conceptualize and define intelligence and then make sense of student representation and achievement in the classroom. Too, this project looks to establish whether teachers in gifted-education settings carry and embody knowledge histories concerned with questions of intelligence, genetics, and educational disparities that differ from those of teachers who engage in more cognitively diverse student populations (i.e. standard public charter schools).

Participation is completely voluntary and participants may withdraw at any point. This work will be included in a doctoral dissertation and may also be used in journal articles and other published materials. Participants will receive copies of any final, distributed, and published works.

Principle Investigator: Daphne Martschenko

University of Cambridge: Faculty of Education
Education, Equality, and Development

Supervisors: I am conducting my research under the supervision of the following, who may be contacted regarding my work:

Anna Vignoles: av404@cam.ac.uk

Jo-Anne Dillabough: jd217@cam.ac.uk

University of Cambridge Faculty of Education: +44 1223 76700

This Informed Consent Form has two parts:

- **Information Sheet (to share information about the study with you)**
- **Certificate of Consent (for signatures if you choose to participate)**

Part I: Information Sheet

Introduction

I am Daphne Martschenko, a PhD candidate at the University of Cambridge conducting research on the working experiences of teachers in gifted and ‘regular’ education settings. I earned distinction on an MPhil dissertation, which looked at gifted education

identification procedures and the phenomenon of ethnic minority and low-income underrepresentation in gifted education in the US state of Virginia. My focus within this doctoral dissertation looks at the ways in which behavioral genetics research on intelligence may influence teacher definitions and understandings of intelligence and student achievement. I intend to work with teachers operating within gifted education settings and teachers who are employed in standard public charter schools.

Type of Research Intervention

This research is twofold. It first involves your participation in an optional and brief semi-structured interview that begins with a discussion about your experiences as a teacher and the environments you have worked in and then expands to the topic of intelligence, or cognitive ability. Participants will engage in three hour-long focus group sessions on the topics of intelligence and education disparities. The final discussion will involve hypothetical situations about an education system that uses the genetic information of students to tailor curriculum and will ask teachers to comment and share reflections. **The interviews and focus group discussions, with your permission, will be audio recorded;** audio-recorded files will be saved in an MP3 format on the password-protected computer of the principal investigator and disposed of 5 years after the completion of this study. Please notify the researcher if you do not wish to be recorded. In total, this study asks for a maximum of 3.5 hours of participation over a three-month period. Participants will also be provided with some pre-reading materials a week before the focus group discussions; these materials should take no more than 15 minutes to read.

Participant Selection

You are being invited to take part in this research because I feel that your experiences in the classroom and in the US education system are valuable sources from which I can move my research forward.

Voluntary Participation

Your participation in this research is entirely voluntary. It is your choice whether to participate or not, you may withdraw at any point during the study.

Procedures

Initially: participate in an optional and recorded in-person interview with Daphne Martschenko. The interview will last between 30 and 45 minutes and give time for you to ask any questions or make clarifying remarks. Further, I may ask for the opportunity to conduct some observational fieldwork in the development of what I intend to be a semi-ethnographic work.

Then: participate in three hour-long focus group discussions with 4-6 other teachers spread out over an extended period of time that accommodates teacher's busy schedules and demands. This part will require some reading in your own time, but will take no more than 15 minutes.

Risks

I do not foresee any major risks that should affect you or your work, but my topic is sensitive in nature given its overlap with a growing area of research in behavioral genetics and its discussion of education disparities. Too, as the focus group component involves interaction with other teachers, some of whom you will be familiar with, anonymity *within* the group cannot be ensured, however, **each participant will be required to sign an anonymity**

contract to guarantee that the identities of and discussions raised by members within the focus groups will not be shared with outside parties.

Benefits

This study offers no compensatory benefits. However, it serves as a way for teachers to discuss freely topics that may shape the ways in which they engage with their students. It also offers an environment for educators to learn about the different experiences of other working professionals and to think collectively about some of the factors and structures that affect student performance; it can therefore be viewed as a professional development exercise.

Sharing the Results

This work will be included in my doctoral dissertation and may also be used in journal articles and other published materials. Participants will receive copies of any final, distributed, and published works.

Right to Refuse or Withdraw

You do not have to take part in this research if you do not wish to do so. You may stop participating at any time that you wish. I will offer a transcription of all in-person individual interviews once they have been completed and you can review your remarks and clarify, modify or remove portions of the conversation. Likewise, participants should feel comfortable in the focus group discussions to state when they wish for a comment to go 'off the record,' or wish to remove themselves from a portion of the study.

Who to Contact

Should any questions arise at any point, I can be reached immediately via email: dm660@cam.ac.uk or phone: +1 571-263-6650 to facilitate next steps. My faculty supervisors can also be reached:

Anna Vignoles: av404@cam.ac.uk

Jo-Anne Dillabough: jd217@cam.ac.uk

University of Cambridge Faculty of Education: +44 1223 76700

Part II: Certificate of Consent

I have read the foregoing information, or it has been read to me. I have had the opportunity to ask questions about it and any questions I have been asked have been answered to my satisfaction. I consent voluntarily to be a participant in this work.

Print Name of Participant _____

Signature of Participant _____

Date _____
Month/day/year

Consent for Audio-Recording

I understand that interviews and focus group sessions will be audio-recorded. I understand that these discussions will be audio-recorded to help the principal investigator identify key points in the discussion, capture what was said accurately, and for analysis purposes. I have been made aware that the principal investigator will dispose of any audio-recordings within 5 years of the completion of this study. I have had the opportunity to ask questions about this process and any questions I have been asked have been answered to my satisfaction. I consent voluntarily to being audio-recorded.

Print Name of Participant _____

Signature of Participant _____

Date _____
Month/day/year

Statement by the researcher

I have provided an honest and clear depiction of my research and to the best of my ability made sure that the participant understands my aims and scope.

I confirm that the participant was given an opportunity to ask questions about the study, and all the questions asked by the participant have been answered correctly and to the best of my ability. I confirm that the individual has not been coerced into giving consent, and the consent has been given freely and voluntarily.

Print Name of Researcher _____

Signature of Researcher _____

Date _____
Month/day/year

Informed Consent Form— Educational Researchers



Informed Consent

This informed consent form is for researchers concerned with the study of minority underrepresentation in gifted education and/or researchers who focus on racial disparities in educational attainment and achievement outcomes in the United States education system. These participants have been invited to participate in qualitative interviews for the research dissertation of doctoral candidate Daphne Martschenko.

The general aim of this research is to unpack structures that contribute to the phenomenon of racial disparities in the US education system, specifically within the realm of gifted education programming. This project intends to study how gifted education teachers' conceptualizations of intelligence may impact upon how they understand the race concept and the phenomenon of ethnic minority underrepresentation in gifted education programs. Too, this project looks to establish whether the knowledge stores of gifted education teachers' as it relates to intelligence, genetics, and race differs from that of teachers who engage in more ethnically and cognitively diverse student populations.

Participation is completely voluntary and participants may withdraw at any point. This work will be included in my doctoral dissertation and may also be used in journal articles and other published materials. Participants will receive copies of any final, distributed, and published works.

Principle Investigator: Daphne Martschenko

University of Cambridge: Faculty of Education
Education, Equality, and Development

Supervisors: I am conducting my research under the supervision of the following who may be contacted regarding my work:

Anna Vignoles: av404@cam.ac.uk

Jo-Anne Dillabough: jd217@cam.ac.uk

University of Cambridge Faculty of Education: +44 1223 76700

This Informed Consent Form has two parts:

- **Information Sheet (to share information about the study with you)**
- **Certificate of Consent (for signatures if you choose to participate)**

Part I: Information Sheet

Introduction

I am Daphne Martschenko, a PhD candidate at the University of Cambridge conducting research on the working experiences of high school teachers in gifted and 'regular' education settings. I earned distinction on an MPhil dissertation, which looked at gifted education identification procedures and the phenomenon of ethnic minority and low-

income underrepresentation in gifted education. In order to better understand the educational environments I hope to be working in, I hope to conduct interviews with administrators in the schools I am in to add richer descriptive detail of the research sites.

Type of Research Intervention

This research will involve your participation in qualitative interviews that could be used in the examination of ethnic minority underrepresentation in gifted education and/or the study of the phenomenon of the documented ethnic-minority White-majority test score gap in the United States. These interviews, with your permission, will be recorded.

Please notify the researcher if you do not wish to be recorded or would like to request anonymity.

Participant Selection

You are being invited to take part in this research because I feel that your research experience and personal experiences in the US education system are valuable sources from which I can move my research forward.

Voluntary Participation

Your participation in this research is entirely voluntary. It is your choice whether to participate or not

Procedures

Type of Research Intervention

This research will involve your participation in qualitative interviews that could be used in the examination of ethnic minority underrepresentation in gifted education. These interviews will be used primarily to add background context to the subject and may include questions that pertain to socioeconomic and racial disparities in the US education system and issues of underrepresentation of students from historically underserved populations in gifted education. These interviews, with your permission, will be recorded. **Please notify the researcher if you do not wish to be recorded or would like to request anonymity.** Audio-recorded files will be saved in an MP3 format on the password-protected computer of the principal investigator and disposed of 5 years after the completion of this study

Risks

I do not foresee any risks that should affect you or your work, but my topic is sensitive in nature and does examine ethical ramifications of work you may be directly concerned with.

Benefits

There will be no direct benefit to you, but your participation is likely to help illuminate the current context in which ethnic minorities are underrepresented in gifted education and less likely to achieve levels of educational attainment met by their White peers. Your participation could contribute to understanding how education environments understand the students within their schools and identify and/or work with children considered to be “gifted”, “academically advanced”, “academically struggling,” and/or “under-performing.”

Sharing the Results

This work will be included in my doctoral dissertation and may also be used in journal articles and other published materials. Participants will receive copies of any final, distributed, and published works.

Right to Refuse or Withdraw

You do not have to take part in this research if you do not wish to do so. You may stop participating in the interview or in observation at any time. I will offer a transcription of the interview once it has been completed and you can review your remarks and clarify, modify, and/or remove portions of the conversation.

Who to Contact

Should any questions arise at any point, I can be reached immediately via email: dm660@cam.ac.uk or phone: +1 571-263-6650 to facilitate next steps. My faculty supervisors can also be reached:

Anna Vignoles: av404@cam.ac.uk

Jo-Anne Dillabough: jd217@cam.ac.uk

University of Cambridge Faculty of Education: +44 1223 76700

Part II: Certificate of Consent

I have read the foregoing information, or it has been read to me. I have had the opportunity to ask questions about it and any questions I have been asked have been answered to my satisfaction. I consent voluntarily to be a participant in this work.

Print Name of Participant _____

Signature of Participant _____

Date _____
Month/day/year

Consent for Audio-Recording

I understand that interviews will be audio-recorded. I understand that these discussions will be audio-recorded to help the principal investigator identify key points in the discussion, capture what was said accurately, and for analysis purposes. I have been made aware that the principal investigator will dispose of any audio-recordings within 5 years of the completion of this study. I have had the opportunity to ask questions about this process and any questions I have been asked have been answered to my satisfaction. I consent voluntarily to being audio-recorded.

Print Name of Participant _____

Signature of Participant _____

Date _____
Month/day/year

Statement by the researcher

I have provided an honest and clear depiction of my research and to the best of my ability made sure that the participant understands my aims and scope.

I confirm that the participant was given an opportunity to ask questions about the study, and all the questions asked by the participant have been answered correctly and to the best of my ability. I confirm that the individual has not been coerced into giving consent, and the consent has been given freely and voluntarily.

Print Name of Researcher _____

Signature of Researcher _____

Date _____
Month/day/year

Informed Consent Form – Behavior Genetics Researchers



Informed Consent

This informed consent document is for behavioral geneticists and social science researchers who conduct research on cognitive ability and/or educational attainment and bioethicists who examine the ethical ramifications of this work. It is also an informed consent form for genetics researchers in the hard and social sciences whose expertise allows them to speak credibly on genetics research on cognitive ability and/or educational attainment from an outside perspective. You have been given this document because you have been invited to participate in an interview for the research dissertation of doctoral candidate Daphne Martschenko.

The general aim of this research is to understand the environment, beliefs, perceptions, and practices of the geneticist researching the foundations of intelligence and to examine the social forces impacting this field of genetics as a whole. This research operates in the hopes of better understanding the current environment in which this research is carried out by speaking with and observing geneticists who work within it. Too, it engages with bioethicists to explore the ethical concerns and considerations that surround genetics research on intelligence.

The primary purpose of this project is to examine how the history of the study of intelligence, which was founded on the eugenic theories of Galton and Burt, shapes the current field of behavioral genetics research. More specifically, this work covers how this history shapes the ways in which 1) researchers carry out their work 2) this work is interpreted by the public and 3) this research impacts upon how socioeconomic and racial disparities in the United States education system are perceived and addressed.

Participation is completely voluntary and participants may withdraw at any point. This work will be included in my doctoral dissertation and may also be used in journal articles and other published materials. Participants will receive copies of any final, distributed, and published works.

Principle Investigator: Daphne Martschenko

University of Cambridge: Faculty of Education
Education, Equality, and Development

Supervisors: I am conducting my research under the supervision of the following who may be contacted regarding my work:

Anna Vignoles: av404@cam.ac.uk

Jo-Anne Dillabough: jd217@cam.ac.uk

Duana Fullwiley¹⁵⁰: duana@stanford.edu

¹⁵⁰ Note that Duana Fullwiley is included only in this informed consent form as it was designed for behavior genetics researchers and bioethicists among whom she is well known. Professor Fullwiley was my undergraduate supervisor at Stanford University and is a recognized medical anthropologist. Having her as a point of contact in this informed consent form was meant to alleviate concerns potential

University of Cambridge Faculty of Education: +44 1223 76700
Stanford University Department of Anthropology: +1 650 723 3421

This Informed Consent Form has two parts:

- **Information Sheet (to share information about the study with you)**
- **Certificate of Consent (for signatures if you choose to participate)**

Part I: Information Sheet

Researcher Background

I am Daphne Martschenko, a PhD candidate in the Faculty of Education at the University of Cambridge. My work examines the behavioral geneticists primarily connected to the research consortiums of SSGAC, BGI, and TEDS and the published research findings these groups have produced. My work also engages with American geneticists and genetics researchers who conduct research on the genetics of cognitive ability/educational attainment using US populations even if they are not formally associated with SSGAC, BGI, and/or TEDS. I am conducting semi-structured interviews with researchers and bioethicists in the hopes of establishing how this field may impact upon, or be situated in relation to, systems of education and educator's approaches to maximizing student academic performance and educational attainment.

Type of Research Intervention

This research will involve your participation in qualitative interviews that will be drawn upon to develop a historical analysis of the evolution of the concept of intelligence and its study as well as how this research stands in relation to these histories in the current context. These interviews, with your permission, will be audio-recorded. **Please notify the researcher if you do not wish to be recorded or would like to request anonymity**; audio-recorded files will be saved in an MP3 format on the password-protected computer of the principal investigator and disposed of 5 years after the completion of this study. Additionally, I may ask to conduct some observations of your spaces of work and collaborations with other researchers.

Participant Selection

You are being invited to take part in this research because I feel that your experiences in the field of genetics research and/or bioethics are valuable sources from which I can move my research forward.

Voluntary Participation

Your participation in this research is entirely voluntary. It is your choice whether to participate or not.

Procedures

Participate in a recorded interview Daphne Martschenko over Skype, the phone, or in-person. The interview will last anywhere from 15 minutes to 45 minutes and give time for you to ask any questions or make clarifying remarks. **If you do not feel comfortable with a recorded interview, please notify the researcher before signing this document**; audio-recorded files will be saved in an MP3 format on the password-protected computer of the principal investigator and disposed of 5 years after the

participants might have about my study by showing that I am receiving guidance from an academic who has been known to engage with scientific researchers ethically and honestly.

completion of this study. In some cases, I may ask for the opportunity to conduct some observational fieldwork, which is up to your discretion to allow.

This informed consent form also grants permission to use emailed/written responses to questions from Daphne Martschenko. Emailed/written responses will only be used if the principle investigator has asked for explicit permission prior to receiving a response.

Risks

I do not foresee any risks that should affect you or your work, but my topic is sensitive in nature and does examine ethical ramifications of work you may be directly concerned with.

Benefits

There will be no direct benefit to you, but your participation is likely to help illuminate the current context in which behavioral genetics is conducted, the position of geneticists within this environment, and ethical knowledge bases from which these researchers draw in the hopes of igniting discourse and action on how this research may potentially impact the United States education system and more specifically gifted education programming.

Sharing the Results

This work will be included in my doctoral dissertation and may also be used in journal articles and other published materials. Participants will receive copies of any final, distributed, and published works.

Right to Refuse or Withdraw

You do not have to take part in this research if you do not wish to do so. You may stop participating in the interview at any time. I will offer a transcription of the interview once it has been completed and you can review your remarks, clarify, modify and/or remove portions of the conversation.

Who to Contact

Should any questions arise at any point, I can be reached immediately via email: dm660@cam.ac.uk or phone: +1 571-263-6650 to facilitate next steps. My faculty supervisors can also be reached:

Anna Vignoles: av404@cam.ac.uk

Jo-Anne Dillabough: jd217@cam.ac.uk

Duana Fullwiley: duana@stanford.edu

University of Cambridge Faculty of Education: +44 1223 76700

Stanford University Department of Anthropology: +1 650 723 3421

Part II: Certificate of Consent

I have read the foregoing information, or it has been read to me. I have had the opportunity to ask questions about it and any questions I have been asked have been answered to my satisfaction. I consent voluntarily to be a participant in this work.

Print Name of Participant _____

Signature of Participant _____

Date _____
Month/day/year

Consent for Audio-Recording

I understand that interviews and focus group sessions will be audio-recorded. I understand that these discussions will be audio-recorded to help the principal investigator identify key points in the discussion, capture what was said accurately, and for analysis purposes. I have been made aware that the principal investigator will dispose of any audio-recordings within 5 years of the completion of this study. I have had the opportunity to ask questions about this process and any questions I have been asked have been answered to my satisfaction. I consent voluntarily to being audio-recorded.

Print Name of Participant _____

Signature of Participant _____

Date _____
Month/day/year

Statement by the researcher

I have provided an honest and clear depiction of my research and to the best of my ability made sure that the participant understands my aims and scope.

I confirm that the participant was given an opportunity to ask questions about the study, and all the questions asked by the participant have been answered correctly and to the best of my ability. I confirm that the individual has not been coerced into giving consent, and the consent has been given freely and voluntarily.

Print Name of Researcher _____

Signature of Researcher _____

Date _____
Month/day/year

Appendix E: Ethics

University of Cambridge Risk Assessment Form Pt. One

| | |
|---------------------------------------|---|
| Student Name | Daphne Oluwaseun Martschenko |
| Course | PhD Education |
| Email | Dm660@cam.ac.uk |
| Supervisor(s) | Anna Vignoles, Jo-Anne Dillabough |
| Title of Registration Proposal | "Investigating teacher conceptualizations of cognitive ability and student achievement as it relates to genetics, intelligence, race, and socioeconomic status" |

| | |
|---|---|
| Research activity to be undertaken | Interviews Focus Groups Survey |
| Location of | United States, predominantly Chicago area |
| If travelling abroad, date of departure: | October 2016 |
| List particular hazards associated with the activity, for example, will there be any personal safety issues? <i>List only hazards which you could reasonably expect to result in harm to you or</i> | |
| <p>No foreseeable risks, but the nature of this project and its discussion of genetics, intelligence, race, and socioeconomics may be sensitive in nature. Steps have been taken to address potential tension in the focus group discussions, to preserve outside group anonymity, and to keep data secure. The New York City Department of Education (NYCDOE) Internal Review Board (IRB) application, which is attached details these measures, which are applicable to Chicago area.</p> | |
| Are the risks adequately controlled? If so, list the existing controls: <i>List the precautions you have already taken against the risks from the hazards</i> | |

| |
|---|
| <p>All focus group participants are required to sign non-disclosure agreement forms to preserve the anonymity of all participants outside of the group. In addition all participants are given informed consent forms highlighting the nature of the project, expectations, and time commitments. Copies of these documents are attached in addition to the IRB.</p> <p>Focus group discussions cover sensitive topics and tensions may arise. Participants will consistently be given the option to abstain from participating to any portion of the study and may withdraw at any point. The principal investigator will refrain from pressing a line of inquiry should she see any visible discomfort or undue stress in participants.</p> |
| <p>List the risks which are not adequately controlled and the precautions to be taken. <i>Can the risk be removed? Is there a less risky alternative? Can the risk be</i></p> |
| <p>I believe all risks have been recognized and steps have been taken to try and pre-emptively address them.</p> |
| <p>Do any other Risk Assessments relate to this activity? If so please attach a copy</p> |
| <p>NA</p> |

| |
|---|
| <p>Emergency measures:</p> |
| <p>I do not see any risks that could require emergency measures due to the proposed project. However, principals of schools will be contacted should any issues arise to facilitate next steps.</p> |

Checklist

Have you specified:

When the activity will take place? October 2016-April 2017

Who is involved? Teachers and principals in the Chicago area working in charter and private schools.

What the activity will involve? Individual interviews, classroom observations, 3 hour-long focus group discussion meetings.

The purpose of the activity? To examine teacher philosophies and conceptualizations of intelligence and education disparities and the relationship between the two. This will be done through three discussions which look to establish how teachers define intelligence, understand the phenomenon of racial and socioeconomic disparities in the US education system (specifically in gifted education) as well as their views on the role genetics does or should play in education systems.

If there are there any special risks?: Topics discussed may be sensitive in nature.

Have you:

Cross referenced to other risk assessments? Yes

Put travel arrangements in place? Yes

Checked health issues? Yes

Checked equipment requirements? Yes

Checked insurance issues? Yes (I am a US citizen)

Where the information is kept/available: Yes

Are all involved informed? Yes

Form completed by (signature):




Date: May 23rd, 2016

Name (in capitals): DAPHNE MARTSCHENKO

In the case of students, signed by Supervisor:

Name (in capitals): Anna Vignoles
23/5/16



University of Cambridge Risk Assessment Form Pt. Two

| | |
|---------------------------------------|---|
| Student Name | Daphne Oluwaseun Martschenko |
| Course | PhD Education |
| Email | Dm660@cam.ac.uk |
| Supervisor(s) | Anna Vignoles, Jo-Anne Dillabough |
| Title of Registration Proposal | Investigating teacher conceptualizations of cognitive ability and student achievement as it relates to genetics, intelligence, race, and socioeconomic status |

| | |
|---|---|
| Research activity to be undertaken | Interviews Observation |
| Location of research | United States and Europe [with members of Hastings Center in NYC; The Council for Responsible Genetics in Boston, MA; The Center for Genetics and Society in Berkeley, CA; The Stanford and Harvard Graduate Schools of Education; The Social Sciences Genetics Consortium (NYC; Stanford, CA; Amsterdam, the Netherlands); TEDS (Twin Early Development Study in London, UK); BGI (USA)] |
| If travelling abroad, date of departure: | October 2016 |
| List particular hazards associated with the activity, for example, will there be any personal safety issues? <i>List only hazards which you could reasonably expect to result in harm to you or others under the conditions in which you are working.</i> | |
| No foreseeable risks, but the nature of this project and its discussion of genetics, and intelligence may be sensitive. | |
| Are the risks adequately controlled? If so, list the existing controls: <i>List the precautions you have already taken against the risks from the hazards you have identified, or make a note where this information may be found.</i> | |
| All participants are given informed consent forms highlighting the nature of the project, expectations, and time commitments. A copy of this document is attached in a separate document. | |
| List the risks which are not adequately controlled and the precautions to be taken. <i>Can the risk be removed? Is there a less risky alternative? Can the risk be reorganised to reduce the hazard? Can protection be provided?</i> | |
| I believe all risks have been recognized and steps have been taken to try and pre-emptively address them. | |
| Do any other Risk Assessments relate to this activity? If so please attach a copy | |
| NA | |

| |
|---|
| Emergency measures: |
| I do not see any risks that could require emergency measures due to the proposed project. |
| <p style="text-align: center;"><u>Checklist</u></p> <p>Have you specified:</p> <p><u>When the activity will take place?</u> September 2016-June 2017</p> <p><u>Who is involved?</u> Behavioural geneticists and bioethicists concerned with genetics research on cognitive ability.</p> <p><u>What the activity will involve?</u> One-on-one interviews over the phone, email, Skype, or in person. There is a possibility for observation with approval from participants.</p> <p><u>The purpose of the activity?</u> To gain background information on genetics research on intelligence, what the field currently looks like, its findings, and how these researchers talk about the field's contested racialized and classist histories in relation to their work today.</p> <p><u>If there are there any special risks?</u> Topics discussed may be sensitive in nature.</p> <p>Have you:</p> <p>Cross referenced to other risk assessments? Yes</p> <p>Put travel arrangements in place? Yes</p> <p>Checked health issues? Yes</p> <p>Checked equipment requirements? Yes</p> <p>Checked insurance issues? Yes (I am a US citizen)</p> <p>Where the information is kept/available: Yes</p> <p>Are all involved informed? Yes</p> |

Form completed by (signature):



Date: May 23rd, 2016

Name (in capitals): DAPHNE MARTSCHENKO

In the case of students, signed by Supervisor:

Name (in capitals): Anna Vignoles

Date: 23/5/2016



University of Cambridge Ethics Review Checklist

Research Committee policies

**RESEARCH ETHICS REVIEW CHECKLIST
FOR FACULTY OF EDUCATION**

Question: Who needs to complete this checklist?

Answer: Any student or member of staff on the Faculty of Education's payroll who is planning to undertake research involving the collection of information from children, young people, teachers or other adults working in educational organisations, parents and other human subjects. **Note: Do not fill in this form if you are already completing the Cambridge University Psychology Research Ethics form**

The Faculty's Three Stages of Ethical Clearance

Stage 1 involves you in completion of this Ethics Review Checklist. This is the first stage of three. It will help you (and others) decide to what extent you need to become involved in the second and third stages. When you have completed it you (and the Faculty) will be in a position to make this judgement.

Stage 2 will involve you in discussing any ethical dimensions of your research in some depth with another 'knowledgeable person of standing'; this is a very likely outcome of completing the checklist. Further details are provided in Section C.

Stage 3 will involve you in obtaining formal 'ethical clearance' through the Faculty of Education's procedures; some projects will need to proceed to this stage. Further details are provided in Section C.

Section A: Details of the Project

Investigating teacher conceptualizations of cognitive ability and
Project Title: student achievement as it relates to genetics, intelligence, race, and
socioeconomic status

Name of Researcher: Daphne Oluwaseun Martschenko

Position in Faculty: undergraduate student / PGCE student / Masters student /
Research Student / Member of Staff

Email address: dm660@cam.ac.uk

Usual contact address: Magdalene College, CB3 0AG

Phone number: 07477468040

Students Only

Course of study: PhD Education

Supervisor's name Anna Vignoles and Jo-Anne Dillabough

Supervisor's email: av404@cam.ac.uk, jd217@cam.ac.uk

Supervisor's contact address: Cambridge Faculty of Education
184 Hills Road
Cambridge CB2 8PQ

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Review date: Jan 2016

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Section B: Checklist

Most of the questions on this checklist deliberately offer you just two answers ('yes' or 'no'). You will probably find that you can answer many of the questions unequivocally one way or the other. However, sometimes you may wish there was an 'it depends' response category. If you find yourself in this position, please give the answer which suggests that, at this preliminary stage, there might be an ethical issue requiring more discussion at Stage 2.

Code of Practice relating to Educational Research

1a) Have you read the *Ethical Guidelines for Educational Research* (2011) of the British Educational Research Association (BERA)? (if you have not read it, the latest version is available at <http://www.bera.ac.uk/researchers-resources/publications/bera-ethical-guidelines-for-educational-research-2011>)

1b) Is this Code relevant to the conduct of your research?

YES/NO

If you have answered 'no', please briefly explain why:

1c) Do you agree to subscribe to the Code in carrying out your own research?

YES/NO

2) Are there any aspects of your proposed research which, in the context of BERA's Code of Practice, might give rise to concern amongst other educational researchers?

YES/NO

If you have answered 'yes', please briefly list possible causes for concern below:

a) The survey component of this research offers a small monetary incentive for participation in the entered into a raffle to receive one of 4 Amazon gift cards priced at \$50 each.

b)

c)

3a) Will you be analysing an existing data set that has already been collected by someone else (i.e. secondary data analysis)?

YES/NO

b) If you answered YES: can you confirm that the data you will be using is *either*

already available in the public domain for anyone to analyse;

or

you have been given permission by the owner of the data set to undertake your own analysis and report the results ¹

N/A

YES/NO

Will be examining public domain student demographic data and school-specific demographic data available by the schools themselves.

¹ This permission should only be given if the owner of the data can make it available for secondary analysis on the basis of the informed consent they obtained from their original participants.

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4. Will you be collecting your own research data for the study (through such techniques as interviewing people, observing situations, issuing questionnaires etc.)

☒ YES/NO

If you have answered NO to question 4, you may proceed to Section C and need not answer any further questions in this section.

Obtaining 'Informed Consent'

5) Are you familiar with the concept of 'informed consent'? (if you are not familiar with this concept you should first consult the following source: page 5 of the BERA guidelines above).

☒ YES/NO

6) Does your research involve securing participation from children, young people or adults where the concept of 'informed consent' might apply?

*Permission is likely to be needed to report any information about people or institutions that is not in the public domain, and which you have been able to obtain due to your privileged access to the research site(s) in whatever capacity.*²

☒ YES/NO

If you have answered 'yes' to Question 6 above, please answer the following questions.

7a) Do you believe that you are adopting suitable safeguards with respect to obtaining 'informed consent' from participants in your research in line with the Code of Practice?

☒ YES/NO

7b) Will all the information about individuals and institutions be treated on an 'in confidence' basis at all stages of your research including writing up and publication?

☒ YES/NO

7c)

(i) Will all the information collected about the institution(s) where research is based be presented in ways that guarantee the institution(s) cannot be identified from information provided in the report?

Yes, the school district in focus will not be identifiable and individual schools and individual participants also will not be easily identifiable.

² Professional work (such as teaching) can involve the collection of evidence to better understand problems/issues and to evaluate innovative practice - leaving practitioners with the question of when these activities become formal research requiring informed consent. This comment is meant to highlight how the collection of data for public reporting **beyond the institution** (e.g. in a thesis) should be considered as a key criterion for deciding when informed consent is required.

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(ii)

*Note: in a thesis written by a researcher about a research context where they have a publicly acknowledged role, it is difficult to disguise the identity of the institution whilst also providing the expected detail of the researcher's relationship with the research context.*³

~~YES~~/NO

(ii) If not, has the appropriate responsible person given approval for the research on the understanding that the identity of the institution cannot be protected in the report of the research.

N/A

YES/NO

(ii) Will all the information collected about individuals be presented in ways that guarantee their anonymity?

Note: a person with a named role, or having a specific set of reported characteristics that is unique in the research context, cannot be assured of anonymity when the identity of the research site cannot be protected.

~~YES~~/NO

(iv) If not, have these issues been explained to the relevant participants (and appropriate gatekeepers in the case of children or other vulnerable participants).

N/A

YES/NO

8. The Involvement of Adults in the Research

8a) Will your research involve adults?

~~YES~~/NO

If you have answered 'yes' to Question 8a above, please answer the following questions; otherwise please proceed to Question 9.

³ At present the implicit assumption is that anonymity is always desirable*, and is always achievable. In many studies these assumptions are sound. However, a practitioner (e.g. teacher) reporting research into their own practice/institution in a thesis would normally need to be explicit about their professional relationship to the research context to give an authentic account of their research. As the staff lists of many educational institutions are in the public domain and often readily found by a web search, a thesis by a named member of staff allows the institution to be readily identified from the name of the thesis author.

Given that an institution can readily be identified, this also has consequences for the degree of anonymity that can be promised to participants - for example those with named roles such as Head of Year 11, Student Voice Coordinator, Head Prefect, etc, or those identifiable from detailed reported characteristics.

* Some institutions or participants may welcome being acknowledged by name in a thesis, and their views should be taken into account and balanced against other considerations.

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8b) Will these adults be provided with sufficient information *prior* to agreeing to participate in your research to enable them to exercise 'informed consent'?

YES/NO

8c) Will the adults involved in your research be in a position to give 'informed consent' themselves with respect to their participation?

YES/NO

8d) Will these adults be able to opt out of your research in its entirety if they wish to do so by, for example, declining to be interviewed or refusing to answer a questionnaire?

YES/NO

8e) Will these adults be able to opt out of parts of your research by, for example, declining to participate in certain activities or answer particular questions?

YES/NO

9. The Involvement of Children, Young People and other potentially Vulnerable Persons in the Research

9a) Will your research involve children, young people or other potentially vulnerable persons (such as those with learning disabilities or your own students).

YES/NO

If you have answered 'yes' to Question 9a above, please answer the following questions; otherwise move to Question 10.

In educational and social research 'informed consent' regarding access is often given by a 'gatekeeper' on behalf of a wider group of persons (e.g. a head or class teacher with respect to their pupils, a youth worker working with young people, another person in an 'authority' position).

9b) Who will act as the 'gatekeeper(s)' in your research?

Please list their position(s) briefly below and, where this is not self-evident, describe the nature of their relationship with those on whose behalfs they are giving 'informed consent'. **The researcher *cannot* act as the gatekeeper** (see 9g below).

i)

ii)

iii)

9c) Will you be briefing your 'gatekeeper(s)' about the nature of the questions or activities you will be undertaking with the children, young people or other potentially vulnerable persons involved in your research?

YES/NO

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9d) If another person (such as a teacher or parent of a child in your study) expressed concerns about any of the questions or activities involved in your research, would your 'gatekeeper(s)' have sufficient information to provide a brief justification for having given 'informed consent'?

YES/NO

9e) If unforeseen problems were to arise during the course of the research, would your 'gatekeeper(s)' be able to contact you at relatively short notice to seek advice, if they needed to do so?

YES/NO

9f) Could your 'gatekeeper(s)' withdraw consent during the research if, for whatever reason, they felt this to be necessary?

YES/NO

9g) (i) Are you undertaking research into your own professional context/institution (e.g. with students in a school where you work)?

YES/NO

If you answered 'YES' then you should identify (in 9b above) a suitable senior person who has agreed to act as an independent point of contact for participants to act as the gatekeeper, and answer the following two questions:

(ii) Will you ensure that other people in the research context are aware of the identity of the gatekeeper?

YES/NO

(iii) Will you take reasonable precautions to ensure that research participants (and where appropriate their parents/guardians) know that they should contact the gatekeeper (and not you) if they have any concerns about the research?

YES/NO

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Other Ethical Aspects of the Research

10) Will it be necessary for participants to take part in the study without their knowledge and consent at the time? (e.g. covert observation of people in public places)

YES/NO

11) Will the research involve the discussion of topics which some people may deem to be 'sensitive'? (e.g. sexual activity, drug use, certain matters relating to political attitudes or religious beliefs)

YES/NO

12) Does the research involve any questions or activities which might be considered inappropriate in an educational setting?

YES/NO

13) Are drugs, placebos or other substances (e.g. food substances, vitamins) to be administered to study participants or will the study involve invasive, intrusive or potentially harmful procedures of any kind?

YES/NO

If you have ticked 'YES' it is vital to refer matter to the Faculty Research Office for onward reference to the University Insurance section.

14) Will blood, tissue or other samples be taken from the bodies of participants?

YES/NO

15) Is pain or more than mild discomfort likely to result from the study?

YES/NO

16) Could the research involve psychological stress or anxiety or cause harm or negative consequences beyond the risks encountered in normal life?

YES/NO

17) Are there any other aspects of the research which could be interpreted as infringing the norms and expectations of behaviour prevailing in educational settings?

YES/NO

18) Are there any other aspects of the research which could be to the participants' detriment?

YES/NO

19) Will the study involve prolonged or repetitive testing?

YES/NO

20) Will financial inducements (other than reasonable expenses or compensation for time) be offered to participants?

YES/NO

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Section C

What Further Steps to Secure Ethical Clearance are Required?

Interpretation of Results

If any of your answers coincide with the response options having a coloured background, then you should assume that further discussion involving Stage 2 procedures is required because some aspect of your proposed research is likely to be 'ethically sensitive'. In practice, many issues can be resolved at this stage.

Members of staff should be especially careful about research involving their own students (question 9g).

If you have ticked 'yes' in response to one or more of questions 10 to 20, both Stage 2 and Stage 3 clearance will definitely be required.

Stage 2 Clearance

Any 'ethically sensitive' responses identified above should be discussed with a 'knowledgeable person of standing'.

In the case of students within the Faculty, this person will, in almost every case, be the person supervising your research.

Members of Faculty staff will need to exercise some care in selecting such a person. S/he is likely to be someone with considerable experience of research in a cognate area to your own and quite likely to be one of the more senior members of the Faculty. S/he should not be someone who is also involved in the research nor should they be someone with whom you regularly collaborate (whether in relation to research, teaching or administration). The test, in every case, should be whether an outsider would judge the person chosen to be 'independent'.

On completion of the discussion, the 'knowledgeable person of standing' is asked to choose one of the following three responses, to delete the other two and to affirm their views by adding their signature.

☒ a) I have discussed the ethical dimensions of this research and, as outlined to me, I do not foresee any ethical issues arising which require further clearance.


or

b) There may be some ethical issues arising from this research. I think it would be prudent for the researcher to seek further advice and, possibly, Stage 3 clearance.

or

c) Ethical issues arise in this research which require further discussion; my advice is that Stage 3 ethical clearance should be sought.

Name: ... Anna Vignoles ... Date of discussion: ... May 23rd, 2016

Signature of 'knowledgeable person of standing' 

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Lodging this form

It is your responsibility as the researcher to lodge this form with the appropriate person well in advance of undertaking your research.

Students should provide their supervisors with a copy which can be lodged with other papers their supervisors are keeping about their work. If Stage 3 clearance is required, supervisors will take steps to initiate these procedures.

Members of staff should lodge a completed copy of this form with the Faculty Research Office. They should draw attention, albeit briefly in the first instance, to the nature of the issue(s) arising. The Director of Research will then advise on the appropriate Faculty procedures to be followed to enable the research to be considered for Stage 3 clearance.

Researchers should be aware that Stage 3 discussions could involve them in making modifications to their research design or proposed procedures and may, in certain circumstances, result in ethical clearance being withheld.

Protecting Human Research Participants Certification

