How to QuantCrit

Applying Critical Race Theory to Quantitative Data in Education

Wendy Castillo and Kamden K. Strunk

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How to QuantCrit equips researchers and users of quantitative data with practices to alter how they collect and analyze quantitative data. Using Quantitative Critical Race Theory (QuantCrit) as a framework, this book develops the foundation for an iterative praxis to explore a range of questions that prompt practitioners and stakeholders to be engaged critics in working towards a more just and equitable society.

The book begins with an overview of QuantCrit and its five tenets: (1) the centrality of racism; (2) numbers are not neutral; (3) categories are neither 'natural' nor given; (4) the importance voice and insight (data cannot speak for themselves); and (5) a social justice/equity orientation. Each subsequent chapter begins with a more detailed explanation and exploration of the tenet. Then, the chapters move into actionable steps that researchers and data users can take to implement QuantCrit into applied practice. Finally, the book closes with thoughts on working to use quantitative data for racial justice.

This book is intended for researchers, data users, and graduate students in education and education-related disciplines. It offers insights and suggested actions that range from working with existing data sets in more racially just ways to more radically reimagining the entire educational research process. As such, the book offers ideas and information that can be useful for anyone working with quantitative educational data.

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'How to QuantCrit is the first of its kind. The text provides a needed historical account of racism in social sciences statistics and offers insights into how quantitative approaches should be used to de-center whiteness while including practical use (and examples) of each QuantCrit tenets.'

Marvin G. Powell, *Ph.D., George Mason University, USA*

'Quantitative Critical Race Theory (QuantCrit) has grown rapidly to become an important strand in research internationally. Quantitative methods have sometimes been antithetical to antiracism but QuantCrit offers a powerful new way forward. In this landmark study – the first book-length exploration of QuantCrit – Castillo and Strunk explore the approach in detail, offering real-world examples of how to apply the insights in practice. It adds up to a unique and invaluable resource for everyone with an interest in quantitative research and racial justice.'

David Gillborn, *author of 'White Lies: Racism, Education and Critical Race Theory'*

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Critical Quantitative Methodologies,
Critical Race Theory, and QuantCrit
as a Methodological Framework

Introduction

The purpose of this book is to help people who work with data in education
and educational researchers to use QuantCrit as a way to move toward equi-
table education policies, practices, and experiences. To answer what Quant-
Crit is and how QuantCrit works, we start with why QuantCrit is necessary
in the first place, or to put it another way, why Critical Race Theory(CRT) is
a necessary intervention in quantitative methodologies. In this introductory
chapter, we review the history of racism in quantitative methods, explaining
why CRT is needed in quantitative approaches. We then turn to an overview
of CRT's history, development, and tenets. Next, we review the development
of various critical approaches to quantitative methodologies. Finally, we pro-
vide an overview of the integration of CRT with quantitative methodologies
in what has come to be known as QuantCrit.

Racism in Quantitative Methodology: Why a Quantitative CRT?

People often think of quantitative methodologies as neutral, objective, and
scientific. They might also tend to think of these methodologies as value-free,
unattached, or unbiased (Strunk, 2024). Given that preexisting understand-
ing, it is natural to wonder why we might need to discuss racism in quantita-
tive methods. In this section, we will explore the historical development of
quantitative methodologies and their contemporary uses to illustrate the con-
nections between methods, white supremacy, and racism.

The history of quantitative methodology, especially in education and psy-
chological research, is inseparable from eugenics in the United States. The
eugenics movement in the U.S. grew in prominence in the first half of the
20th century and was supported by prominent scientists and even U.S. presi-
dents (Cohen, 2017; Farber, 2008). Eugenicists were broadly committed to
the idea that humanity could be improved by identifying genetically superior
groups of people. Those groups could be encouraged to procreate, given re-
sources, and elevated to leadership positions. By contrast, groups deemed in-
ferior would be pushed out of society, prevented from procreating (including

via forced sterilization procedures (Lombardo, 1996; Reilly, 2015)), and relegated to subservient social and vocational positions and roles. Taken to its logical endpoint, eugenics also led to violence, criminalization, and genocide (Moses & Stone, 2010; Müller-Hill, 1988). The eugenics movement, at least in its more formal or explicit incarnations, fell largely out of favor after World War II as U.S. scientists and politicians sought to distance themselves from the eugenics-inspired Nazi atrocities and genocide, though some of its ideas endured in modern science and psychology (Black, 2003; Levine, 2017).

In psychology and educational research, the move to quantification, measurement, and testing was largely driven by a commitment to eugenics (Strunk, 2024). Many of the prominent generators of early quantitative thought in these areas were ardent eugenicists with explicitly white supremacist ideological stances. For example, one frequently cited founder of quantitative methodologies is Francis Galton, a self-described eugenicist committed to the idea that intellectual ability was genetic and fell along racial lines (Hall, 2003). Another example is Edward Thorndike, who was vital in developing early intelligence testing approaches, who wrote that "original differences in intellect, character, and skill … are related to the families and races when individuals spring" (Thorndike, 1913, p. 129). Others, like Robert Yerkes, who developed one of the earliest mass-testing approaches for intelligence, argued that intelligence fell along a racial hierarchy and that the advancement of human civilization required a eugenics approach to avoid "the menace of race deterioration" (Yerkes, 1923, p. viii). These ideas persisted and became central to the development of quantitative approaches in education and psychology. More recent authors like Cattell (1965), Terman (1961), and Jencks (1972) made similar arguments using quantitative methods for the biological and genetic superiority of white people and especially for the intellectual inferiority of Black people.

While the above-discussed individuals made substantial contributions to the development of quantitative methodologies in the service of white supremacist agendas, it is easy to lose sight of those ideological commitments given that quantitative methodologies are often taught without historical or ideological contexts. But, quantitative methodologies are a profoundly human endeavor, and considering those methods' generation and ideological stakes is essential. To illustrate, we now discuss several names that most students of quantitative methodologies would know but perhaps without knowing anything about them. Most first-year methodology courses will introduce the analysis of variance (ANOVA) and its test statistic F. The F stands for Fisher's exact test. The Fisher here is R. A. Fisher, who created the F test and was key in modern conceptions of ideas like variance, blocking designs, and more (Rao, 1992). Fisher was also an avowed eugenicist who, at one point, actively campaigned for the legalization of forced sterilization of people deemed inferior (Evans, 2020). After World War II, when Nazi scientists were seeking university positions in postwar Europe, Fisher supported the appointment of one such scientist named von Verschuer. In his reference letter, he wrote of

the Nazi regime that "I have no doubt that the [Nazi] Party sincerely wished to benefit the German racial stock, especially by the elimination of manifest defectives, such as those deficient mentally, and I do not doubt that von Verschuer gave, as I should have done, his support to such a movement" (Weiss, 2010, p. 745). While Fisher elsewhere condemned the anti-Semitism of the Nazi regime and the Holocaust itself, he was also sympathetic to the eugenic aims of such a movement. In his development of statistical methods and theory, Fisher sought to find better ways of identifying and isolating desirable genetic and biological traits so that procreation could be stratified to "benefit … the racial stock" (Weiss, 2010, p. 745). Fisher also contributed to a UNESCO report on race, in which he wrote that "available scientific knowledge provides a firm basis for believing that the groups of mankind differ in their innate capacity for intellectual and emotional development" (UNESCO, 1952, p. 56). While his ideas and statistical models are often taught as neutral, unbiased, and objective means of understanding and processing data, they are also products of his own eugenic intellectual project.

In a second example, we take up Karl Pearson, whom most first-year students would know for the Pearson product-moment correlation or Pearson's *r*. He is also the developer of the chi-square test (Plackett, 1983), also known as a Pearson chi-square test, and principal components analysis (Jolliffe, 2002), a common approach to factor analysis. Some also credit Pearson with the development of the histogram. Pearson was also a collaborator of Francis Galton and, at one point, held the Galton Chair of Eugenics at University College London (Porter, 2004). An avid eugenicist, Pearson argued that nations should work to improve themselves via "better stocks" genetically, which might be accomplished "chiefly by way of war with inferior races" (Pearson, 1901, pp. 43–44). He further wrote that this might require that the "superior race must either eject the inferior, or, mixing with it or even ling alongside it, degenerate itself" (Pearson, 1901, p. 44). Pearson similarly argued against immigration, arguing that Jewish immigrants were "inferior physically and mentally" and "will develop into a parasitic race" (Pearson & Moul, 1925, p. 126). Referring to Black people in the U.S., Pearson wrote that "it is no use trying to teach the negro by the same methods as we would the white man. We must find a method which will enable the negro to realize his own limitations" (Pearson, 1914, p. 296). His development of statistical methodologies was largely in service to his scientific pursuit of eugenics and racial superiority.

The history of statistical methods in educational and psychological research is inherently racist. White supremacist and eugenics ideologies animated those who created the field and instituted its logics and theoretical models (like probability theory, the general linear model, and more). Racism is, so to speak, baked into the bread. This leads scholars like Zuberi and Bonilla-Silva (2008) to describe quantitative methodologies as *White Logic, White Methods* (the title of their edited book). Elsewhere, Zuberi (2001) summarized this connection, writing, "Statistical methodologies were developed as part of the eugenics movement and continued to reflect the racist ideologies that

gave rise to them" (p. x). This core feature of the development of quantitative methods is not purely historical but is still evident in modern applications of statistical methodologies (Carter, 2005). Quantitative methods continue to justify or explain societal stratification, justify under-resourced schools for people of Color, blame marginalized communities for health disparities, and more (Strunk, 2024). Modern approaches tend to differ in that they usually rely on social, rather than biological, explanations for racial stratification, but the underlying logics are primarily the same (Allen et al., 2008).

While much of this presentation of the history of quantitative methodologies in educational and psychological research has focused on racism and white supremacy, it is important to note that these histories are also deeply ableist, transphobic, heterosexist, colonialist, and xenophobic. In fact, a core feature of the logic of white supremacist eugenics relies on ableism (Powell, 2020; Wilson & St. Pierre, 2016). The idea that people of Color are genetically intellectually inferior (which is demonstrably false) and should thus be relegated to marginalized status and perhaps even removed altogether relies on the belief that if one has different intellectual abilities, one is less worthy, less human, or less valid (Selden, 2000). In other words, the attempt to construct racial hierarchies of dignity and worth involves relying on the belief that intellectual ability gives one dignity and worth. Not only is this a racist logic, but it is also ableist. Similar logics have also been used to argue for the inferiority and unworthiness of transgender and nonbinary people (Horbury & Yao, 2020; Lowik, 2017), queer people (Berro & Zayhowski, 2023), Indigenous people (Croisy, 2020; Sanchez-Rivera, 2022; Stote, 2022), migrants and immigrants (Nelkin & Michales, 1998), and people with (dis)abilities.

While modern quantitative researchers would largely reject eugenics and acknowledge its harms, the legacy of racism (and other forms of oppression and bigotry) endures. While eugenicists relied on biological and genetic explanations to assert white supremacism, social explanations are more common in contemporary research (Kendi, 2017; Solórzano & Yosso, 2002). That is, while modern researchers do not, for the most part, assert genetic deficiencies, they often do assert social or psychological deficiencies (Allen et al., 2008). For example, the often-repeated (though false) argument that families of Color value education less than white families is an argument for a social, rather than biological, deficiency that seeks to explain educational disparities. (While this claim still circulates in educational research, it is also debunked by robust and racially conscious researchers (e.g., Harper & Davis, 2012; Puchner & Markowitz, 2015)). Researchers might also point to behavioral difficulties, parental involvement in schooling, work ethic, and other social factors that supposedly explain disparities by demonstrating deficits among people or communities of Color. In other words, while genetic eugenics has, for the most part, lost favor in educational research, researchers still work from models that assume, look for, and create evidence of racialized deficits. Quantitative educational researchers, for example, might tend to study "race" without ever acknowledging, studying, or considering the role of racism in

racial disparities in education (Harper, 2012). In short, quantitative educational research still has a deep, embedded, and extensive racism problem.

At the same time, quantitative methodologies have a particular ability to launder their sociohistorical roots and entanglements, creating a thin veneer of "objectivity" or "neutrality." In so doing, students of educational research and those who become researchers often learn these methods as if they were truly neutral and objective, free of ideological and conceptual baggage. As a result, their racist (and ableist, sexist, heterosexist, transphobic, xenophobic, colonizing, etc.) connections go largely unexamined, unchallenged, and thus those connections continue to shape modern research (Cummings & Cummings, 2021). Core in this is what Giroux (2011) termed the culture of positivism, in which individuals learn that "true" science is objective, neutral, value-free, and usually quantitative. Positivism, or the notion that there is one universal, objective truth to social phenomena that can be ascertained by detached researchers using adequate methods, is rejected by critical theories in general. However, because it treats the "tools" of data collection and analysis as neutral or objective rather than ideological and constructed, positivism launders methods and data of their ideological entanglements, leading many to an uncritical embrace of certain methodologies (Strunk & Hoover, 2019). As a result, even well-meaning researchers often reproduce the racist logics and outcomes of the generators of those methods, who were ardent and unabashed white supremacists and eugenicists.

CRT offers a potential intervention. CRT has similarly intervened in other fields, beginning with legal studies, as well as the broader education research space (especially qualitative educational research). CRT is a necessary and important intervention in fields founded in white supremacist logics, especially when those logics become laundered over time to appear superficially neutral or objective. In fields such as this, CRT helps researchers and practitioners examine and understand how race and racism might shape the field of inquiry, the modes of analysis and interpretation, and resulting beliefs and practices. In this chapter, we next turn to the history and tenets of CRT.

History and Tenets of Critical Race Theory

Over the past several decades, CRT has become an increasingly popular theoretical framework for educational research, most often qualitative or theoretical work. Originally developed in legal studies by scholars such as Derrick Bell, CRT came to be understood as having several core tenets for analyzing social phenomena. While there are various theorists and scholars in CRT who work with somewhat different lists of tenets, there is much commonality among them. Because QuantCrit is the application of CRT to quantitative methodologies, a basic understanding of the history and tenets of CRT is necessary before engaging QuantCrit. As a result, in this chapter, we briefly outline the development of CRT and its emergence and proliferation in educational research and provide an overview of its most commonly cited tenets.

It is beyond the scope of this book to detail the entire history of the emergence and shaping of CRT, and several other scholars have offered detailed and compelling historical accounts of CRT (Crenshaw, 2011; Delgado & Stefancic, 2011; Tate, 1997). Instead, we offer a brief outline of the emergence of CRT and its entrance and growth in educational research, along with a summary of each of the primary tenets of CRT and its applications to education. CRT grew out of the field of Critical Legal Studies (CLS), which was a broader scholarly movement within legal studies that pointed out that laws and policies were not neutral or objectively rational but were instead the result of socioeconomic, political, and ideological forces (Brown & Jackson, 2013). CLS scholars were often focused on issues of class and gender, and many were informed by Marxist and neo-Marxist analyses, which primarily revolved around class and labor (Walton, 2020). This critical turn in legal studies shares many parallels with a similar critical turn in educational scholarship, which initially proceeded from Marxist perspectives in what came to be known as Critical Theory (Gottesman, 2016), with later shifts to incorporate perspectives like CRT.

Over time, the critiques of CLS grew into the tenets of contemporary CRT. For example, one reason scholars moved from CLS to CRT in legal studies was the lack of sustained attention and centering of racism in analysis. One tenet of CRT that is often named is the centrality and permanence of racism. Another reaction to CLS was the lack of attention to intersections, which explained inequity. The often-repeated example is that a company might offer Black men and white women promotions and nevertheless refuse to promote Black women, an action that sits at the intersection of racism and genderism. Intersectionality is another often-named tenet of CRT. Similarly, scholars were dissatisfied with a perceived lack of action orientation in CLS—that is, that analyses that deconstructed policy did not always or readily lead to actions that change policy. Another often-named tenet of CRT is the necessity or a justice orientation. In some ways, then, the tenets of CRT can be seen as both growing out of and reacting to earlier frameworks, including CLS and Marxist analysis, more broadly. Over the decades since, scholars have advanced, refined, expanded upon, and reoriented CRT in various ways. There is no universally agreed-upon set of tenets for CRT, and different scholars work with somewhat divergent tenets and definitions of tenets. Below, however, we briefly outline some of the most frequently named and utilized tenets of CRT, with particular attention to those tenets that eventually inform QuantCrit.

The Permanence, Centrality, and Banality of Racism

This first tenet of CRT is perhaps its most foundational: that racism is a permanent, ingrained, central, and normalized feature of society, especially Western and United States societies (Milner, 2017; Seriki et al., 2015). This tenet calls attention to the ways that racism is so normalized as to be banal. Racism structures systems of governance, community, wealth, commerce, healthcare,

and virtually every aspect of modern life (Acevedo & Solorzano, 2021; Bell, 2000; Neely et al., 2020). CRT also points to racism as a central organizing feature of societies like the U.S. For example, CRT scholars might point to the ways that racism is integrated into the United States Constitution through references to enslavement, the three-fifth compromise, and Indigenous populations (Acharya, 2022; Feagin & Ducey, 2018; Wright, 2021). Racism, CRT scholars contend, is so central and permanent in structuring governance and social relations that it does not require individual racist intent (Massey et al., 1975; McMorris, 1998). In other words, racism does not require the presence of individually racist people who intend to inflect its effects. Of course, there may also be no shortage of individually racist people who amplify or extend the harms of racism, but the point is that it is so central and ingrained that even without those people, racism would still perpetuate.

Importantly, this tenet also holds that race is a social construction (Cabrera, 2018; Mills & Unsworth, 2018; Parker, 1998). In other words, while there may be "real" differences in things like skin color, categories of race are not "real" in any objective sense. Rather, racial categories are constructed socially, and those social constructions shape the material realities of the people who are captured by those categories. This social construction is clearly visible in United States history, where courts and the United States public debated, reshaped, and relitigated who is white (López, 2006). In government policy, racial categories are defined in ways that are both arbitrary and at times unhelpful, allowing for only some kinds of identities but not others to be legitimized (Duncan, 2002; López & Hogan, 2021). For example, the place of people who identify as Arab in the U.S. Census categories is, at present (though it will likely change in 2030), white (Kayyali, 2013). In another example, people of Indian, Chinese, Malaysian, and Tibetan descent would all be categorized as Asian, presenting significant problems for research and policy (Teranishi & Nguyen, 2011; Teranishi et al., 2013). The boundaries of racial categories are socially defined, and the ways they are defined have the power to shape the social realities people experience.

The permanence and centrality of racism is one of the most commonly cited tenets of CRT, and examples of its application in research abound. Recently, scholars have pointed to the ways that social relations are so infused with racism that artificial intelligence models and other algorithms reproduce racist ideas and outcomes (Adams, 2021; Adib-Moghaddam, 2023; Noble, 2018). Facial recognition software misidentifies people of Color as criminals at alarming rates, and large language models and other generative AI applications put out racially biased ideas and images despite supposed safeguards being in place (Bacchini & Lorusso, 2019; Nkonde, 2019; Stevens & Keyes, 2021). Other examples include those from healthcare, where measures of kidney function, blood oxygen concentration monitors, and a range of other measures designed to be "objective" are racially biased (Diao et al., 2020; Jamali et al., 2022; Sikka, 2023). Tests of intellectual ability and academic achievement systematically underestimate the abilities of students of Color.

Black men charged with crimes receive substantially harsher sentences and are more likely to be sentenced to death if they survive police encounters, which is also less likely compared to white peers (Beckett & Evans, 2016; Rehavi & Starr, 2014; Schwartz & Jahn, 2020).

Racism is permanent and resilient. Efforts at reform often fail because racism is deeply and permanently ingrained, so it finds new forms of expression. In one example, CRT scholars have documented the ways that school desegregation was never really accomplished, and United States schools are now as racially segregated as ever (Dixson & Rousseau, 2005; Morris, 2006; Radd et al., 2020). Voting rights and other civil rights legislation, scholars argue, ultimately failed to accomplish racial equity, and the rights gained were slowly stripped away over time through other means (Crowley, 2013; Delgado & Stefancic, 1998). This is not to suggest that CRT scholars are disinterested in reform efforts but that they also critique many reforms for being inadequate to fundamentally shift social systems away toward racial equity.

One of the ways that this tenet shows up in informing educational research is by shifting the question. For example, many researchers start with questions like: Is there a racial disparity? Could racism affect outcomes? This tenet might lead researchers to start with a different question, such as: Given the centrality of racism, how is racism affecting this outcome? How could racism be ameliorated or interrupted in this context? What would racial equity look like? This also pushes researchers away from the decades of constant and repeated documentation of racial disparities' existence toward more action-oriented work.

The Rejection of Objectivity and Neutrality

In the landscape of research methodologies, most traditional work emerges from a positivist or postpositivist paradigm (Strunk & Mwavita, 2024). That work positions itself as a search for objective and universal truth. To find those objective and universal truths, then, requires that measures, analyses, and researchers be objective, neutral, and unbiased. Critical perspectives in general and CRT in particular reject this notion (Sablan, 2018). There is no such thing as an unbiased or neutral observer. Researchers are, of course, biased and non-neutral in their perspectives. Their perspectives are, quite naturally, influenced by a lifetime of experiences, by the particular ways they have interacted with organizations, socialization, norms, institutions, and society. Those interactions are also influenced by social position and identity. The perspectives of a person for whom educational systems worked quite well and resulted in very positive outcomes will not be the same as a person whose experiences were with underfunded schools, inequitable learning conditions, and negative outcomes. Having been socialized in a racist system and society, the researcher would also inevitably have their perceptions shaped by those racist ideologies and systems. CRT has been described (among other theoretical perspectives) as a standpoint framework. In other words, it posits

that the world simply looks different from different social positions, and different historical, social, political, and material contexts might give rise to very different realities.

The Importance of Voice, Embodied Experiences, and Counter-Storytelling

One way this shows up in much of the CRT scholarship is the emphasis on counter-stories and counter-storytelling. Because society is structured in ways that perpetuate racism, the dominant narratives and stories all support the status quo of a racist society. As a result, CRT scholars suggest counter-storytelling as a necessary intervention. For example, Bell (1992) used extended counter-stories, which were composite narratives derived from his experiences (rather than being a specific, factual "story") to highlight systemic racism in the U.S. In education, Solórzano and Yosso (2002) described counter-storytelling as a research methodology. They described counter-storytelling as an act of resistance that counters dominant deficit narratives, can be derived from personal narratives or research data (such as observations and interviews), and can be composed in a variety of ways. Counter-storytelling is most common in qualitative research, where qualitative data from participants may be used to construct counter-stories and narratives. However, it is a relevant consideration in quantitative data analysis as well, in that it might push researchers to ask how these data might tell stories other than or counter to the dominant discourses the data usually inform.

Whiteness as Property

Another core analytic tenet of CRT is whiteness as property—that whiteness both serves as a form of property and also conveys certain property rights to those who possess it. Coined by Cheryl Harris (1993), this has become a widely used analytic frame within CRT. Harris (1993) observed that, while whiteness has an internal self-identity dimension, it came to take on an "actual legal status" that "converted an aspect of identity into an external object of property, moving whiteness from a privileged identity to a vested interest" (p. 1725). In fact, United States courts devoted volumes of case law to defining who was white and to what whiteness entitled those who possessed it. For example, whiteness was the defining characteristic that marked one as enslaved or free in U.S. history. Whiteness marked which business, accommodations, and rights one had access to, especially during de jure segregation. Access to those rights and privileges was restricted to those who "met a strict standard of proof" (Harris, 1993, p. 1726). Whiteness as property, according to Harris (1993), involved four central rights: rights of disposition, rights to use and enjoyment, reputation, and status property, and the absolute right to exclude.

Scholars have applied this to the analysis of education in multiple ways. For example, Annamma (2015) described one of the benefits of whiteness

as property as the intangible benefit of innocence. That is, whiteness conveys with it the state of presumed innocence, juxtaposed with the presumed aggression, criminality, or suspiciousness of youth of Color. In applying this idea to the intersections of racism and ableism, ability became subject to surveillance in classrooms in ways that aligned with whiteness as property. In another example, Salisbury (2021) applied this tenet to understanding educational policy. He examined the ways that educational opportunity was constructed as a right connected with whiteness, which shaped policy reform conversations. Scholars have deployed this tenet to understand the ways that whiteness operates within and beyond schools and universities in ways that entrench the racist status quo as a baseline rather than a problem.

Intersectionality

Another core tenet to much of CRT is intersectionality. In the classic example of intersectionality, first offered by Collins and Crenshaw (Collins, 1998; Crenshaw, 1997), a Black woman is denied a promotion. She alleges that her denial is based on discrimination. The company, in its defense, points out that they have previously promoted white women and Black men. Thus, they assert that they can prove they do not discriminate on the basis of race or gender. As Crenshaw (1997) pointed out, this analysis fails to consider the nature of gendered racism. It is possible for the intersection of gender-based discrimination and racism to produce a negative outcome for a Black woman that is less likely to occur for a Black man or white woman in similar circumstances. In this example, the intersectional system is gendered racism. But other systems and ideologies intersect, too. For example, some scholars in the field of queer and trans studies write about a system of white supremacist cisheteropatriarchy in which white supremacism/racism, cisgenderism, heterosexism, and patriarchy all intersect to produce particular effects at different social locations. Intersectionality is not, at its core, about "multiple identities" so much as it is about the systems of domination and oppression that intersect in particular ways. For example, an intersectional analysis might point to the ways that the intersections of racism, transphobia, and patriarchy intersect in ways that place trans women of Color at extremely heightened risk of violence.

   This is a critically important insight: An analysis that only considers one domain, system, or ideology will always be insufficient and will miss crucial insights. Researchers interested in racism, for example, must also consider the effects of other systems and ideologies such as ableism, genderism, heterosexism, settler colonialism, xenophobia, linguicism, and others. Intersectionality points out the ways that people at different social locations are affected by different intersecting and intertangled systems of power and domination that produce different effects, lead to different life chances, and allow different experiences. As a result, researchers must take up more nuanced and

multidimensional perspectives and analyses to generate meaningful insights and actions.

History and Development of Critical Quantitative Methodologies

Above, we have briefly outlined some of the major tenets used in CRT. We did so because CRT is the theoretical framework that informs QuantCrit. However, other critical perspectives exist, some of which predate and inform the development of QuantCrit. There is often conceptual slippage around the idea of "critical theory/theories." While there is a particular perspective named Critical Theory, which arises from the Frankfurt school of Marxist thought, the term "critical theories" is also sometimes applied broadly to mean theoretical perspectives that center critique, equity, and justice, including Critical Theory, CRT, queer theory, and many others. This conceptual slippage can make tracing the idea of critical quantitative methodologies difficult, given that similar conceptual overlap, confusion, and shifts are present in the development of critical quantitative methodologies. Among the first authors to explicitly use the language of critical quantitative methodologies, alongside "quantitative criticalism" was Stage (2007). In a special issue featuring multiple authors from different perspectives (Baez, 2007; Carter & Hurtado, 2007; Kinzie, 2007; Perna, 2007; St. John, 2007; Teranishi, 2007), the authors coalesced around two basic emphases of criticality in quantitative methods:

1 To leverage data to show educational processes and impacts at scale, highlighting disparities and pinpointing societal or institutional continuations of ingrained inequalities in these procedures and results (Stage, 2007).
2 To challenge the frameworks, metrics, and analytical methods of quantitative research to introduce alternative models, measurements, and analysis techniques that more accurately capture the experiences of underrepresented individuals (Stage, 2007).

Years later, Stage and Wells (2014) proposed an additional task: to carry out research that is culturally pertinent by examining institutions and individuals within their specific contexts. Finally, Wells and Stage (2015) argued that quantitative criticalism questions standard beliefs in quantitative research, requires proficiency in statistics and critical theoretical perspectives, and requires articulation and application of specific principles from critical perspectives for credibility and rigor.

Although these contributions by Stage and colleagues were the first to use the language of critical quantitative methods (and of quantitative criticalism), they were far from the first to apply statistical reasoning to questions of equity and justice. In the early 20th century, W.E.B. DuBois used statistics to highlight the racial inequities stemming from slavery and the impact of Jim Crow laws. Dubois' work on The *Philadelphia Negro* (, 1899) and *The American Negro* (, 1900) produced data visualizations grounded on illustrating the

systemic racism at that time for Black Americans. Those data visualizations are still used as exemplars in methods courses today. DuBois' work predates the emergence of CRT as a theoretical framework, and so is not technically QuantCrit, but shows the long history of attempts to use quantitative data and statistics critically. Others, like Zuberi (2001), Huber et al. (2006), and Gillborn and colleagues (2010), wrote about the implications of CRT and racism for the use of quantitative methods prior to the term QuantCrit being used. More recently, organizations like Chicago Beyond (2019), Child Trends (Parekh et al., 2019), and Urban Institute (2022) have published guides on how to do research (both qualitative and quantitative) in more racially equitable ways, though these do not explicitly reference CRT or QuantCrit. However, these represent some of the various efforts at using statistical inferences and quantitative data in more racially just ways.

Other critical perspectives have also sought to integrate quantitative methodologies as well. One prominent example is the use of quantitative methodologies in queer and trans studies in education. Strunk and Shelton (2024) provide a systematic review of that work, which includes approaches such as queer survey research (Simpfenderfer et al., 2024), queered uses of large-scale datasets (Kilgo, 2020), and even efforts to bring together queer theory and QuantCrit (e.g., QuantQueer, Strunk, 2024). Other approaches include the use of quantitative data to critically study disability (Parekh, 2024) and feminist quantitative approaches (Scott & Siltanen, 2017). However, QuantCrit comprises a specific set of critical quantitative work, whose development and tenets we outline next.

Development and Use of QuantCrit

It was in the 2018 *Race Education and Ethnicity* special issue that the terminology of "QuantCrit" was formally introduced. QuantCrit was the first framework to *explicitly* outline the application of CRT principles in quantitative research (Gillborn et al., 2018). It is important to note how this approach differs from other approaches, such as quantitative criticalism. For example, none of the commitments and paradigm shifts that Stage and colleagues outlined specifically focused on racism, the maintenance and default to the status quo (white supremacy), and the myth of neutral data in a racist society. Those earlier iterations of critical quantitative methodologies and quantitative criticalism might be best understood as a generalist approach that did not take up any particular theoretical perspective nor articulate any particular investments beyond the general idea of justice and equity aims. We also note that, occasionally, quantitative criticalism a la Stage and colleagues is referred to as "CritQuant," which is fundamentally different from QuantCrit. This book focuses on QuantCrit, which is an application of CRT to quantitative methodologies.

In the 2018 special issue, Garcia et al. (2018) made the case for QuantCrit. Other authors in that issue offered practical examples of its

application (López et al., 2018; Pérez Huber et al., 2018), and outlined the five principle tenets (Gillborn et al., 2018). Garcia et al. (2018) argued that without first reckoning with the history of eugenics, power structures, and individuals who have used quantitative work to oppress others, it is not possible to use quantitative methods for racial justice. They recommended that researchers conduct critical self-reflexivity of their positionalities, values, and praxis. The concept of a positionality/reflexivity statement is demonstrated in the same issue (López et al., 2018) and is now supported by a majority of the field (Boveda et al., 2023; Castillo & Gillborn, 2022). In the same issue, Huber et al. (2018) demonstrated how one might rethink measurement using a QuantCrit lens by using existing data. Lastly, Gillborn et al. (2018) formulated the five QuantCrit tenets as follows:

1 The centrality of racism—racism does not only exist as individually motivated acts of hatred or aggression. Racism is intertwined with the policies, laws, institutions, and cultural norms one exists in. Unless the user of data is cognizant of this racist reality, they run the risk of replicating (intentionally or unintentionally) existing racial inequalities.
2 Numbers are not neutral—unlike qualitative data, which is often questioned and its biases ribbed, quantitative data is more often taken at its face value. Numbers are constructed by humans. At every stage, researchers or data users decide how to collect, analyze, and interpret them. Thus, numbers are a reflection of the assumptions and biases of a racist society.
3 Categories, like racial groups, are neither "natural" nor given—"The things which are typically taken as markers of 'race' are superficial characteristics that have become inscribed with meaning through social interaction" (Castillo & Gillborn, 2022). When researchers collect demographic information such as race, it is not that they are measuring potential differences subject to some kind of biological distinction; rather, it is evidence of disparate social treatment according to the previously mentioned superficial characteristics. Similarly, categories like numbers are a reflection of the assumptions and biases of a racist society.
4 Data cannot "speak for themselves"—like qualitative data, numbers are not just lying around. They need articulating and contextualization. It is the responsibility of the users of data to choose which numbers best answer the questions at hand, present them in a way that is *accessible* to other stakeholders (i.e., teachers, parents, community members, policymakers), and contextualize the numbers in a way that describes their social, economic, statistical, and practical significance (if any).
5 Social justice/equity orientation—this tenet requires the user of data to not only be a critical consumer of the data and cognizant of its white supremacist biases but also use data to be an advocate of social justice. Quantitative data and analysis can and should inform both an understanding of the nature and depth of racial inequities and strategies to eliminate them.

QuantCrit, the education field writ large, and other disciplines are developing tools and strategies to begin reimagining the role that research and data can play in an anti-racist society. However, we must acknowledge that applying any framework and set of practices will not dismantle systemic racism. Although QuantCrit is still a nascent field of study, the concept has already spread to other fields, such as medicine and the art of writing (Gerido, 2020; Hammond, 2019). Recent reviews found over 400 articles in their initial searches, but most articles were published after 2018 (Castillo & Babb, 2024; Tabron & Thomas, 2023). Every article that was included in Castillo and Babb's (2024) review was published in 2019 or later. Educational organizations like the Society for Research on Educational Effectiveness (SREE) and the Center for Educational Opportunity Programs at the University of Kansas featured QuantCrit in their quantitative methods training series.

As QuantCrit takes off as a methodology and paradigm shift, it is even more important to emphasize that the process of learning how to QuantCrit will always be iterative, and as the world changes, researchers and users of data must be ready and continue to refine, unlearn, and relearn. Castillo and Gillborn (2022) published a "how to guide," and the next chapters intend to build on this foundation of "how to QuantCrit."

Our Positionality

Wendy Castillo

My life experiences as a Mexican American from East Los Angeles, a first-generation college student, and a multi-language learner who attended underfunded public schools have shaped my perspective on education quantitative research. My community was and still is segregated, and I lived in an almost 100% Latino community. Growing up there were few, if any, white-collar professionals. Most, like my father, were blue collar workers, and I did not know anyone who worked with data for a living. When I attended college and graduate school, I continued not seeing Latina's teaching or working in quantitative fields. My experiences as teacher in K-12 schools helped me understand the power numbers hold for school leaders and policy makers. I viewed statistics as part of understanding the "white man's language," and essential to being able to dismantle systemic racism. So, I began graduate school with an interest in quantitative methods. I trained in experimental methods, both randomized controlled trials and quasi-experimental design. At the time, I did not realize that these methods were positivist and postpositivist methods; and I did not know nor was I taught what those concepts referred to either. I took as many quantitative courses as I could and followed my advisor's trajectory by also training as a generalist rather than in any specific content area. My training was not Critical, it was traditional and postpositivist. I was not pushed to think about quantitative methods using any Critical frameworks. My coursework did use a general equity perspective that aimed to help

improve student outcomes, and sometimes focused on particular populations like urban, Black and Brown, and low-income students.

It was not until I graduated and obtained my Ph.D. that I realized the research approach I used perpetuated the status quo, white supremacy. I was doing research the way other quantitative researchers were doing it. When I thought about the impact research had in the last 30 years, it had not meaningfully improved outcomes. I had an internal reckoning and searched for quantitative anti-racism frameworks. The same year I graduated (2018) was also the year the special issue from the *Race, Education, and Ethnicity* journal published articles introducing the theory of QuantCrit and early examples of how to apply it. After reading this work, I began to use a QuantCrit approach in my work, first at a research-practice partnership at New York University, and then at the National Urban League, the largest civil rights organization in the U.S. Simultaneously I held a lectureship at Princeton where I infused a QuantCrit approach in my research methods and econometrics courses. Using a QuantCrit framework piqued my interest in conceptualizing and theorizing how to more specifically make each tenet actionable. Over the last four years, I have presented and written about how to apply QuantCrit.

Throughout the process of innovating new ways of approaching QuantCrit, I have made mistakes and learned from them. I think it is important to be transparent in my own process of learning how to QuantCrit. For example, initially I proposed using interaction terms to quantitatively simulate intersectionality, a practice that some QuantCrit scholars were already using (e.g., Jang, 2020; López et al., 2018; Suarez et al., 2021). I now realize that statistical interaction terms are measuring identities, often self-identified identities, not intersections of systems of oppression. A more ideal way to estimate intersectionality might be looking at the interaction between racism and sexism. But perhaps quantitative methods will never truly be able to capture the nuances of such complex and layered systems. Still interaction terms can still be a useful tool for subgroup analyses, but not to model intersectionality. I hope to set an example with my own vulnerability of my mistakes and motivate others to share the learnings from their work in order to progress as a field and strive to be better.

My position towards QuantCrit is distinctive and nuanced. As explained above, I approach it from the background of someone who trained in traditional methods that has unlearned and relearned (through iterative and continuous cycles) a new approach to quantitative methods. I acknowledge I am a novice to CRT, and do not consider myself a CRT scholar. Rather, I look forward to fine tuning indefinitely my understanding of the theory and conceptualizing how best to apply CRT to existing and new quantitative and mixed methodologies.

I realize that having attended two ivy leagues (Brown for undergraduate and University of Pennsylvania for graduate school) as well as having taught at one (Princeton) comes with a set of privileges where society biases these degrees as being superior to all others and a more reliable source of knowledge. Given these advantages, I have vowed to use my privilege to uplift the

voices of historically oppressed communities. I very specifically state uplift their voices because I do not intend to "speak for the voiceless." I believe these communities have voices, and it is my duty to uplift them to make sure they are heard. For example, I created the first open call to request proposals for funding while working for a family foundation. Prior to my effort, it was only open to those whom the organization was in communication or had an existing connection. I cocreated a computer science assessment for elementary students with teachers and district leaders to ensure it was culturally responsive to Black and Brown communities in New York City. I was also part of the founding team to establish the first Youth Advisory Committee at the National Urban League. Now, in my next role, as assistant professor in Educational Foundations at Montclair State University, one of the largest Hispanic Serving Institutions in the Northwest (second only to Lehman College CUNY), I look forward to lifting Latino voices and mentoring Latino students.

Although I possess the privileges of a renown pedigree, English was not my first language, I am the daughter of undocumented immigrants, and my street race (Lopez & Hogan, 2021) is "Mestiza." I also recognize that in some spaces I am a white-passing Latina. Given my background and life experiences, the barriers and lack of opportunities I encounter(ed) are the reason that I continue to work in education. I recognize that I cannot separate my life experiences from my scholarship. Rather, they are a source of knowledge from which I can draw from to inform my scholarship, also known as cultural intuition in the CRT literature (Bernal, 2016). As I continue my research in education, it is essential for me to recognize the biases and assumptions I may hold because of the negative and positive experiences I have had as a Latina in the United States public school system, higher education system, and workforce. I recognize my bias to support and improve the lives of Black and Brown students, and it is a bias I am proud of and do not wish to get rid of.

Kamden Strunk

My background with quantitative methodologies was, for the most part, very traditional. Throughout my undergraduate and master's degree experiences, all of my exposure to quantitative research was in the field of clinical psychology, and my instructor for those courses was a behaviorist. The emphasis on observable behavior in psychological research was strong. I even remember being at a conference and him remarking that a booth selling books on psychodynamic theory ought to be illegal. While I did not learn the word "positivism" until years later, my early exposure to research methods was entirely rooted in positivism. In my doctoral program, I was exposed to a wider array of approaches, including an entire course on epistemologies. Yet, my quantitative methods training at the doctoral level was entirely positivist in nature. I did not learn CRT in any of my coursework, and I am not sure if it was covered in any courses in the College of Education at Oklahoma State University, where I earned my Ph.D. at

the time. I did have one course in "Transforming Pedagogy," which it turned out was exclusively focused on Critical Theory (which, as we briefly described earlier in this chapter, is rooted in Marxist traditions). This was my first encounter with critical theoretical perspectives. I would later learn about feminist theory and queer theory in an elective seminar on "Gender in Education." Still, faculty at Oklahoma State and in national networks via the American Educational Research Association really discouraged further exploration. Yet, I thought that statistical analysis could be used to help achieve a more equitable education system. It was not until my first faculty job, at the University of Southern Mississippi, that I began to explore it more seriously. I had a group of supportive colleagues, including two who used CRT in their work, with which to think about and enact a more critical research practice. Over the two years I spent in Mississippi, we engaged in a broad range of activist work, education events with the community, and writing critical scholarship. It was with some people from that group that I eventually co-authored my first book about oppression and resistance in Mississippi's higher education context (Strunk et al., 2017). In that book, we tried to use statistics to argue that the patterns in Mississippi's educational outcomes were best explained by racism, rather than other factors like income. Since that time, I have learned, thought, and written much more about critical quantitative analyses, including but not limited to QuantCrit. But, I came to this having been trained first as a traditional quantitative methodologist, and later working to infuse critical perspectives into that work. As such, I tend to think first as a quantitative methodologist and statistician, asking how to infuse critical perspectives into that work.

I was also born and raised in Oklahoma in a deeply segregated society where, in retrospect, whiteness and white privilege are woven throughout my experiences. I grew up in white neighborhoods, went to predominantly white schools (all over 75% white at the time I attended), and never had a Black teacher until my doctoral program (even then it was in an informal mentoring capacity rather than as a course instructor). I have no doubt that whiteness shaped my educational outcomes, too. In high school, when I was not doing well in classes and my teachers complained about my performance, the school guidance counselor suggested I might be bored, and enrolled me in a dual-enrollment program at the local community college. As a result, I started my first year of college with 27 college credit hours already earned, when many other students with those same teacher complaints might have faced school disciplinary referrals. As a child, my maternal grandparents lived in a sundown town and held open hostility to people of Color. My parents looked down on them for that, but still held some negative views of their own. I remember as a child inviting people from school to my birthday and being scolded by my mother for inviting the only Black student in the class.

During my postdoctoral appointment at Oklahoma State, I worked with undergraduates at Langston University. Langston was the only HBCU in Oklahoma and was a short drive from the well-appointed state land-grant I attended. The resource disparities were striking. The faculty at Langston taught

heavy loads, worked in old buildings with very obvious signs of a lack of maintenance, and were paid substantially less than their just down the road. When I moved to Mississippi for my first faculty job, the racism was right out in the open again. In my first few weeks, I went outside in the evening to hear people chanting racist slogans over a loudspeaker in the distance. The city was more obviously segregated than those of my youth, or at least I saw it more clearly. We routinely heard racist rhetoric even in faculty meetings. I recall being told that, as a university with a relatively high population of Black students, we needed to lower our expectations because, we were told, those students could not achieve as much. However, I was lucky enough to be hired alongside critical scholars, including CRT scholars, who I could talk to after such meetings to unpack what had happened (and write about it, and send letters to administrators about it). When I moved to Auburn University, in Eastern Alabama, I again was lucky to land in a spot with colleagues who could push my thinking and provide critical perspectives that helped me continue to develop. It was during my time at Auburn that first wrote something that intentionally and formally took up CRT, while continuing to develop my own approaches to critical quantitative methodologies and continuing to learn from others who were developing those methods, as well.

My positionality relative to QuantCrit is, as a result, complex and nuanced. The systems of power and domination that QuantCrit seeks to confront, for the most part, benefit me. I experience intersectionality in that while I sometimes expression oppression and marginalization on account of my queer identity, I also benefit from systems that privilege men, cisgender people, and whiteness. CRT was not taught in my graduate programs, and I have learned it by reading, talking with colleagues, working with communities, and by writing. So, I approach CRT as a relative newcomer to the theory and will tend to ask how quantitative methods can take up CRT (rather than how CRT might take up quantitative methods) due to my background and experiences.

About the Book

This book is our attempt to put into writing how researchers and practitioners can enact QuantCrit. We do not seek to set down a list of absolute rules or a checklist of do's and don'ts. Rather, we hope to offer a set of ideas, tools to think with, and potential possibilities that might serve to inspire others who want to do anti-racist quantitative educational research. We explore each QuantCrit tenet in a full chapter. First, we explore the tenet and its meaning. Then, we offer applied examples of how that tenet might be taken up in educational research. The examples range from those that are easier to implement and can be used with secondary data, to more complex examples that would require a more radical reimagining of research approaches. We hope by providing a range of examples, we open possibilities for those who want to enact QuantCrit and work toward racial justice in education to do so using a variety of quantitative approaches in a variety of applied settings.

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2   The Centrality of Racism

The Centrality of Racism

That racism is a central, permanent, and normalized aspect of the United States and other Western societies is a core commitment of Critical Race Theory (CRT), and thus of QuantCrit as well. Importantly, the purpose is not to test *whether or not* racism is a central feature. Instead, it prompts them to ask how the tenet *that* racism is a central feature of United States society might inform different questions, analyses, and practices. For many quantitative researchers, this type of theoretical framework is less familiar. Often, quantitatively trained researchers learn an emphasis on theoretical model testing. We might collect data based on variables in the theoretical model, and then test how well that model "holds up" to the empirical data. Analytic theories like CRT function a bit differently. While it may at times be useful to "test" the tenets of CRT against empirical data, and empirical data can certainly highlight the way those tenets operate, "testing" the tenets is not really the point. Instead, the tenets are used as analytic frames to help make sense of the data, and in a larger sense, the social world. So, for the QuantCrit practitioner and researcher, the question becomes: how does the centrality of racism inform the questions one asks, the data one collects, the ways the data are analyzed, and the ways the analyses are interpreted and used to make program and policy decisions?

In a way, the centrality of racism is perhaps the most foundational tenet of QuantCrit. The other tenets, in large part, logically follow from this one. For example, if racism is a central, normalized, and permanent feature of society, then it logically follows that numbers and categories would not be neutral, as they were generated by a society with deeply embedded racism. Because of that dynamic, although not every QuantCrit project would take up every QuantCrit tenet, the centrality of racism would almost always be a component of a QuantCrit analysis or project.

In Chapter 1, we provided an overview of the CRT tenet of the permanence of racism. Here we briefly highlight the related tenet of the centrality of racism for QuantCrit before turning to examples of how this tenet might inform or shape the construction and use of quantitative research. Racism, in both

CRT and QuantCrit, is a permanent and central organizing feature of society. For example, scholars have pointed out the ways that racism permeates much of the U.S. jurisprudence, even the U.S. Constitution (Acharya, 2022; Feagin & Ducey, 2018; Wright, 2021). Racism occurs at both the personal level as well as the structural or systemic level. Because racism is systemic, though, individual racists or individually racist intent are not required for racism to continue and proliferate (Massey et al., 1975; McMorris, 1998). Racism so permeates society that beneath virtually every social institution and practice lies a layer of racial bias and discrimination, even when participants may not be actively aware of it (or when they have learned across a lifetime to be unaware of it).

Education serves as a prime example. While public education is often conceptualized as a public good that enriches society and encourages participatory democracy (Giroux, 1984), it also has deep and lasting roots of white supremacist ideology and racism. When originally conceived through the movement for "common schools" by Horace Mann in the mid-1800s, United States public education was open only to white children (Bell, 2004). It remained formally segregated by race through the 1950s and 1960s (with the date range being due to slow implementation of the U.S. Supreme Court's *Brown* decision across the nation; Clotfelter, 2004). Desegregation was slow, halting, and ultimately never fully accomplished, and today, public schools are, in many cases, at least as segregated as they were before *Brown* (Orfield & Jarvie, 2020). Public schools also existed in the second half of the 19th century for Indigenous populations in some regions, but with a very different intent than the schools for white children. Those schools for Indigenous children were forcibly enrolled (often against the wishes of the family and children), were boarding schools, and aimed to eliminate Indigenous cultures, languages, and practices in order to "kill the Indian in him, and save the man" (Pratt, 1892, p. 46). Those schools have been described by scholars as a form of cultural genocide (Shear, 2015). Moreover, there is evidence that at least some of those schools were also sites of violence and death, with recent discoveries of mass graves for children at some of those sites (Austen, 2021, May 28; Brooks, 2022, May 11).

Higher education has a similar history. As universities began in the early U.S., they were racially segregated and open only to men (Bonilla-Silva & Peoples, 2022; Stefkovich & Leas, 1994). The Morrill Act of 1862 saw the onset of land grant universities, massively expanding the reach of higher education across the U.S. (Singh, 2021). Those universities were, for the most part, exclusive to white students (Wheatle, 2019). Moreover, land grant universities were often "granted" Indigenous lands that had been taken by coercion or force, leading some to label the institutions "land-grab universities" (Lee & Ahtone, 2020; McCoy et al., 2021). Following the second Morrill Act of 1890, states began establishing universities that would also serve Black students. In most states, then, there would be separate land grant universities: one to

serve white students, and another for Black students (Wheatle, 2019). From their inception and carrying through to the present day, the resource disparities between primarily white-serving institutions (PWIs) and historically Black colleges and universities (HBCUs) have been vast (Brown & Burnette, 2014; Harris, 2021). Of course, HBCUs have also served as important sites of liberation, education, and organizing for communities of Color (Douglas, 2012; Hayes, 2007; Jones & Jones, 2022). But, the very foundations of higher education in the United States have also been deeply shaped by white supremacist ideologies. To put it another way, education has always been caught up with racism, eugenics, and even genocide. The very roots of public education in the United States are inextricably linked with racist ideas and movements. To put it more succinctly: Racism is central.

Racism, too, is more than the exclusion of people of Color, discrimination against them, or systemic biases. Racism is also in operation in which knowledges are normalized and centered, and which are marginalized or subjugated. The perspectives of white individuals, culture, achievements, and lifestyles often dominate the collective focus (Toldson, 2019). Researchers have long documented the "hidden curriculum" of schools, colleges, and universities, and the ways that it infuses the entire process of education with the norms, values, and ideals of whiteness (De Lissovoy, 2021; Giroux & Penna, 1979; MacDonald, 2019; Margolis & Romero, 1998). This, too, is racism, and it is a central feature of much educational data where white students are the dominant or norm or reference group, positioning students of Color as "other" in schools and society. It is beyond the scope of this text to thoroughly present the scholarship on the centrality of racism in United States education and the ways whiteness is centered, but we suggest interested readers consult authors such as Harris (2021), Leonardo (2013), Matias (2016), Lopez and Sleeter (2023), and many others. For the remainder of this chapter, we highlight actionable steps that researchers can take to enact QuantCrit principles in their work.

Take Action: Avoid Centering Whiteness

Related to the ways whiteness is centered in schools and society, so too is whiteness often centered in educational data and research. Implementing QuantCrit in your practice necessitates a shift away from a white-centric viewpoint. For example, majority white samples in research are often treated as "normal" samples, while samples with more students of Color are often treated as "diverse" samples. This sets the experiences and perceptions of white students and educators as the norm and sets the experiences and perceptions of students of Color as, at best, "other" and potentially even "abnormal." A similar dynamic plays out when researchers test models that include white as the reference or control group. A common example is with regression models that use so-called "dummy coding."[1] In "dummy coding," one group is treated as the reference or comparison group to which all other

groups are compared. In educational research, it has been quite common for the reference or comparison group to be white people. Researchers have pointed out the racist nature of this coding scheme, and suggest using other coding schemes (such as effect coding where the reference group is the grand mean rather than any particular group; Mayhew & Simonoff, 2015). As we explain below, changing the coding scheme only ameliorates the problem rather than solves it. But, this is a clear example of the centering of whiteness in research models.

While comparing students of Color to white students is not inherently at odds with QuantCrit principles, doing so without critically examining its implications is problematic. We advocate carefully considering which group is central to your analysis. There are several layers at which these racial comparisons can be problematic. First, researchers often tend to fall into a pattern sometimes called gap-gazing (Gutiérrez & Dixon-Román, 2011). In gap-gazing, researchers become fixated on demonstrating time and again that racial gaps exist in areas like achievement, health, and resources. One important consequence of gap-gazing is that it emerges from a deficit perspective. Looking for achievement gaps, for example, starts from an assumption about the deficits that students of Color might experience and seeks to quantify those deficits. Even with an equity-focused inquiry that documents racial gaps, the results can be quite easily appropriated to reinforce racist discourses. In one example, achievement gap research is often cited by individuals promoting views of students and families of Color as either inherently less academically talented or as having social deficits (such as families not valuing education) that hold back their achievement (Russell et al., 2022). Of course, those discourses are not aligned with the realities that researchers have documented, and achievement gaps are actually largely the result of racism (Holtz et al., 2023; Milner, 2008). However, the continued production of gap-gazing scholarship can work to reify existing dominant discourses that position students and families of Color as deficient, rather than highlighting the ways those students and families are marginalized and underserved.

Again, we do not suggest that a racial comparison can never be appropriate under any circumstances, but that they must be used carefully and reflexively, with researchers interrogating what the comparison might accomplish and whether it is appropriate. CRT researchers, in particular, have questioned the utility of continually redescribing inequitable outcomes when the available theory and research points to an entire social and educational system designed to create inequity in those very outcomes. Racial comparisons may not be the best way to move past that cycle of continually describing the inequities that exist and into work that uproots and reimagines systems that produce equity.

People often have the misunderstanding that to study racism or racial liberation, a racial comparison is necessary. It is not. First, racism can and should be studied in predominantly white populations. Secondly, it is also

possible and sometimes the best choice to study samples entirely comprised of students of Color. For example, studies of strategies for navigating school, or of resistance and resilience approaches, or of culturally sustaining school experiences, or of critical consciousness development may be well-suited for study among a sample of students of Color.

While, in our experience, researchers often default to studying race and racism through a comparative lens (and often a comparison of students of Color to white students), we suggest several alternatives:

1 Use a universal target or goal. For example, what outcomes would mark "success" and are there targets that could be set that help measure what helps students meet those targets? These kinds of comparisons might be thought of as criterion-referenced assessments as opposed to norm-referenced.
2 Use the overall average. This strategy will not always be the most appropriate, but can (as discussed earlier in this chapter) at least help researchers move away from centering whiteness as normative. That said, the overall average (or grand mean) can also be white centering depending on the sample. For example, in a school district with 75% white students, the grand mean will still skew heavily toward white students. Some statistical techniques (e.g., the ANOVA; Strunk & Mwavita, 2024) use the grand mean by default as the reference against which groups are compared. When racial group comparisons are necessary, a comparison to the grand mean might be a viable option. Other options might include using the mean of a particular school, class, district, or state, for example.
3 Analyze within groups. Understanding the nature of how racism shapes inputs and outcomes does not require, necessarily, racial comparisons at all. It may be possible and perhaps more helpful to study a phenomenon entirely within a single group. For example, Garvey et al. (2019) studied queer and trans students of Color using a quantitative lens, but did not include white students in the analysis at all. Doing so allowed for more nuanced and useful analysis of intra-group differences in experiences and needs than between-groups comparisons could have afforded. Other researchers have, for example, used within-groups analyses to understand the ways that factors like documented/undocumented immigration status and income might influence outcomes for Latina/o/x/e[2] students (Patler, 2018; Peguero, 2008).

So what does this mean for practitioners, and researchers in both the K-12 and higher education settings? Rather than compare your students to a contrived "white" normal, think about why the comparison is even happening in the first place, and choose the best analysis for the question you are trying to answer.

Take Action: Be Explicit about Race and Racism

CRT and, thus, QuantCrit call for explicit attention to the role of racism in shaping society and determining outcomes. In other words, researchers should say what they mean so that practitioners and other data users can use data and research as it was intended. The reality is that practitioners and researchers often lean on race-evasive euphemisms or define them in overly broad and often unhelpful ways. For example, the literature is replete with mentions of things like diversity, culture, urban schools, safety, belonging, and a host of other ways of talking about race without ever mentioning race. Take for example, what it means to refer to a school district as diverse. Diverse in what ways, exactly? Income? Gender? Sexual identity? Ability? Nationality? Immigration status? Often, "diverse" in the literature is meant to imply students of Color. Worse yet is the idea of a "diverse student" or a "student of a diverse background." An individual of a diverse background might imply a person who has experienced a range of different backgrounds, cultures, and ways of being, perhaps, but typically is another euphemism for a student of Color. Similarly, the notion of urban students or urban schools is often used as a euphemism for students of Color or majority-Black schools (which are sometimes but by no means always or even usually in urban environments). Doing research and using data to unsettle and combat racism requires practitioners and researchers to be clear and explicit with their language and intentions.

To that point, researchers also sometimes fall into the pattern of writing in ways that obscure their core meaning or use overly broad language that does not fully apply to their work. For example, the acronym BIPOC has become more commonplace, meaning Black, Indigenous, and People of Color. However, many samples described as BIPOC do not have meaningful Indigenous representation. A core logic of the BIPOC acronym is the centering of Black and Indigenous people, and grew out of the collaboration between Indigenous activists and Black Lives Matter organizers. Applying the term to a sample that does not include Indigenous people is usually inappropriate. Similarly, in research focused on Black students, it is better to simply state that the sample is comprised of Black students rather than using a more generalized term like students of Color or minority. Here, we do not mean to suggest there is only one way to name a group, but instead to challenge researchers to be intentional and explicit with their language so that it clearly conveys their work's purpose, intent, and applicability.

Specifically, we emphatically recommend that researchers offer operational definitions for race and racism in their work. This is particularly important for data users who aim to responsibly interpret and use research. The meanings of race and racism are fluid, political, and contextually determined. Researchers cannot simply state "racism" or "race" and assume readers will share their viewpoint on the meaning and utility of those terms. Instead, they should carefully define what they mean, how they made decisions about

operationalization and measurement, and cite the scholars whose work they are leaning on to build their definitions.

A final point, and one we return to several times throughout this book, is to avoid treating race and racism as interchangeable ideas or terms. We offer some specific approaches to moving toward centering racism later in this chapter and return to the idea of racial categories in later chapters. But it bears mentioning here, as well, because the use of race/racism language is another way that meanings can be confused, misconstrued, and taken out of context. An example is when researchers write that race was associated with, predicted or caused some outcome difference. Realistically, researchers broadly and generally know that race is almost never the actual causal variable in those relationships. There is not something biological or inherent in students of a particular race that causes an outcome. For example, race does not cause differences in school discipline rates or high school graduation rates. Rather, racial differences develop due to a complex set of sociopolitical relations, which include racism at individual, systemic, and structural levels.

Take Action: Directly Measure Racism

Often, researchers interested in studying the effects and impacts of racism use a range of proxy variables to stand in for racism. As we discussed earlier, a common proxy is race itself, where researchers conduct racial comparisons and interpret differences as being potentially driven by racism at the individual, structural, and/or systemic levels. While we would argue (and have argued elsewhere, e.g. Castillo & Gillborn, 2022) that interpreting racial differences through the lens of racism is preferable to attributing those differences to race itself (which is a nonsensical and empirically false attribution). We would also argue that the best-case scenario is a direct measurement of racism. Racism and its effects are not evenly distributed among members of the same racial categories, nor even members of the same micro-group or even household. Racism is a dynamic, resilient system and structure, and reaches different moments, different people, and different situations in varied and complex ways. As such, the direct measurement of racism would allow researchers to be much more precise and nuanced in the ways they assess how racism affects outcomes, life chances, and experiences.

Yet, the measurement of racism is notoriously complex and extremely difficult. This is a complicated suggestion for us to make, because there are not widely used and agreed upon measures of racism in educational research (or broadly speaking, in most fields). Moreover, racism is a complex, resilient social dynamic that often resists overt measurement (Bonilla-Silva, 2021). For example, asking a white person to what extent they harbor anti-Black racism is likely to elicit a stringent denial. Bonilla-Silva (2021), in his path-making work on individual-level racism, found that white people strongly denied racism—that racist was among the worst things one could call them—while

also repeating racist tropes and expressing skepticism about matters like inter-racial dating or discomfort with Black authority figures. Because so much of the research in education is based on self-report, tests, or surveys, measuring racism becomes extremely complex. How does one measure an attitude or belief that people are socialized to strongly deny?

Moreover, measuring experiences of racism on the part of people of Color is equally as complicated. Racism is more than individual racist interactions (e.g., being called a racial slur, having a racist insult used against one, or being denied an opportunity on the basis of race). It extends to the structural and systemic levels (e.g., unequal resources, segregated schools, racist laws and policies, uneven enforcement actions) and even at the environmental level (e.g., the concentrations of pollution, chemical plants, sewage facilities, and other environmental factors that actively undermine health and, through harms to brain health, learning opportunities; Assari & Mincy, 2021; Muscatell et al., 2022; Grasser & Jovanovic, 2022). Asking individuals in a self-report survey about those factors is unlikely to be helpful. Systems and structures are often completely opaque to those whom they affect (DiAngelo, 2016; Vaught & Castagno, 2020). Even at the individual experience level, researchers have documented the tendency of individuals to minimize even overt and obvious forms of racism as less serious (Irby-Shasanmi & Leech, 2017; Williams, 2016). Individual racism also functions at the level of microaggression, where slight, subtle, and daily comments and experiences accumulate (Domínguez & Embrick, 2020; Sue et al., 2007). But part of the power of microaggressions is that each individual comment or slight is so small and subtle that one might question whether they really experienced it at all, in a kind of racial gaslighting. As a result, it is extremely difficult to meaningfully survey people about microaggressions.

However, scholars have attempted to measure racism in various ways. Measuring racism requires a careful consideration of how one defines racism and at what level one is attempting to measure it (e.g., individual, systemic, structural). Measures of one type or level of racism cannot stand in for other types or levels. For example, a measure of individual racism does not account for structural or systemic racism, or vice versa. There are also varied conceptualizations and sub-conceptualizations of racism, such as anti-Blackness (Willams Comrie et al., 2020, June), whiteness (Schooley et al., 2019), white privilege (McIntosh, 1998), and others. Below we briefly highlight some of the ways that researchers have attempted to quantify racism in different settings and at different levels.

Individual Racism

Individual racism is arguable among the easier or more straightforward to measure. People of Color can be asked about their experiences with individual racism. White people can be asked about their own racist beliefs or actions. Notably, because racism requires an element of social power behind

the racial bias, discrimination, or violence, white people in the United States cannot experience racism, per se. They can experience individual-level bias, discrimination, or even violence, but because there is not a social system behind that experience (as a white supremacist social order underlies those experiences for people of Color), those experiences cannot be properly considered racism). But, for the reasons discussed earlier in this chapter, measuring even individual racism is complicated and difficult.

Researchers have for decades attempted to measure people of Color's experiences with individual racism. Over the past several decades, researchers have conceived multiple approaches to those measures. One example, the Adolescent Discrimination Distress Scale, includes items such as, "You were discouraged from joining an advanced level class," and, "you were called racially insulting names" (Fisher et al., 2000). Another example is the Index of Race-Related Stress, which includes items such as, "You were passed over for an important school project although you were better at the task than the white/non-Black person given the task" (Brigham, 1993). The Perceived Racism Scale attempts to measure both overt and subtle racism, with items such as, "Whites often don't include me in study groups," and, "I have been made to feel uncomfortable in a classroom" (Dominguez McNeilly et al., 1996). The Everyday Discrimination Scale is less specific to racism, but is often used as a measure for discrimination, and includes items such as, "You are treated with less courtesy than other people are," and, "You are called names or insulted" (Williams et al., 1997). Others have attempted to measure microaggressions, such as with the Racial and Ethnic Microaggressions Scale, which includes items such as, "Someone assumed that I would have a lower education because of my race," and, "Someone avoided eye contact with me because of my race" (Nadal, 2011). There are numerous other existing examples of attempts to measure the experience of racial discrimination, bias, or microaggressions in the literature. As the sample items point out, such measurement is difficult and nuanced. Additionally, the nature of racism rapidly evolves as it morphs to meet the socio-political moment, meaning measures become rapidly out of date (several of the above examples include language that might now be seen as outdated). Researchers should carefully evaluate the content of various available scales to determine which might be most appropriate for the particular sample, questions, and study definitions.

Researchers have also made efforts to measure and quantify the racist attitudes, beliefs, and behaviors of white people. One of the more commonly used scales is the Color-blind[3] Racial Attitudes Scale (CoBRAS), which measures color-evasive racist attitudes with items such as "Racism may have been a problem in the past, but it is not an important problem today," and, "Talking about racial issues causes unnecessary tension" (Neville et al., 2000). Similarly, the White Racial Identity Scale attempts to measure white racial attitudes with items such as, "Racism only exists in the minds of Black people," and, "The White race will be polluted by intermarriage with Blacks"

(Helms & Carter, 1990). That scale also attempts to measure more positively the possibility of anti-racist white attitudes with items such as, "I speak up in a White group situation when I feel that a White person is being racist," and, "It is White people's responsibility to eliminate racism in the United States." One notable example that does not rely on self-report is the set of tests known as implicit association tests (IAT) that use reaction times to gauge subtle or implicit racist attitudes (Greenwald et al., 1998; Nosek et al., 2007). While these tests have been controversial (e.g., Schimmack, 2019), they are still used as a way to measure racism without directly asking white participants whether or not they are racist. These tests involve sorting items into those on the screen's right side versus the left. In various rounds of testing, the right-hand side of the screen might be positive attributes and white faces while the left is negative attributes and Black faces, while in a later round that pairing would be inverted. By measuring how long it takes a person to pair a white face with a positive attribute versus a Black face with a positive attribute (and similarly for negative attributes), the test attempts to quantify the implicit association one holds between racial groups and positive/negative ideas.

For practitioners looking for additional measures of whiteness and white racial attitude, see Schooley et al. (2019) and Atkins (2014) useful reviews. Researchers have also recently developed measures of white racial allyship. These include the Racial Allyship Scale, which includes items such as, "It's not fair, but I've gotten lots of advantages from being White," and, "White supremacy needs to be addressed for our country to move forward" (Williams & Sharif, 2021). Similar to direct survey measures of experiences of racism, measures of white racial attitudes are complicated, situation- and time-dependent, and vary widely in their quality. Researchers should carefully assess the available scales to determine which might most closely meet the needs, definitions, and contexts of their work.

In general, the available survey measures for practitioners and searchers to use are at the individual-level racism are uneven, tend to be older (e.g., most are more than 20 years old at the time of this writing), and may not neatly align with definitions of racism that are common in CRT. Because of that, we also recommend that researchers consider undertaking scale development work to create new, innovative scales that more readily integrate with CRT (and thus with QuantCrit). That work will not be a fit for most individuals as scale development projects demand particular expertise in psychometric research and are time- and resource-intensive. For example, most scale development projects will involve at least three phases, including initial content development and validation, then initial testing of the instrument followed by revision, followed by a final round of testing in a new sample. This also means multiple relatively large samples must be collected. In short, that work is important, but will require expertise, time, and, frankly, funding to carry out. We recommend that organizations with the resources to support such work should do so, as better measurement of racism will be essential to the future of QuantCrit work.

Structural and Systemic Racism

Structural and systemic racism have been less widely measured in educational research than in other fields, most notably sociology and health sciences. One approach uses geographic information systems (GIS) or other geography-related metrics to understand racism at a structural or systemic level. This approach often analyzes racial segregation through racist housing policies (e.g. redlining, restrictive covenants, and exclusionary zoning policies) and indices that are a composite of indicators of disproportionality (Furtado et al., 2023; Kramer & Hogue, 2009; Williams & Collins, 2001). Others attempt to take up multiple large-scale datasets like the American Community Survey and attempt to create composite variables that capture the cumulative impact of structures and policies (Adkins-Jackson et al., 2022). For example, researchers might take the combination of inequitable civic participation, voting power, treatment by the judicial system, and health care access at the level of a neighborhood, city, metropolitan statistical area, or state as a measure of structural racism in that location (Hardeman et al., 2022). Other researchers have used the combination of mass incarceration, educational attainment, employment data wealth, and residential segregation to create a composite county-level estimate of structural racism (Siegel et al., 2023).

While few educational researchers have yet posited such measures, some approaches exist to measuring structural racism, particularly for schools. For example, Polos et al. (2022) quantified school-level structural racism based on a combination of student demographics, sense of connectedness, perceived life chances, school discipline data, and school attendance metrics. They did so in the context of public health research, but their approach might also be useful for education researchers.

In general, measures of systemic and structural racism have relied on existing public datasets to create indexes based on housing, employment, law enforcement, healthcare, political participation, incarceration rates, and other factors that might indicate greater or lesser degrees of systemic and structural racism. We note that, in general, the literature has tended to use systemic and structural racism as closely related and largely overlapping constructs. While such measures have not yet been broadly used in educational research, they show promise in the measurement of racism beyond the level of individual perceptions. We recommend that QuantCrit practitioners and researchers consider how such approaches might enrich their research.

Summary

QuantCrit in practice and research, recognizes the centrality of racism to schooling, education, and society. White supremacist ideologies are infused throughout education in both informal and formal curricula and shape life chances and educational outcomes of students, families, and communities.

In this chapter, we have made several recommendations for practitioners and researchers to consider in their work, which we briefly summarize below:

- Ask how starting with the centrality of racism as an assumption might guide the selection of different questions, measures, and models.
- Avoid the use of white-centric models, variables, and analyses.
- Carefully consider the appropriateness of racial comparisons. When comparisons are necessary, avoid treating white as the normal or reference group. Consider approaches such as comparing to a universal goal or criterion, using the grand/overall mean as a comparison point (with the caution that in majority-white samples, this may not be substantively different from comparing to white as the reference group), or analyzing within-groups patterns and differences (whether in white samples or samples of people of Color).
- Clearly define race and racism in the research and interrogate how the variables, models, and analyses do or do not align with those definitions. The definitions should be based on the critical race literature for those engaging QuantCrit as a framework, and should have clear citational engagement with that literature.
- Whenever possible, directly measure racism. This can be at the individual level (e.g., experiences of racism among people of Color, or white racial attitudes) and/or the systemic and structural levels.

In the next chapter, we consider how the QuantCrit principle that numbers are not neutral might further challenge researchers to reconsider their quantitative research.

Notes

1 The term "dummy coding" is widely used in statistical analysis, but has been critiqued for its use of ableist language. We use it here because there is no commonly used alternative term, but place it in quotes to mark it as a contested and problematic term.

2 Throughout the text, we use varying terminology for Latino, Latina, Latinx, Latine, and Hispanic people and populations. In general, we use the form Latina/o/x/e to capture various identities and terminology preferences. Because Latino is masculine-gendered and Latina is feminine-gendered, people have proposed various more inclusive language. This has included Latinx, which is a preferred term for some queer and trans people (Gonzalez, 2022), but is critiqued by others in part due to its lack of a clear Spanish pronunciation (Salinas, 2020), while others suggest it is a colonizing term (Gonzalez, 2022). Others have proposed the use of Latine as an alternative to Latinx which has a clearer history of Spanish-language use and pronunciation (Miranda et al., 2023). In other cases, we use Hispanic, particularly when referring to Census data and other sources which include this term. We discuss this language more in Chapter 4.

3 We note that, more recently, researchers have moved toward the language of color-evasive instead of color-blind. This is due to two primary factors: Color-blind is an ableist word choice that positions blindness as a moral failing, and the form of racism to which it refers does not involve a person who is actually unable to

perceive color/race, but rather a person who has learned to evade talking about color/race (Annamma REF?). Thus, color-evasive or race-evasive are more accurate terms that also avoid the ableist implications of color-blind language.

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3 Numbers Are Not Neutral

Numbers Are Not Neutral[1]

Some of the earliest quantitative data in education came from the SAT, originally known as the Scholastic Aptitude test, and its enmeshment with white supremacy. By the year 1900, twelve northeastern universities had collaborated to streamline the admissions process by creating the College Entrance Examination Board. For James Conant, the former President of Harvard University, an entrance exam did not suffice. He envisioned a new scholarship exam that would serve as an academic equalizer for all men (he was likely referring to all *white* men, and certainly meant *only* men) across the United States, regardless of income (Lemann, 1999. Using the Army Alpha aptitude test as a framework, the same framework Yerkes (1932) used to ensure disqualification of Black men from military officer status, the SAT was developed to assess higher-order reasoning skills and help predict academic success in college (Lemann, 1999). The development of the SAT was also led by Carl Brigham, another eugenicist who believed that tests could be used to demonstrate the intellectual superiority of white people and warned of the dangers of interracial relationships and procreation (Rosales & Walker, 2021).

The SAT, and many similar tests of aptitude, deeply embed cultural biases in their items, where knowledge of vocabulary or analogies rely on particular white-normed turns of phrase or object relations. Still, the SAT (and ACT and other similar tests) remain in widespread usage in higher education to the present day and have continued to exclude minoritized students from admission to selective colleges and merit scholarships for schools that offer them (Carnevale et al., 2019; Geiser, 2020; Mattern et al., 2011; Walpole et al., 2005; Zwick & Greif Green, 2007). Moreover, researchers have argued that such tests are not particularly strong predictors of college attainment beyond their correlation with income (Dixon-Román et al., 2013; Sackett et al., 2012). Of course, wealth is also stratified by race given the endemic white supremacist economy of the United States, compounding the racial bias of such (Aliprantis et al., 2021; Derenoncourt et al, 2024; Gupta et al., 2023; Boerma & Karabarbounis, 2021; Kermani & Wong, 2021). The same is true of intelligence tests, which were developed for explicitly racist aims of keeping Black men from

becoming officers in the United States Military (Yerkes, 1932). Intelligence tests demonstrate extreme and persistent racial bias. The items on intelligence tests also rely on cultural rather than intellectual skills, asking test takers to parse idioms, make sense of uncommon or advance terms, and engage in a range of tasks that carry cultural bias (Au, 2020; Gillborn, 2016). These commonly used numbers that often stand in for ability, aptitude, or intellect are all too easy to take up uncritically, but those numbers are themselves ideological products with inextricable ties to eugenics and white supremacy.

Most assessments used in education center the culture, norms, and values of white middle-class children by using questions that disadvantage students from historically oppressed communities who may have differing social, economic, and familial contexts than their white peers (Modaffari & Jimenez, 2021). Some examples, aside from the SAT, include local/state/national standardized achievement tests, such as the National Assessment of Education Progress (NAEP), Iowa Test of Basic Skills, TerraNova, and State of Texas Assessment of Academic Readiness (STAAR). These assessments have been developed by predominantly white men (National Center for Education Statistics, n.d.a) and are problematic because they act as gatekeepers for specialized high schools, gifted and talented programs, and grade-level retention (Center for Measurement Justice, n.d.). In addition, when students of Color perform poorly on tests that do not center their culture and ways of knowing, it creates a deficit-narrative around their capacity rather than a focus on the cumulative effects of systemic racism (Harper & Davis, 2012; Howard, 2016; Noguera, 2003). Efforts have begun by scholars like Jennifer Randall, whose Center for Measurement Justice is creating new anti-racist assessments centered on the liberation and learning for Black, Brown, and Indigenous students. That said, even with "better" tests, or "less racist" tests, the logics of high-stakes educational testing remain deeply rooted in racism, and it will take more than tweaks on a test to unseat that legacy.

Following federal mandates from No Child Left Behind and Race to the Top, state and local districts have established an infrastructure to collect massive amounts of student and teacher data annually. While those federal programs were superficially intended to measure and narrow gaps between different students and different schools, their logics of accountability have long been critiqued by Critical Race Theory (CRT) and other critical scholars. Scholars have various described the programs as race-evasive (Leonardo, 2007), anti-Black (Wun, 2022), and a way of evading the real (racist) causes of educational disparities (Freeman, 2005). Using achievement test data, those programs required growth in test scores within a school and offered various punishments for failing to meet goals and incentives for meeting or exceeding those arbitrary goals. However, those systems of accountability often harm students they are purported to be benefiting the most, and can exacerbate the existing disparities at under-resourced schools (Darling-Hammond, 2007). That is, the problem is not simply that the tests are racially biased (even though they frequently are, and often proceed from racist

and eugenic intellectual traditions), but also that the core logic of testing accountability fails to move schools towards equity. In more recent years, schools have begun adding to their data collection apparatus to include data on attendance, discipline, teacher effectiveness, even sense of belonging. The volume of education data continues to increase, making it all too easy to take up those data without critically evaluating their meaning, purpose, and ideological production.

All of these education data are socially constructed within, as CRT and QuantCrit point out, a deeply racist society. QuantCrit researchers must critically analyze who produced the data, what the ideological investments of those people and the data might be, how the data might reflect or reproduce racism, and how the data might be reconsidered. This is really not a particularly revolutionary concept, even for traditional quantitative researchers. A core concept in testing and measurement is that validity is not a property of tests, it is a property of the interpretation and use of a test score (American Educational Research Association et al., 2014; Strunk & Mwavita, 2024). In other words, it would never be correct to say the SAT is valid, or this test of mathematics achievement is valid. Tests cannot be valid, even in the most ardently positivist quantitative traditions. Instead, it is the interpretation and use of the score that might be valid. So, the question is not whether the SAT is valid. The question would instead be what constitutes a valid interpretation of, for example, the SAT Verbal score. What exactly does that score represent? How can that score be used? Would it be valid to use this score to determine whether someone could succeed in college? These are traditional considerations around validity. QuantCrit adds the layer of asking who intended particular uses, whether those uses might reflect underlying racist ideologies, and what new interpretations and uses might CRT (and potentially other critical frameworks) generate. This is further complicated by how the analyst/researcher decides to splice the data, analyze, and interpret it, which can lead to telling one particular story or truth when, in reality, many exist. Therefore, numbers are not neutral.

Take Action: Switch from an Outcome to an Inputs Approach

Much of applying QuantCrit involves a mental shift in one's approach to the work. One shift that has been recommended by researchers is that rather than starting with the outputs or outcomes of education like standardized tests, start with the inputs that shaped those outcomes (Strunk, 2023). It might be a very different study/analysis to research Black students' schooling experience by comparing what kinds of resources, educators, and supports are in place than it would be to simply compare their end-of-year achievement test scores to white students, especially in a segregated school system like that in the United States. Shifting from comparing outputs to comparing inputs helps put the focus on the systems and structures that produce inequitable outcomes, rather than simply re-documenting the inequitable outcomes repeatedly.

This inputs-first approach enables the tenets of QuantCrit to be implemented by starting with the assumption that data is not neutral and racism is present and active within schools. Consider K-12 school discipline data as an example. Discipline data could be seen as both an input and an output. In this example, we will consider it an output. Discipline data are not neutral—the same behavior by the same student can be interpreted, coded, and reported (or not be seen as reportable at all) by different teachers. Similarly, the same behavior from different students often results in very different reactions. What for one student might be viewed as assertive, self-confident, or showing initiative could be viewed as defiant, disrespectful, or disobedience when enacted by a different student.

Researchers have documented the ways that school discipline falls disproportionately on students of Color (Fasching-Varner et al., 2014; Hirschfield, 2008; Simmons, 2016; Stovall, 2016; Zabala-Eisshofer et al., 2024). Moreover, the presence of School Resource Officers (SROs) is often positioned as an intervention to reduce or prevent violence (though scholars have argued that SROs also inflict violence, and often fail to prevent the most extreme instances like school shootings; Turner & Beneke, 2020). However, the presence of SROs is, in general, associated with an increase in racial disparities, particularly in terms of school-based arrests (Fisher et al., 2022; Theriot, 2009; Williams et al., 2022). The presence of SROs also predicts more recorded disciplinary infractions for Black students in particular (Advancement Project, 2024). This school-prison nexus (Gardner et al., 2022; Krueger, 2010; Winn & Winn, 2015) shows up in multiple ways in education, but students, especially students of Color, routinely face arrest and legal system ramifications for in-school behavior that is unevenly enforced in racialized patterns. Additionally, schools make various decisions about what data to report. In most areas, schools report local data at the district level, report discipline data to the state department of education, and further report discipline data to the federal government. Highlighting the non-neutrality of data, Baggett and Andrzejewski (2021) found that districts often reported very different data across these three levels, and the differences were difficult to explain. It appears the discipline data suffers not only from simple accuracy issues (transposing columns, missing a line during data entry, entering something incorrectly) but also ideological issues in what data schools choose to recode as they report to different agencies and governing authorities. As a result of these dynamics, a researcher who wants to use school discipline data might initially think they have readily available and ready-to-use large scale data. What they really have is an ideological, political, and social imbroglio to disentangle in order to make sense of those data.

Another part of this mental shift is approaching the work from the perspective of how the inputs can change structures and institutions to remove barriers to enable students' success rather than how we can change students to fit into the system. In the discipline example, think about the reasons students of Color are disciplined. This line of thinking will lead to collecting the input

data that is influencing the discipline data and questioning whether the solutions should target individuals versus institutions and systems. With this new approach, rather than looking at disciplinary rates by race/ethnicity, which researchers have shown time and time again exist and are predicted and explained by CRT, consider these alternative input indicators:

1 **Get data on class sizes.** Research has shown smaller class sizes can lead to improved academic outcomes, but also student engagement and student behavior, and is even more beneficial for low-income, students of Color, and students with learning challenges (Achilles, 2012; Blatchford et al., 2011; Bosworth, 2014; Chingos & Whitehurst, 2011). Having fewer students allows teachers to focus on students' strengths, more student–teacher interaction, and encourage supportive behavior among classmates. Twenty-eight states have laws in place to not allow more than a 1:25 ratio until 3rd grade, with research indicating that 18 is the most optimal in elementary school (Blatchford et al., 2011). However, lower class sizes help all students in all grades (Millsap et al, 2004).
2 **Get data on support staff-student ratios.** The recommendation for counselors and social workers is a student ratio of 1:250, while the school psychologist's recommended ratio is 1:500 (American School Counselor Association, n.d.; National Association of School Psychologists, 2024; School Social Workers Association of America, n.d.). Only 14% of districts meet the counselor ratio, and 8% meet the school psychologist ratio. Further disturbing is that, on average, schools with more white students more often met the recommended ratios (Prothero & Riser-Kositsky, 2022). Perhaps behind the discipline number is a lack of access to mental health support and a backlog of school psychologists trying to assess students with special needs.
3 **Get data on the race/ethnicity of teachers.** Research shows that students of Color with teachers who share the same racial/ethnic background are less likely to have lower exclusionary disciplinary rates (Lindsay & Hart, 2017) and have more positive experiences and attitudes in school (Egalite & Kisida, 2016). In addition, it is well documented that for students of Color, having teachers of similar racial/ethnic backgrounds is related to better academic outcomes (Gershenson et al, 2022 Grissom et al., 2017) and more referrals for gifted and talented programs for students of Color (Grissom & Redding, 2015)
4 **Get data on SROs.** SROs interventions target reforming the individual through arrests and disciplinary infractions rather than through the implicit and explicit school systems and culture. To date, no evidence (qualitative or quantitative) shows SROs positively benefiting students and schools (Arneson et al., 2024; Zabala-Eisshofer et al., 2024). Given the lack of evidence, it is even more important to get numeric data on SROs and understand how these numbers vary compared to nearby districts and majority white schools/districts. Furthermore, gathering survey data on how their

presence is perceived by students, teachers, parents, and administrators could inform their reform or abolishment.

5 **Analyze school climate data.** Districts like NYC, Tulsa, and Seattle Public Schools are now administering surveys to teachers, students, and parents. In NYC, they ask questions on student–teacher trust, conflict resolution, bullying prevention, belonging, and valuing students and families' racial/ethnic backgrounds. In addition, data on access to extracurricular activities is also included in these surveys (New York City Department of Education, n.d.a). Examining these results alongside SRO numbers, support staff ratios, class sizes, and discipline outcomes could explain some of the underlying causes of either positive or harmful interventions and behavior.

Next, we offer an example from higher education contexts. Hispanic serving institutions (HSI), unlike historically Black colleges and universities (HBCUs) that were intentionally created to serve Black students, were not designed to serve Hispanic[2] students. The term HSI is an "after the fact" term applied to colleges and universities with at least 25% Latino enrollment and they fall under the umbrella of minority serving institutions (MSIs). Latino college enrollment (input) has outpaced other racial-ethnic groups, however, not in bachelor degree attainment (output) (Dyer & Román-Torres, 2022).

Drawing on the QuantCrit tenets that data is not neutral and that racism is central, one may think they are off to a good start by beginning with enrollment (input). However, institutions of higher education, including HSIs, were not designed to serve Latino students. They were intended to serve predominantly white students who matriculate directly after high school, which may explain why Latinos are not graduating at the same high rates in which they enroll. With this context, some other input and structural data to consider collecting aside from enrollment include the following:

1 **Funding per pupil.** HSIs receive the least amount of funding from the federal government compared to other MSIs despite having the largest enrollment numbers (Anguiano and Navarro, 2020). Getting data on how HSI per pupil funding compares to funding at predominantly white institutions (PWIs) will begin to show the inequitable inputs.

2 **Equity audits.** Center for American Progress recommends that institutions conduct equity audits to improve outcomes for historically oppressed students. They recommend collecting data on financial aid and admission policies to ensure equity in early admissions, and treatment of transfer and legacy students. Other essential data indicators include reviews of bridge programs, mental health services, academic supports, and child care centers, and analyzing data on faculty diversity and accessibility of classes and programs (Bombardier, 2019).

  Excellencia in Education (n.d.) provides a framework as part of its seal of excellence to HSIs that intentionally serve Latino students as part of a

comprehensive institutional strategy (data, practice, and leadership). It includes the following data indicators in addition to enrollment data.

3 **Retention data.** Knowing when a student is falling out of the pipeline and combining this data without other survey measures, such as belonging or other measures that proxy barriers like working hours or course times, can help build interventions to keep Latino students in school. A recent survey found that more than 45% of Latino college students work, and they are more likely to work full-time and not be involved in any extracurricular activities than their peers (Flaherty, 2023).

4 **Transfer data**. Not all transfer data is created equal. Some students do not intend to transfer from a two-year to a four-year since their goal may be a certificate or associate's degree. There is upward transfer data for those who move from a two-year college to a four-year college. There are also lateral transfers, where students go from one two-year college to another two-year college and, similarly, from one four-year to another four-year college. Lastly, there are reverse transfers, where students go from a four-year to a two-year college. Data from the National Student Clearinghouse indicates that upward transfers have declined, while lateral and reverse have increased, accounting for most of the transfer enrollment decline (National Student Clearinghouse, 2023). They did not disaggregate these outcomes by race/ethnicity.

5 **Financial student support.** With the rising costs of higher education, financial aid is more important than ever. Latinos receive grants at lower rates than their Black, Pacific Islander, and Native American/Indian peers (National Center for Education Statistics, 2019). Not that loans are the solution or should increase, but they are one way to help pay for college, and Latinos take loans at lower rates than their Black, Pacific Islander, Native American, and white peers (Elengold et al., 2021). Understanding how financial support varies at HSIs and how students pay for college will help support Latino student success.

6 **Representation of Latinos in staff, administration, and faculty.** Although staff and administration can improve its diversity, faculty, especially full-time Latino faculty, is strikingly low. Researchers studying K-12 teachers have demonstrated that teachers of similar racial/ethnic backgrounds as their students improve academic outcomes (Gershenson et al, 2022; Grissom et al., 2017). New research proves the same logic can be applied to a higher education context (Curtis, 2021). Yet, in fall 2021, only 5.5% of full-time faculty are Latino and only 3.1% are tenure-track, while HSIs have at least 25% of their student body identifying as Latino (National Center for Education Statistics, n.d.b).

Both the K-12 and higher education examples recommend finding existing data to understand the inputs shaping student outputs/outcomes. This data may not be easily accessible, so one must advocate for schools, districts, and institutions to prioritize it and make it accessible. Once this data is made

available, one should use it strategically to advocate for creating interventions and policies that support the most vulnerable students. Part of using a CRT approach is to be action-oriented. We will discuss using data for advocacy in more depth in Chapters 5 and 6 when the QuantCrit tenets "Voice and Insight: Numbers do not speak for themselves" and "Justice and Equity Orientation."

Take Action: Variable and Model Selection

Researchers often employ measures and models that are white-normed. Usually, researchers do this with relative unawareness of the fact the tool they are using is white-normed. For example, Usher (2018) documented how the vast majority of motivation models, variables, and measures were created by white researchers in predominantly white samples collected at PWIs. The result is the exclusion of community input in model development and models that may not be culturally responsive and valid for people of Color. Similarly, most theories of learning, models of student engagement, and student-teacher interactions have been developed in predominantly white samples with little to no consideration of race and racism (Strunk & Andrzejewski, 2023).

QuantCrit in practice, recommends researchers to carefully consider which variables to use, how those variables were or will be measured, to what extent those variables and measures might be steeped in whiteness, and the implications of selecting those variables to create a model. A model can tell how much variation is "explained" by the variables that were included, but it will not select the variables itself (that selection is done by human researchers), and each variable is not hermetically sealed from the rest of the world. Sometimes, researchers seem to include variables for no reason other than they are able to; they may think that including the maximum number of variables makes their research more detailed, comprehensive or valid; the opposite is the case (see Gillborn et al, 2021). Each variable that is included will reduce the apparent effect of other variables: it is possible, therefore, to muddy the waters simply by including a surplus of variables without any sensible judgment about which might be the most relevant. That is, are researchers and practitioners throwing into the calculation lots of factors which may have a dubious relevance to the research question? In this way "the signal is overwhelmed by the noise" (Miller, 2020).

For example, a model might include variables that control for socioeconomic status (SES) and/or prior achievement including an SAT score in higher education. Remember that SES and prior achievement do not exist independent of racism. SES is inextricably linked to racial wealth inequality stemming from accumulation of racist policies. And students of Color are generally overrepresented in low-resourced schools and tracks, and students in under-resourced schools have less experienced teachers, face lower expectations, and have few role models, among other inhibiting circumstances (Heitzeg,

2016; Brown, 2014). Thus, when controlling for prior achievement and/or SES, one can also think of it in a sense as "controlling" for racist systems and disguising the effects of racism students experienced in prior years of education (Gilborn et al, 2021; Gillborn, 2010). Even more damaging is when the data and models present the results as if it is a deficit of the individual, rather than an effect of the system.

Measures of variables and models developed with whiteness at their center, without samples that were racially diverse (and diverse across other dimensions of identity), without the input of communities of Color, and with race-evasive conceptual frameworks simply will not be up to the task of racial justice. QuantCrit might mean moving away from the foundational or mainstay variables and models. In other cases, researchers may need to reconceptualize constructs or reimagine measurement strategies.

Take Action: Define Terms and Denominators

We humans place definitions on the quantitative data we collect. So, QuantCrit researchers and practitioners must be explicit and provide our definitions of the data (see the appendix for definitions of key terms used in this book). Originating from technology companies, many education agencies and organizations have adopted dashboards or data snapshots to understand who they are serving and their progress toward academic goals. When publishing data visualizations, it is essential to define any terms in a note, table, appendix, or footnote and be as explicit as possible. Failure to do so leaves the data up for interpretation as one can see in the example below. New York City (NYC) Department of Education (DOE) schools annually posts the following DOE Data at a Glance:

- "In 2022-23, there were 1,047,895 students in the NYC school system, the largest school district in the United States. Of those students:
- 14.1% of students were English Language Learners
- 20.9% were students with disabilities
- 72.8% were economically disadvantaged
- Race or ethnicity:

  - 41.1% Hispanic
  - 23.7% black
  - 16.5% Asian
  - 14.7% white

- 140,918 were in charter schools"

From the above data snapshot, the following terms should be defined: economically disadvantaged, English Language Learner, and disability. Defining what is economically disadvantaged is particularly important in the context of NYC, one of the most expensive cities in the U.S., which might look

different from the rest of the country. English Language Learners is no longer a preferred term in education because it doesn't have the asset-based perspective that a term like "Multi-language learner" does by emphasizing the skills students already possess and valuing knowing more than one language (Najarro, 2023). The type of disability the dashboard is referring to is not specified: is it cognitive, noncognitive, or both? This ambiguity leaves the data user with many unanswered questions.

In this "at a glance" New York City Department of Education (n.d.b) dashboard, only four race/ethnicity categories are provided. The following missing "typical" categories are glaringly obvious: Pacific Islander and Native American/Indian. However, given the large (over one million) number of students and being one of the most diverse cities in the country, more detailed racial/ethnic categories could have been published without issues of identifiable data. In addition, without any explanation, Hispanic and Asian are capitalized, but not Black or white. In this book, we have added a footnote in Chapter 1 stating, "Asian, Black, and Latino are capitalized in this book because these words reflect a shared identity and community. "White" is intentionally not capitalized because it holds a distinct array of connotations; capitalizing this term in such a context could inadvertently align with the narratives promoted by white supremacists and center them." Perhaps in the case of NYC DOE it is to distinguish references to skin color versus other races/ethnicities that do not refer to skin color.

Let's take a higher education example: the University of California provides many dashboards. Table 3.1 shows Fall enrollment numbers and percent by race/ethnicity data that can be found online (University of California, 2024).

Table 3.1 University of California Fall Enrollment and Percent

	2015	2016	2017	2018	2019	2020	2021	2022	2023
African American	1,466	1,926	1,873	1,915	1,778	1,916	2,298	2,274	2,404
African American (%)	4	4	4	4	4	4	4	5	5
American Indian	217	217	204	223	193	184	214	310	320
American Indian (%)	1	0	0	0	0	0	0	1	1
Asian	14,373	15,766	15,390	16,294	16,246	17,347	17,990	18,381	18,670
Asian (%)	35	33	33	35	35	37	35	38	37
Hispanic/Latino(a)	9,992	12,540	11,960	11,678	11,695	11,916	13,573	13,065	14,482
Hispanic/Latino(a) (%)	24	26	26	25	25	26	26	27	28
Pacific Islander	129	102	97	104	116	97	137	101	125
Pacific Islander (%)	0	0	0	0	0	0	0	0	0
White	8,719	9,790	9,314	8,871	8,867	8,826	10,152	8,813	9,030
White (%)	21	21	20	19	19	19	20	18	18
Unknown	1,201	1,309	1,214	1,327	1,128	1,334	1,355	1,187	1,349
Unknown (%)	3	3	3	3	2	3	3	2	3
International	5,459	5,829	5,954	6,265	5,928	5,089	6,008	4,457	4,586
International (%)	13	12	13	13	13	11	12	9	9

Unlike the K-12 example, the UC system provides both the number and percent. However, it is much more information to consume and more challenging to read. The dashboard also allows users to filter by gender, sexual orientation, and UC campus. Most importantly, unlike the K-12 example, there are definitions at the bottom of the page that define gender and sexual orientation identity as well as international identity. They did not define or explain the race/ethnicity categories; however, they defined these terms on other web pages and used more nuanced categories than those above.

Here are their definitions (University of California, 2024):

1 **Applicants**—Students who make a formal application to attend the University of California.
2 **Admits**—Students who have been made a formal offer of admission to attend the University of California.
3 **Enrollees**—Students who have accepted an offer of admission and are enrolled at the University of California.
4 **Freshmen**—Students from high schools. Includes applicants with college coursework taken during high school or the summer after graduation.
5 **Transfers**—Students from community colleges or other postsecondary institutions.
6 **California Residents**—Applicants who are residents of California for admission purposes.
7 **Domestic Nonresidents**—Applicants who are residents of the United States but not residents of California for admission purposes.
8 **International**—Applicants who are not residents of the United States for admission purposes.
9 **Source school**—Last school attended.
10 **Gender identity**—Prior to 2016, UC collected only binary "Male/Female" gender through a voluntary question and individuals not identifying with these categories were grouped as "Unknown." For fall 2015 and prior years, gender data on this dashboard reflects these categories. Beginning in 2016, UC began collecting expanded gender identity information as part of the CA Gender Recognition Act, including a nonbinary category and four additional gender identity categories. On this dashboard, for fall 2016 and later, gender reflects gender identity categories used in the most recent year. Note that the category "Woman" was previously "Female," "Man" was previously "Male," "Nonbinary" was previously "Genderqueer/Gender non-Conforming" and "Genderqueer or Nonbinary Gender," "Transgender Woman/Trans Woman" was previously "Trans Female/Trans Woman," and "Transgender Man/Trans Man" was previously "Trans Male/Trans Man." The gender identity on this dashboard reflects selections made by students at the time of application. Enrollment data may reflect updates made with campus registrars after enrolling.

11 **Sexual orientation**—UC began collecting sexual orientation data in 2016. The data on this dashboard reflects selections made by students at the time of application. Enrollment data may reflect updates made with campus registrars after enrolling.

Their disaggregated race dashboard has footnotes explaining when students are asked about their race/ethnicity and how category options have changed over time. Further, they have an entire document detailing the historical context of how race/ethnicity questions were once worded versus how they are now asked, including all the categorical options, for example, "Which of the following groups best describes your racial background? Check as many categories as may apply."

In addition to explicitly defining key terms, relatedly is being explicit on how averages from dashboards are calculated: who is (is not) in the denominator? Said differently, who is being counted, and who is not? An analysis may present averages or model coefficients that are 'accurate' (i.e. mathematically there is no error), but this is not the end of the researcher/analyst's responsibility to present a meaningful picture or the responsibility of the data user. The accuracy of the averages and coefficients depends on how well they represent the group of people under analysis.

In K-12 education, averages on data accountability indicators are calculated at the school, district, and state levels. When schools and districts report their achievement scores, do they include all students with Individualized Education Plans (IEPs), only selective (cognitive versus noncognitive) IEPs, or none at all? Each denominator will tell a different story and can have varying implications for students of Color. If there are proportionally more Black students (and this number may be artificially lower due to under-identification) compared to other racial/ethnic groups, then not including IEP students can provide a distorted representation of Black students' outcomes.

Consider a higher education example. When colleges report their faculty diversity by race/ethnicity, they can use all full-time faculty as a denominator or both full-time and part-time. If they choose to report just full-time, does the denominator include non-tenured faculty, such as visiting professors and lecturers? These choices can have varying implications in their presentation of the data. Tenure-track jobs are more competitive to obtain and held by men. Thirty-eight percent of all full-time faculty positions in the U.S. are held by white men (National Center for Education Statistics, n.d.b). When the National Center for Education Statistics (n.d.b) presents faculty diversity data, they include all full-time faculty: only 5.5% of faculty are Latino, and 5.8% are Black. If one analyzes further, only 3.1% of all tenure-track faculty are Latino, and 3.5% are Black. And for those who have already achieved tenure, the percentages are even more striking: 1.9% of tenured faculty are Latino, and 2% are Black. Although one percentage point might not seem like a lot, it equates to about 8,370 fewer professors. This means that the difference between the number of full-time Latino faculty to the number of tenured Latino faculty ($5.5 - 1.9 = 3.6$ percentage point difference) equates to about 30,000 individuals.

Applying QuantCrit to practice means transparency all around. In other words, researchers and practitioners should include definitions of the terms related to the data, as well as clarity on who is and is not included in the denominator. These practices allow for responsible and accurate use of data and help reduce misinterpretation of the data.

Summary

QuantCrit in practice and research, recognizes the non-neutrality of numbers. White supremacist ideologies are infused throughout education in the selection of accountability outcomes, variables, and model selection. In this chapter, we have made several recommendations for practitioners and researchers to consider in their work, which we briefly summarize below:

- Switch from an outcome to an inputs approach to capture barriers and inequities that shape inequitable outcomes.
- Carefully consider which variables to select, how those variables were or will be measured, to what extent those variables and measures might center white individuals, and the implications of selecting those variables to create a model for students of Color.
- Be explicit and provide definitions for all data so that data users can accurately represent the data they analyze and use it responsibly.
- When presenting averages, be explicit about the denominator so data users know who is being counted and who is not.

In the next chapter, we consider how the third QuantCrit principle, "categories are neither natural nor given," might further challenge researchers to reconsider their quantitative research.

Notes

1 Portions of this chapter were adapted from Castillo, W., & Gillborn, D. (2022). How to "QuantCrit": Practices and questions for education data researchers and users (EdWorkingPaper: 22-546). Retrieved from Annenberg Institute at Brown University. https://doi.org/10.26300/v5kh-dd65

2 The term "Hispanic" is used only in reference to Hispanic-serving institutions (HSIs) because it is an official federal designation. Throughout the text, we use varying terminology for Latino, Latina, Latinx, Latine, and Hispanic people and populations. In general, we use the form Latina/o/x/e to capture various identities and terminology preferences. Because Latino is masculine-gendered and Latina is feminine-gendered, people have proposed various more inclusive language. This has included Latinx, which is a preferred term for some queer and trans people (REF), but is critiqued by others in part due to its lack of a clear Spanish pronunciation (REF), while others suggest it is a colonizing term (REF). Others have proposed the use of Latine as an alternative to Latinx which has a clearer history of Spanish-language use and pronunciation (REF). In other cases, we use Hispanic, particularly when referring to Census data and other sources which include this term. We discuss this language more in Chapter 4.

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4 Categories Are Neither Neutral nor Natural

Racial Categories and the Power of a Label

It is very easy to think about categories, and perhaps especially racial categories, as neutral, natural, or fixed. They can feel so stable, so obvious, so *easy* that their political, ideological, and sociohistorical nature is obscured. In fact, racial categories are anything but neutral, natural, or fixed. Their definitions have shifted over time to meet various political uses of the categories, and those definitions remain fluid. At one level, there is the problem that the commonly used racial categories are problematic, imprecise, and fail to capture the ways that many people self-identify. At another level, though, the issue is not so much that the particular set of categories is bad, but that the scheme of categorization in general is intricately linked with racism, white supremacy, and eugenics. Categories are often deployed as tools of oppression and marginalization, and researchers should recognize the risks that any set of categories pose while also considering how and whether categories might be useful. And importantly, the categories are not "real"—they are socially constructed. As we reviewed in Chapter 1, Critical Race Theory (CRT) holds that race is a social construction rather than a material reality (Cabrera, 2018; Mills & Unsworth, 2018; Parker, 1998). And this is particularly true at the level of racial categories. While there are "real" differences in things like ancestry and skin tone, those characteristics are one part of what is then taken up in the social discourse of "race." The social construction of "race," then, sediments into racial categories that are used to define and reify differences and to create a social hierarchy. The categories are often arbitrary, always political and ideological, and deserve careful scrutiny by those employing QuantCrit perspectives.

CRT scholars often point to the historical meanings of terms like white as examples of the social construction of racial categories. The very idea of a category of people called white is linked with European colonization of the Americas (LaFleur, 2020; Mills, 2020). It is a recent invention rooted in Western culture (Du Bois, 1910). Its earliest known uses derive from comparisons of European colonizers with Indigenous people in the Americas (then known as the West Indies). As colonization proceeded in the Americas and Africa,

Europeans increasingly used the term white to refer to themselves (Omi & Winant, 2014). However, that use was not merely the product of Europeans noticing variability in skin tone between various regions. Rather, it was used to denote those who were higher in their imagined hierarchy of human worth, with white people at the top of that hierarchy, Indigenous people (often called "savages") lower down, and Africans (sometimes referred to as "subhuman") at the bottom. This set of racial categorizations was ideological and political—and it supported the Europeans right to colonize the Americas (including the literal and cultural genocides that accompanied that settler-colonialism (Grosfoguel, 2013)), as well as their enslavement of Africans (Nobles, 2000). Over time, the system of racial categorization in what would become the United States continued to evolve, and a system of anti-Black racism quickly took hold. Initially, enslavement was an individual status that was justified by enslavers in part based on race. Over time, enslavement came to be defined as a hereditary status (Welch, 2004), effectively making the categories of Black and enslaved synonymous. When enslaved people and poor white people collaborated in rebellions against wealthy plantation owners, the resulting moves in law and practice deepened race as a central defining category of social life. Specifically, laws began to regulate the interaction of people from varying racial groups in what eventually became segregation (Lopez, 2006). This same set of laws and practices further entrenched the status of Black people as subordinate and marginalized and white people as privileged and centered in society.

As race took a more and more central role in policies and practices in the United States, the question of what exactly made a person white became increasingly important. Because being white conveyed a number of societal benefits and affordances, many people sought to be recognized as white. Notably, this led to a long series of U.S. Supreme Court and other judicial decisions attempting to define what exactly made someone white. Some of those cases have become infamous, such as the Dred Scott v. Sanford decision, in which the Court declared that Black people were inferior with "no rights which the white man was bound to respect" (*Scott vs. Sandford*, 1856). Other cases centered, though, around what criteria would allow one to be white. For example, in Ozawa vs. United States (1922), brought by a Japanese immigrant seeking citizenship, the U.S. Supreme Court ruled that the plaintiff was ineligible for citizenship because Japanese immigrants, regardless of their skin color or other physical attributes, were not white.

The Court employed a shifting array of criteria, from the infamous "one drop" rule, where one drop of non-white blood renders one non-white, to efforts at scrutinizing skin tone, facial bone structure, ancestry, and ultimately simply the opinion of the day (Lopez, 2006). U.S. law and jurisprudence evolved over time, with courts deciding that Chinese, Japanese, Hawaiian, Burmese, and other immigrants were not white, while Syrian, Irish, German, Finnish, and other immigrants were white. Some European immigrant populations were denied the category of white, or at least took some years to fully

attain that status, such as Italian immigrants who were sometimes (though not commonly) required to classify themselves as non-white (Guglielmo, 2004; Jacobson, 1999). However, while whiteness has been redefined over time and, at times, used to exclude or marginalize people who would today be commonly understood as white, the category was mostly defined in opposition to Black in an effort to deny the rights of citizenship, property, and self to enslaved and later subjugated people (Foste & Tevis, 2022; Leonardo, 2009).

Racial categorization schemes, then, developed largely in service to white supremacist and colonizing agendas. The category of "white" developed, for the most part, as a category of exclusion and of giving rights to some that are denied to others, offering protections to some that are unavailable to others, and legislating a racial hierarchy. One of the ways those categories have become so common and so widely used is due to the U.S. Census, which many data users and researchers defer to in constructing their own categorization schemes.

Racial Categories in the U.S. Census

Researchers measuring race often default to the categories used by the U.S. Census. On a certain level, this is a sensible choice as it allows researchers to make comparisons with the population to determine whether their samples are representative. The Census categories, though, are not neutral, natural, or fixed. They have a long, ideologically fraught, and racist history. When researchers default to those categories unreflexively, they (whether unknowingly or knowingly) take up those histories and racial ideologies. At present, the U.S. Census has six racial categories and two ethnic categories. The racial categories include American Indian or Alaskan Native, Black or African American, Native Hawaiian or Pacific Islander, white, or Some Other Race. The two ethnic categories are Hispanic and Not Hispanic (Jensen, 2021, August 4). Individuals must select both a race and an ethnicity on the Census so that one could be white and Hispanic or Latino, or Black or African American and Hispanic or Latino. In practice, many researchers use a set of seven categories by specifying white, non-Hispanic and Black, non-Hispanic, and adding a Hispanic category to their analysis.

Historically, the Census categories have changed rather dramatically. The earliest versions of the Census had only three racial categories: free whites, all other free persons, and slaves (Lee, 2010). Later, the Census added a category for free colored persons, followed later by the addition of a "mulatto" category. In 1860, the category of Indian was added. After emancipation, the Census was updated to categories of white, Black, "mulatto," Indian, and Chinese. In 1890, Japanese was added, and in 1900 "mulatto" was dropped but then added back in 1910. Categories continued to be added over time, including Korean, Filipino, and Hindu. In 1930, "mulatto" again was dropped from the Census, but "Negro" was added and defined as anyone with any Black ancestry. At the same time, Mexican was added, which had previously

been included in the white category. Mexican was dropped again in 1940 (moving Mexican individuals back into the white category). It was not until 1970 that the Census added a question about Hispanic ethnicity was added (Nobles, 2000). This is not an exhaustive history of the Census categories but is intended to show the ways that the federal definitions of race have shifted back and forth, morphing and changing over time. And specifically, those changes were driven by ideological and political goals. For example, the addition of many categories was driven by a concern about immigration from various parts of the world, but only when those immigrants were not white (e.g., there were no additional European categories added, but the Census added categories for various Asian nations before ultimately recombining those in top-line statistics).

One particular example is the category of "Hispanic." As outlined above, the definition of this term has been fluid, and it is a relatively recent development in U.S. racial categorizations. The root of the term relates to Spanish heritage (Gimenez, 1989). Labeling people from North, Central, and South America as Hispanic is, thus, a colonizing label (Arana, 2024). Those in these regions with Spanish heritage have that background largely because of the violent conquest, colonization, and genocides that took place throughout the region by Spain. Further, the label continues a kind of colonial erasure of Indigenous peoples throughout the Americas who do not trace their ancestry to Spain. Still, many people strongly identify with the term "Hispanic," with some objecting to alternative language like Latina/o/x/e, Chicana/o/x, their country of origin, and others (García, 2020; Salinas & Lozano, 2019). The genesis of the term "Hispanic" in Census data resulted from advocacy by people to whom that label might apply (Martínez & Gonzalez, 2021). Additionally, there are people who identify as Afro-Latina/o/x/e (who might be "Black, Hispanic" in the Census), adding additional complexity to the term (Haywood, 2017).

In March 2024, the Office of Management and Budget announced that it would merge the race and ethnicity question for the 2030 census. The impetus behind merging these two questions came from the overcounting of white individuals and undercounting of "Hispanic" individuals in the 2020 census (Khubba et al., 2022). This applies to white-passing Latina/o/x/e's who may feel forced to select "white" even if they do not identify this way and are not offered the privileges of being white in America. However, the Latino/a/x/e community is both diverse racially and in their experiences, with wide variability in things like complexion (due to colorism; Charles, 2021; Quiros & Dawson, 2013), immigration status (Cisneros, 2018; Enriquez, 2017; Muñoz, 2016), language (Bishop & Kelley, 2013; Campbell-Montalvo, 2020), and more.

Although race and ethnicity are distinct concepts, two-thirds of Latina/o/x/e people consider "Hispanic" or "Latino" their race (Pew Research Center, 2015). While both race and ethnicity are socio-political constructs, they are not the same. Ethnicity encompasses multiple dimensions, including

language, culture, religion, and nationality, while race is a designation based primarily on physical characteristics, including but not only skin color. Since neither "Hispanic" nor Latina/o/x/e are an option for the race question, for Afro-Latina/o/x/e individuals, who constitute 12% of the Latina/o/x/e population (Gonzalez-Barrera, 2022), having separate questions has allowed them to mark Latina/o/x/e as their ethnicity and Black as their racial identity. Early research from the Federal Committee on Statistical Methodology published work finding that merging the question would undercount the Afro-Latina/o/x/e population (AfroLatino Coalition, 2024). And more than 30 organizations that support the Afro-Latino community have joined to create the AfroLatino Coalition to bring awareness to the issue of undercounting Afro-Latinos.

There is no easy, one-size-fits-all answer to how to measure race among people the Census would label as Hispanic. It is contested and presents difficulties for racial equity-oriented researchers. The new options would still allow Afro-Latinos to mark both Hispanic and Black, but within the confines of one question, and thus conflating race and ethnicity. Both these new approaches as well as the old two-step approach incorrectly imply that they are two separate identities. Pew Research (Gonzalez-Barrera, 2022) found that using another separate question (in addition to the current Census questions) that directly asked participants if they identify as Afro-Latino yielded more respondents than using a two-step question. Perhaps the solution lies in experimenting with more different approaches and phrasing, and analyzing which yields the best representation from the most marginalized Latina/o/x/e communities, Afro-Latina/o/x/e, and Indigenous communities. Those applying QuantCrit should be intentional and transparent with how they chose to ask questions about race and ethnicity, which categories they include, and how they code racial categories.

Similar to the Latin/a/o/x/e/Hispanic category, Black is a contested and complex category. While researchers may sometimes deploy the category unreflexively, it is layered and nuanced. For example, researchers have documented differences in experience, income, wealth, and outcomes between first-generation Black immigrants from Africa and the Caribbean and differences between those groups and Black individuals born in the United States (Jackson & Cothran, 2003; Manuel et al., 2012). For example, Black immigrants start businesses at higher rates than American-born Black individuals and complete college at higher numbers (Howard, 2019). It makes intuitive sense that those differences would exist. A person born in the United States will experience the racist social order in very different ways than a person born in Africa or the Caribbean might. At the same time, recent U.S. immigrants may face different financial, employment, and housing barriers than those born in the U.S.

In a final example, researchers may tend to deploy the category of Asian as a monolith and use it without additional nuance. However, researchers have demonstrated across the past several decades that people within the category of Asian can be highly varied in their resource access, experiences,

and outcomes. For example, Teranishi (2007) found large differences between students who recently immigrated to the United States from Southeast Asia versus mainland China. For example, poverty rates among Hmong, Cambodian, and Laotian families were two to four times higher than those for Chinese, Japanese, or Korean families. Similar patterns played out in high school graduation rates. As a result, Teranishi argued for more nuanced data collection and analysis of Asian students' opportunities and outcomes, and against treating Asian people as a monolithic and homogenous group. Similar arguments can be made for all of the standard racial categories, which often do not account for variations in needs, languages, aspirations, resources, or outcomes.

Our point in describing these complexities around racial categories often used by researchers, policymakers, and large-scale datasets is that the categories are not neutral, natural, fixed, or uncontested and may not always be meaningful. Researchers and data users must ask themselves critical questions about why these categories exist in the first place (i.e., racism) and how they are using these socially constructed categories of race and ethnicity. What sources are they leaning on for their definitions of race and ethnicity? Who might their choices about measuring race and ethnicity center or marginalize? Who might those choices exclude? There may be times, questions, and projects where centering particular groups will make sense and be an equity-oriented choice. However, who the research centers or excludes is a choice researchers should be clear, transparent, and thoughtful about.

Categorization Beyond Race

While we have emphasized racial categories in this chapter so far, racial categories are not the only type of category that needs scrutiny, can produce oppression, and should be carefully examined by QuantCrit researchers. In fact, this tenet of QuantCrit is one where there is very clear overlap with other perspectives, including queer theory and critical studies of disability. Here, we briefly overview those critiques and how they might inform an approach to categories and categorizations within a QuantCrit framework.

In queer theory (and broadly in queer studies research), scholars often deconstruct identity categories, demonstrating how they are sociopolitical and ideological constructions rather than natural or neutral groupings of people with similar characteristics. This is most notably applied in queer theoretical work to sexual and gender categories. For example, queer scholars point to the complexities of seemingly simple or commonly understood categories like sex assigned at birth. While it is commonly understood as a natural, biological, binary classification of male or female, the genetic and physiological realities are much more complex. For starters, around 1.7% of humans are born with intersex characteristics that do not fit neatly into a male or female categorization (Blackless et al., 2000). Those individuals are often surgically altered to cause their physiology and, often specifically, external

genital presentation to conform to the binary male/female categorization more closely (Davis & Evans, 2018). Researchers have also documented that multiple genetic and physiological sex categories exist among humans (Fausto-Sterling, 2000). And yet, the social category of sex assigned at birth is binary and so prominently understood as binary that it can feel radical to suggest that sex is not so simple. Gender is more commonly understood (except in some radically conservative circles; Gutzwa, 2021) as a social construction with some relationship to sex assigned at birth. Various conceptualizations of gender exist, but most acknowledge the social nature of gender as a set of norms, expectations, and socialization experiences that are in some way correlated with the sex one is assigned at birth (Davies & Hoskin, 2021). Sex is not truly binary—it is much more complex. So, it should come as no surprise that a social construct built on top of sex categories would also be complex. Gender involves layers of social expectations, socialization, interests, activities, clothing choices, grooming and aesthetic choices, career paths, personality characteristics, and more. Socially constructed notions of masculinity and femininity come to bear in this categorization of gender, as well.

But for queer theorists, there is an inherent rejection of the notion that gender is real in a material sense at all. Queer theory involves a "continuous deconstruction of the tenets of positivism at the heart of identity politics" (Eng et al., 2005, p. 3). This is a rejection of the idea that there is an interior and essential nature of any identity category. Identity categories like "man" or "woman" or "nonbinary" are sociopolitical constructions with the power to acquire and discipline subjects (Butler, 1993a). Identities are, instead, performative. Importantly, the use of performativity in queer theory is different from what has emerged in more colloquial usage, where performative has come to mean phony or even manipulative. In queer theory, performativity is instead a theory of identity in which identities are discursive constructions. Or, as Butler (1988) phrased it, the "self is not only irretrievably 'outside,' constituted in social discourse, but that the ascription of interiority is itself a publicly regulated and sanctioned form of fabrication" (p. 528). The identities and their categorizations cannot exist apart from social discourses which give rise to them. Identity performances, then, "are for the most part compulsory performances, ones which none of us choose, but each of us is forced to negotiate" (Butler, 1993b, p. 26). Often, the categories are created and reproduced in order to name who is "deviant, undesirable, or subject to violence" (Strunk, 2024, p. 11). While this analysis is most often applied by queer theorists to sexual and gender identities, it would apply to any and all identity categories as well.

Categorization and naming is, for queer theorists, dangerous. The categories constrain what is possible, who is worthy, and do so "within certain limits which are deemed by a majority within-group as acceptable" (Gunn & McAllister, 2013, p. 161). Categories, then, also mark who is normal, centered, and valued versus those who are other, marginalized, and in need of surveillance and discipline. As we have discussed earlier in this chapter, this

is true of racial categories as well, where their construction has gone hand-in-hand with the construction of a white supremacist hierarchy. Put simply, "if anything, queer theory teaches that naming kills" (Morris, 2000, p. 27). Butler (1993b) clarified that "this is not an argument *against* using identity categories, but it is a reminder of the risk that attends every such usage" (p. 19).

In another example, scholars in the field of critical studies of disability make similar arguments about disability categories. The category of "disabled" is, in this framework, a purely social construction. Such scholars point out that who is (dis)abled in a given moment and space is determined by how the space was constructed and for what reasons. For example, a space that is physically inaccessible by a wheelchair user represents a series of choices (to build stairs instead of ramps, to use fixed desks instead of moveable ones, etc.) made by the designers of the space more than it represents anything intrinsic about the wheelchair user. Systems of racism and ableism "externally imposes identities on individuals by applying socially constructed labels" (Annamma et al., 2013, p. 9). As such, critical scholars of disability question "how normative cultures of ability or disability are conceived, materialized, spatialized and populated, or … mapped onto bodies marked by differences of race, class, gender, and ability" (McRuer, 2006, pp. 71–72). Such scholars also reject the medical model of disability that places disability labels as an essential, biological, diagnostic category to be applied to certain bodies, instead arguing for a social model of disability (Erevelles, 2019). And as others have pointed out, the categories of (dis)ability and race have a closely linked history (Annamma et al., 2013). Both categorization schemes served to construct hierarchies of worth and value (Loutzenheiser & Erevelles, 2019). The intersections of racism and ableism positioned people of Color as intellectually inferior, and ableism positioned varying intellectual abilities as signaling who deserved to be valued and who could be dehumanized and treated brutally. Scholars have also described the intersections of racism and ableism in the development and application of DisCrit, which brings CRT to disability studies in an intersectional analysis (Annamma et al., 2018).

So then, categories are dangerous, they are risky, and they are social constructions. There is no natural, neutral, or ideologically detached way to categorize humans. That does not mean researchers and practitioners should never use categories. As Strunk (2024) suggested:

> Researchers should consider what work the categories they mobilize in their research might do. What are the implicit beliefs about human identity that are manifest in the categories they choose to construct in their surveys or datasets? In what ways might researchers imagine different ways to construct those analytic categories? (p. 11).

Next, we provide some practical suggestions on how researchers and practitioners might think about and use categories differently in their work.

Take Action: Contextualize the Categories that Matter

While categories are dangerous, they also have uses that are difficult to escape. One example is in higher education data. The U.S. federal government mandates that universities collect and publish demographic information, and that they must do so in ways that conform to the standards of the Integrated Postsecondary Education Data System (IPEDS). IPEDS, in turn, relies on similar racial and ethnic categories as the U.S. Census, which are incomplete and problematic for a range of reasons, as described earlier in this chapter. So, how can those charged with handling institutional data meet the external demands of accreditors and the federal government while also working toward more liberatory and meaningful data practices? How can they contextualize their data collection in more meaningful ways?

One example of a potential strategy can be found in the University of California system's racial data collection practices (University of California, 2024, April 18). While they collect data that conform to IPEDS standards, they also collect detailed subgroup information. For example, they disaggregate the African American or Black IPEDS category into African American/Black, African, Caribbean, and Other African American/Black. For Asian students, they disaggregate to Chinese, Asian Indian, Vietnamese, Filipino, Korean, Japanese, Taiwanese, East Indian, Indonesian, Cambodian, Thai, Bangladeshi, Hmong, Laotian, Sri Lankan, and Other Asian. They also include racial categories of Iranian, Armenian, Lebanese, Egyptian, Israeli, Palestinian, Afghan, Turkish, Syrian, Iraqi, Jordanian, Moroccan, Saudi Arabian, Assyrian, Yemeni, Algerian, and Kurdish.

We do not intend to suggest that more racial categories are "better"—but that it may be worth considering whether more detailed categories might allow for different analyses and inferences. For example, at UCLA, for the Fall 2023 admissions cycle, while 12.59% of African students were admitted, the number was 9.72% for African American students. Of Cuban applicants, 8.88% were accepted, while only 6.01% of Puerto Rican applicants were admitted. Among Asian applicants, for those who were Taiwanese, 11.23% were admitted, while only 5.91% of Hmong applicants were admitted. In some cases, deeper levels of disaggregation can produce more nuanced results that may help educators and researchers make different decisions about what funding, resources, and supports are necessary. But even in this example, we also wonder what groups might have gone uncounted or placed into an "other" category who might have unique needs and experiences that are uncaptured by these categories. Additionally, nuanced categories can be helpful, but they still carry the same risks as any other scheme of categorization.

Another example is in the way that some institutions, including Virginia Commonwealth University (n.d.), have begun collecting gender data. The federal government mandates that these data be collected as "male" or "female" only for submission through IPEDS. As we reviewed earlier in this chapter, neither male nor female are really genders (and instead refer to sex assigned

at birth, which is also more complex than this binary would allow). But beyond that, gender is not a binary construct. Institutions might be interested in understanding the needs, experiences, and outcomes of nonbinary, genderqueer, two-spirit, and agender students, as well as those who are transgender in addition to being men or women. As a result, many institutions of higher education have begun collecting an additional set of data on gender identity, in addition to sex assigned at birth. Virginia Commonwealth University, for example, collects in categories of cisgender man, cisgender woman, exploring, gender nonconforming, genderqueer, non-binary, prefer not to disclose, questioning, transgender man, and transgender woman. Of note, though, because this second question is optional, a large number of students do not answer it (26.2% as of Fall 2023), though the percentage of those not reporting has declined over time (it was 82.0% in Fall of 2020, 58.1% in Fall of 2021, and 39.0% in Fall of 2022 at this particular institution).

This tension between mandatory data collection and attempts to collect more equity-oriented data presents a similar question as the one we explored earlier with regard to race. How can the institution meet federal data mandates while also looking to more liberatory and humanizing data collection practices? One answer is to collect the data in multiple ways or phases. For example, students may be asked for the sex listed on their birth certificate, then also asked for their gender identity. They might even be asked an additional question about whether they identify as transgender or cisgender. For example, the first question may be:

Sex assigned at birth (the sex listed on your birth certificate):

- Female
- Intersex
- Male

Gender:

- Agender
- Genderqueer
- Man
- Nonbinary
- Two-spirit
- Woman

Do you identify as transgender?

- Yes
- No

We also note that in the above example that it may be possible to extrapolate transgender status from the combination of sex assigned at birth and

gender, but we would encourage allowing students to self-identify with that label rather than it being researcher-assigned. We have also presented the response options in alphabetical order, but different response option orderings may be appropriate depending on the sample and circumstances.

But, when possible, we would urge researchers and others who collect data to reconsider the categorization altogether. For example, researchers might consider a "Select all that apply" response mechanism. Ideally, researchers could make use of option response options where participants could self-describe in any number of ways, which the researchers could later analyze and potentially categorize as appropriate. For example, simply asking participants to write in a free-form response to Race, Gender, Sexuality, and other variables can produce more humanizing and nuanced outcomes. In cases where, for reasons of policy mandates, funding requirements, or other external stipulations, researchers must collect closed-ended and narrow identity categories, they should consider having two items: One that is open-ended, followed by another with the required categories. The second item can be framed as, "If you had to choose from one of the following federally-mandated racial categories, which is the best fit for you?"

Take Action: Avoid Creating Arbitrary Categories and Racial Re-formation

Researchers and practitioners sometimes use categories to examine disparities in outcomes between race and ethnicity. One reason individuals sometimes employ racial categories, as we discussed in Chapter 2, is to try to capture racial disparities. We also discussed the problems with racial comparisons and broadly suggest moving away from treating racial categories as independent variables toward measuring the actual variables of interest (i.e., racism). However, sometimes using those categories is inevitable, especially in secondary data analysis and when a policymaker, funder, or stakeholder requests it.

Implementing QuantCrit in practice necessitates careful consideration when deciding which racial/ethnic groups are central to the analysis. Failure to do so likely means defaulting to the status quo of using the commonly used racial/ethnic categories (e.g., white, Black, Hispanic, Asian, and Native American). When researchers or practitioners are collecting new data as part of a project, it is important for them to choose the most useful categories based on the (research) question that is being explored and validate those categories with individuals from the community to ensure that they resonate with them. With secondary data, the dynamic is a bit more complicated. However, practitioners and researchers can still be intentional in the way they proceed with their analysis, as described in this section.

Education and health fields are calling for disaggregation of outcomes to identify unmet needs and serve the most vulnerable communities (Kauh et al., 2021; Yeung & Mun, 2022). Until recently, quantitative education research did not use nuanced or granular racial categories and thus did not and could

not disaggregate outcomes. Common racial categories used and sometimes still used in quantitative analysis are "white/non-white, white/minority, and white/Black/other." Now, some combinations of more detailed categories are more typical in quantitative studies, including "American Indian or Alaskan Native, Asian, Black, Hispanic, Native Hawaiian or Other Pacific Islander, and white" (Baker et al., 2022).

When presenting racial/ethnic categorical data, while being mindful of privacy concerns, practitioners and researchers should disaggregate with all available categories (in the section that follows, we discuss how to handle small sample sizes using nonparametric methods) and reframe from regrouping individuals into racial categories they did not select. In many quantitative analyses, when sample sizes are too small, all people of Color are grouped together as either minority or non-white. Alternatively, if some racial/ethnic categories have a large enough sample, they remain in the disaggregated analyses like Black and Hispanic, while other groups that have a smaller sample, often Asian, Pacific Islander, and Native American, are grouped together as "Other." Not only did individuals not self-identify with the label "Other," this categorization literally "others" these marginalized groups that are so often already invisible in most data. Both aggregating all non-white individuals into one category or creating a new "other" group are arbitrary choices to avoid, even if they have been used in past quantitative work.

Recategorizing an individual can also mean that racial re-formation is occurring. Racial formation is the theory that focuses on institutions' role in creating racial categories that benefit the ruling group to create inequalities that legitimize their power, and thus, racial formation is a socio-political and economic construct (Omi & Winant, 2014). It follows that racial re-formation, as coined by Campbell-Montalvo (2021), is the process of changing a student's racial category to something other than that which was reported by them or their families. In her paper, she described the erasure of student's identities that occurred in a Florida public school. Florida law does not allow school personnel to change how a family reports the race or ethnicity of a student, even if they are not in agreement. It also states that a student who is Hispanic can select any race. However, when schools need to report to the state, they are only allowed to report using six race categories and one Hispanic category (Florida Legislature, 2023). A student who only selects Hispanic and not a race is not reported in a racial group. In other words, ethnicity supersedes race in those data. Florida law stipulates that "mixed-race" categories are meant for non-Hispanic students selecting more than one race (Florida Legislature, 2023). As a result, Latina/o/x/e/ Hispanic students are sometimes racially recategorized in school data. In the example presented by Campbell-Montalvo (2021), racial re-formation happened in cases when Latina/o/x/e students or their families selected a race AND an ethnicity. School administrators, who in her example were white monolingual women, made a final determination based on their biases and

assumptions of which race or Hispanic category to select for the student. Campbell-Montalvo (2021) wrote:

> A student's card listed her as both Hispanic and White. When discussing which pile to put her card in, I asked Mrs. Adams how she made her classifications. She replied that she went by the family composition. When race was unclear on another card, Mrs. Adams explained, 'Dad is Black, mom is Hispanic, so I'd go with Black.' (p. 188)

The practice of racial re-formation that occurred in the Florida public school is erasing the Afro-Latina/o/x/e identity of students and has taken away their right to choose how they identify. Practitioners and researchers should refrain from recategorizing students as they risk imposing racial re-formation. Given that racial re-formation may have already occurred when practitioners and researchers receive secondary data, it is important to ask follow-up questions, such as who answered the race/ethnicity question. Was it a student's family, a teacher, a school administrator, or the actual students? Additionally, asking how long ago this question was completed is important since researchers have shown that students' understanding of their identities changes over time (Flannigan et al., 2022).

In the same school, another instance of racial re-formation occurred (Campbell-Montalvo, 2021). Based on the school's student demographics, a representative parent advisory committee is formed. When the school administrator calculated the percentage of white (non-Hispanic) students, they included white students who selected more than one race and potentially identified as multi-racial or a race other than white. The percent changed from 30% to 33%. Although three percentage points might not seem significant, it could potentially influence advocating for the inclusion of another parent from a non-white background to the committee. This example illustrates both QuantCrit tenets, "numbers are not neutral" and "categories are not neutral or natural." School administrators recategorized and practiced racial reformation by using a numerator that included students who selected more than one race in the white category to artificially inflate the percentage of white students.

Take Action: Nonparametric Statistics

One common reason offered for more problematic and imprecise means of utilizing racial categories in research is to point to the ways that more nuanced data collection would result in very small sample sizes in some groups. For example, researchers might default to a "student of Color" category because of relatively small populations of various groups. Using many racial categories, which might allow participants to better reflect their self-understanding in the data, can also result in problems of small and unbalanced sample sizes. Further, sometimes the group sizes can become so small as to present an ethical challenge. When samples are extremely small (often when they are less than

five), researchers will not report results from that group separately as there is a real possibility of the participants being individually identifiable. In other words, publishing statistics on extremely small groups could compromise the confidentiality of participants within that group. As a result, researchers often look to create combined categories. A very common example, as we described in Chapter 2, is to create a student of Color or BIPOC student group. In other cases, there might be several racial groups plus an "Other" category. This approach quite literally others the individuals in that category. We advise using alternative verbiage to "other," like "race not listed" or "another race."

When samples are so small as to present a confidentiality problem, there may be reason to avoid more fine-grained analyses. That said, even in cases of samples that are extremely small, researchers should consider how likely participants are to be identifiable rather than using a standard cutoff of $n < 5$ unreflectively. For example, if the data come from an individual school and in a specific year, reporting on a very small sample might be very identifiable. Individuals in that community might immediately recognize who the couple of individuals in that group are and thus know what their responses to a survey or scores on a test were. In other cases, like researcher-collected data where the sources are not as specifically traceable, the concern may be less warranted. Combining data from multiple years (e.g., three- or five-year estimates) can also create larger samples and alleviate concerns about identifiability.

When the concern is not about confidentiality, though, but about the practical issue of analyzing data from small groups, there are options available. The problem of unbalanced and small sample sizes is particular to parametric statistics like *t*-tests, ANOVAs, regression models, and other parametric models (Strunk & Mwavita, 2024). Other statistical tests do not have the same limitations. For example, researchers might consider nonparametric approaches. Because nonparametric tests make no assumptions about normality, typically have very low minimum sample sizes, and can readily handle unbalanced samples, they can be useful tools in this sort of situation. Most parametric tests have nonparametric equivalents, some of which we highlight in Table 4.1 below.

Table 4.1 Nonparametric Equivalents to Parametric Tests

Design	Parametric Test	Nonparametric Equivalent
Within-groups design, IV has two levels	Dependent samples *t*-test	Wilcoxon *T*
Between-groups design, IV has two levels	Independent samples *t*-test	Mann–Whitney *U*
Between-groups design, one IV with more than two levels	One-way ANOVA	Kruskal–Wallis *H*
Within-groups design, bivariate relationship between continuous variables	Product-moment correlation (Pearson's *r*)	Rank Correlation (Spearman's *rho*)

As we discussed in Chapter 2, racial comparisons can be problematic in and of themselves. However, here we are recommending not allowing small sample sizes or unbalanced samples to keep groups from being represented in the research. There are tools, like nonparametric tests, that make analyses of very small groups possible. In fact, of the techniques in Table 4.1, the minimum sample sizes are quite small. For example, the between-group analyses listed only require five participants per group. Additional nonparametric statistics also exist that allow for testing research questions that are inaccessible through traditional parametric tests. These include the ability of the chi-square test of independence to test for a relationship between two categorical variables, which is sometimes used to test for racial segregation. While it can be easy and comfortable to fall back to the traditional set of statistical analyses, QuantCrit researchers should familiarize themselves with a larger range of statistical tools (and potentially create new ones) in order to be able to ask new, different, complex, and nuanced questions.

Take Action: Person-Centered and Profile Analysis Techniques

Another strategy is to change the entire framing. While many researchers default to using race as a categorical variable for the purposes of comparisons in order to study racism, it is not the only available approach. Another approach might be person-centered and profile analysis techniques, such as hierarchical cluster analysis, latent class analysis, and latent profile analysis. These techniques attempt to group participants with similar patterns of responses, which can allow for greater insight into intraindividual patterns. This is a shift from more traditional variable-centered approaches where the emphasis is more on how variables relate to one another. Another benefit of these approaches for QuantCrit researchers is that they enable a different approach to handling categories. For example, rather than asking whether/which racial groups differ on a certain set of outcomes, a researcher could construct profiles or clusters of response patterns and then ask if there is a racially disproportionate pattern in those findings.

For example, in a hierarchical cluster analysis of LGBTQ+ college students at public universities, Strunk and Ford (2022, October) found four clusters or score patterns in the data. One such cluster was those who were high in outness/identity disclosure, high in general perceptions of the campus climate, and low in witnessing or experiencing bias incidents. Another cluster was also high in outness/identity disclosure but was low in general perceptions of the campus climate and high in witnessing and experiencing bias incidents. The authors subsequently tested, using the chi-square test for independence, whether racial and gender identities were related to cluster membership. They found that LGBTQ+ students of Color were more likely to be in the group with negative campus experiences, as were two-spirit and nonbinary students. There were no meaningful between-groups differences by race in outness or campus experiences. However, the cluster analysis uncovered a

pattern in which students of Color, two-spirit, and non-binary students who were high in identity disclosure were more likely to have their disclosure met with hostility and bias incidents. Meanwhile, white cisgender students were more likely to have their disclosure met with positive and affirming experiences on campus.

Similar analyses may allow researchers and practitioners to evaluate what patterns exist in data, such as discipline referrals and outcomes, resource allocation, interactions with school counselors, and educational outcomes, and then determine how those patterns might be racialized. This approach can also be helpful in pulling researchers and practitioners away from interpreting race as a causal variable. QuantCrit and CRT researchers, of course, understand that race is not a causal variable in any educational outcome and often instead interpret the relationship between race and outcomes as a result of racism. Race is not causing educational disparities—racism is. But, when race is placed in a typical regression, ANOVA, or SEM model, it is placed in a way that lends itself to a causal interpretation. Often, it's being treated as an independent variable, which means it is a potential or suspect causal variable, even when the researchers/analysts know that is not logically the case. Turning the model around, as person-centered analyses do, asking what intraindividual patterns exist among important variables and then asking how those patterns are racialized can re-orient the analysis in ways that are helpful for engaging QuantCrit.

Summary

QuantCrit research views categories as contingent and risky rather than natural, neutral, or fixed. Researchers and practitioners engaging with QuantCrit should start by recognizing that categories are sociopolitical and ideological constructs rather than natural reflections of some underlying biological or social reality. Based on the principle that categories are not neutral, natural, or fixed, we have suggested several ways for researchers to approach their quantitative work:

- Think carefully and critically about the reasons for using categories in the first place and ask which categories might be most useful and most insightful for a given set of research questions.
- When categorization might be necessary, consider how to best contextualize the categories that matter for the work. With which categories do individuals in the affected communities (rather than researchers or academics) self-identify? How do participants understand themselves? What nuances might be necessary to understand how intersecting systems of racism, classism, heterosexism, cisgenderism, misogyny, ableism, and more impact the opportunities and outcomes being evaluated?
- Avoid creating arbitrary categories because it is easier to analyze data. Along the same lines, recoding individuals into categories they did not select means assigning them a race through racial re-formation.

- Consider the use of nonparametric statistics to overcome the issue with small or unbalanced sample sizes for more traditional parametric approaches.
- Consider the use of person-centered, profile, and cluster analyses to move away from testing for racial category differences and toward understanding intraindividual patterns. Researchers can then ask how those patterns might be racialized.

In the next chapter, we take up the tenet of the importance of voice and insight, considering strategies for better integrating community involvement and participant voice in quantitative educational research.

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5 Voice and Insight

Data Cannot "Speak for Themselves"

Voice and Insight: Data Cannot "Speak for Themselves"

The widely known adage states that "numbers will speak for themselves," implying that numerical evidence is clear, objective, and needs no further contextualization, explanation, or interpretation. But do numbers speak for themselves, or do people speak for numbers? We surmise that *people* speak for numbers just like *people* interpret qualitative data. And when humans become involved, so do their past experiences, ideologies, and assumptions. Moreover, the data do not naturally exist apart from the human activity of research. Researchers and others decide what questions to ask, how to ask them, in what ways measurement should be executed, from whom data will be collected, by what means, and at what time. The entire data collection enterprise is a human one. Even if numbers could speak for themselves, which they cannot, the numbers are always already a social construction, complete with ideological and sociopolitical baggage (Covarrubias & Vélez, 2013; D'ignazio & Klein, 2020).

Another common adage is "Show me the data," implying that the data will provide undisputed proof of the one truth that exists. In reality, many truths exist, and many stories can be told depending on how you "slice and dice" the data. Critical Race Theory (CRT) is distinct from positivism and post-positivism and their views on objective truth and race. See Table 5.1 for an explanation of the contrasting perspectives.

Although people tell stories with data by explaining and interpreting data (e.g., presentations, visualizations, articles, or books), which stories are told and valued depends on who is in power, in addition to who is telling the story. When applying a QuantCrit approach to contextualize the data, anchoring on the lived experience of those most affected by racism is paramount. Building on a CRT framework, researchers might take up community-engaged research, frequently found in health and qualitative education studies (Gibbons & Pérez-Stable, 2024; Ishimaru et al., 2022), and Participatory Action Research (PAR; Macaulay, 2017). The idea is to conduct research or use numbers *with* communities, not imposing meaning-making and doing research *on* communities.

Table 5.1 Conceptualizing Race and Truth across Research Paradigms

Positivism	Post Positivism	Critical Race Theory
Race is a real, inherent, and biological construct, and every person fits into a category. There is an objective reality to race, and even if it is complicated, it is ultimately measurable and observable. There is one universal, absolute truth that can be ascertained through sufficiently objective methods.	Race is an objectively real, inherent, biological construct. However, measuring race is difficult and cannot, at the present time, be done perfectly. Even advanced genomic analysis still has a degree of error and uncertainty. It might also emphasize the importance of social context like culture, region, and language. There is one universal, absolute truth. However, there will always be some degree of uncertainty about whether observations and inferences actually get all the way to that absolute truth. As such, there is an emphasis on biases and error, as those are the difference between the observations and inferences and truth.	Race is not real in an objective, biological, or scientific sense. It is a social, political, and ideological construction. This does not deny differences in things like skin color, hair texture, etc., but instead points out that these exist in multiple different continuums and with extreme diversity. Race, as it exists in modern society, is constructed. However, it still materializes in the lived experiences of people and shapes their life chances in very real ways. Truths are relative and context-dependent. Truths depend on social position and standpoint, and, as a result, there are multiple equally valid truths. However, the recognition of different viewpoints and truth claims is a socio-politically and ideologically contingent phenomenon. Systems of power and domination determine which truths and truth claims are centered and which are subjugated.

Note: Adapted from Egon G. Guba and Yvonne Lincoln (1994), "Competing paradigms in qualitative research," in Handbook of qualitative research 2nd ed. Edited by Norman K. Denzin and Yvonne S. Lincoln (Thousand Oaks, CA, Sage, 1994) and Urban Institute's guidebook on increasing the rigor of quantitative research with participatory and community-engaged methods by Rodríguez et al., 2023.

While many of the suggestions in the following sections advocate for including community stakeholders as equal partners by doing research *with* communities, we want to advise data users and researchers to be mindful of the delicate balance of asking the community for their input and involvement

while being mindful of not overburdening them. This relates to the ethical principle of "justice" in United States human research ethics regulations. That principle asks who bears the burdens of research and who stands to benefit from it (Strunk & Mwavita, 2024). Researchers must be mindful of the burdens they impose on communities and what benefits those same communities might stand to gain. For this reason, organizations such as Chicago Beyond (2018) and Urban Institute (Langness et al, 2023) recommend compensating individuals for their time and giving authorship credit to individuals and communities involved in the study. However, even compensation may not suffice, especially if researchers are constantly asking the same individuals or groups. Researchers must be cognizant of the burdens their work might place on individuals and communities and seek genuine relationships that include reciprocity. Paying compensation can be a strategy and might be a morally and ethically appropriate step. However, researchers must also do the deeper work of building non-extractive, genuine, and deep relationships with the communities they seek to serve. This is especially true for researchers who are outsiders to those communities.

Next, we provide some practical suggestions on how researchers and practitioners might think about and utilize community voices and insights when working with numbers and statistics.

Take Action: Incorporate Community Voice

Researchers can incorporate community voices into their studies through formal and informal structures. Formal structures involve setting up a Community Advisory Board (CAB), also known as a Community Advisory Committee (CAC). However, community input can also occur informally through community meetings, focus groups, and interviews. Both approaches can incorporate community voices throughout the entire research process, from the research formation to the research distribution and communication phase. Notably, either approach requires significant time investment from the research team and participants. This may be why this practice is currently one of the least present in the empirical QuantCrit literature (Castillo & Babb, 2024). Qualitative researchers have, in general, done more with community input in their work, but there is no reason this cannot be more widely taken up in quantitative research.

A CRT approach, and thus a QuantCrit approach, values the expertise of communities of Color's lived experiences and views communities as equal partners in the research process. The mere formal act of creating a CAB is starting to shift the narrative of who is considered an expert because, traditionally, advisory boards only consist of "experts," narrowly defined as those with methodological and/or context expertise, typically working in academia and holding an advanced degree. A CAB can consist of many different community stakeholders, including but not limited to community leaders, practitioners, and/or young people. For example, in a healthy nutrition and

exercise randomized controlled study, a CAB consisted of community and academic experts in adolescent obesity prevention, including parents, the Los Angeles County Health Department, and youth-serving organizations (Bogart et al., 2014). Some researchers might choose to have a specific CAB that only consists of young people because, in their education studies, they are the most affected. This also occurs in Youth Participatory Action Research (YPAR), which has become relatively common in qualitative educational research (Anyon et al., 2018; Caraballo et al., 2017). Treating youth as partners in research that affects their lives can be a move toward justice. Building community advisory boards, youth partnerships, and other community relationships is a deeply relational process. It requires a substantial investment of time and energy on the part of researchers and others who use data. Those relationships are also trust-based. In community-engaged work, community members often have prior negative experiences working with researchers where they have felt burned by the process, abandoned, or taken advantage of (Strunk et al., 2016).

Community input can begin as early as deciding what to study and how to design the study. True participatory research begins at the point of determining research questions. For those designing interventions, it makes sense that communities would have insights into what programs and program components might be more effective in their communities. One approach involves giving communities autonomy in the design and implementation of programs. For example, in a healthy food in schools initiative, the intervention was co-created with a local health organization. In partnership with schools, the "Fun 'n Healthy" program was developed with a focus on self-esteem development, promoting the consumption of more water, fruits, and vegetables, and increasing physical activity (Waters et al., 2018). In addition to co-creating the intervention, schools made the final decision on the actual content of the program that was implemented. Part of the program also included a support staffer who served as a knowledge broker who also provided technical assistance to resource and customize the intervention. Although there was no formal CAB, throughout the research study, the team often consulted with parents, school staff, and community leaders. They also had a formal government stakeholder committee and an advisory committee from the community health organization that met annually (Waters et al., 2018).

Community input can continue into the data collection and design phase when a lot of sense-making occurs. They can help with deciding what is important to measure and valued by their communities and ensure that in new data collection, such as survey development, researchers use culturally relevant and appropriate word choices and phrasing (Rodriguez et al., 2023). For example, in an intervention to increase healthy eating in preschool-aged children, the CAB consisted of five ethnically diverse mothers who, in addition to helping design the intervention, also gave feedback on the 10-item Happier Meals knowledge quiz that was used as an outcome for the study to ensure readability and validity. CAB mothers were also paid 50 dollars for every two hours of their time (Ledoux et al., 2018).

Researchers can also consider strategies where community members are involved in data collection. This is especially prominent in health-related research and has come to be known as community-based participatory research (CBPR; Hacker, 2013; Wallerstein et al., 2017). In CBPR, community members might be involved in delivering interventions, administering surveys, conducting interviews, or completing field observations. They may have access to participants, sites, and insights that are unavailable to outside researchers or observers. Another mechanism for the effectiveness of those methods is that members of the community may trust individuals from the community and provide them with less guarded responses or more access to other kinds of data. This is a double-edged sword, though, as that increased trust also requires more researcher responsiveness and accountability to ensure the trust is not broken.

When data collection is finished, and it is time to begin the analysis, bringing in community voices at the early stages of analyses can influence the direction of the remainder of the analyses. Virtually and in person, researchers can include the community through "data parties." Defined by the Administration of Children and Families Office of Planning Research and Evaluation (2023) as "an inclusive and equitable research method for engaging diverse voices to review and interpret data through participatory analysis and sense-making." The benefit of data parties is that they shift power to those most impacted by the data through a participatory approach. It is a bidirectional learning process for researchers and community members to interpret data by discussing context, identifying data needs, creating community ownership, and co-creating implementation and policy recommendations (Administration of Children and Families Office of Planning Research and Evaluation, 2023; Franz, 2018).

Similar to "data parties" is the concept of "groundtruthing" the data, which can occur at "data parties." Groundtruthing originates from satellite imaging to validate that the data collected by a machine from a particular place was actually collected at that place (Nagai et al., 2020). However, this approach has been adapted across disciplines to rather than validating machine based outputs using the knowledge of communities to "ground" and contextualize it. In QuantCrit, it is the practice of "groundtruthing" the research study on the expertise of communities (Pérez Huber et al., 2018; Solórzano & Vélez, 2015; Tabron & Thomas, 2023). Without their expertise, numbers are conjectural, and in order to understand them within society, researchers need the expertise of the communities. Some examples of reflective questions that can be used during the "groundtruthing" process through meetings or at "data parties" that specifically center on the core QuantCrit tenet of the centrality of racism include the following:

1 What racial/ethnic groups are missing from the data?
2 What is the data telling you about structural and systemic racism?
3 How do you think structural and systemic racism is present in the data? Is it hidden? If so, how and under which variables?

4 How would the analyses change if they centered on the most vulnerable students in the community?
5 What other systems of oppression do you see in the data?
6 Which data points or analysis resonates with your experience with individual and/or systemic racism?
7 Are there any other analyses that are missing?
8 Taking into consideration the permanence of racism, how should results be communicated and interpreted?

Lastly, community input may be impactful for policy and change-making in the distribution and outreach phase. The research-practice-policy gap has been widely documented where research findings do not reach practitioners and policymakers (Alazmi & Alazmi, 2023; Khomsi et al., 2024). Researchers tend to stay in their lanes and present to other researchers at academic conferences. When the community has input and ownership in the research study, the findings are also in the hands of those outside the academic circle. In the case of the previously mentioned example of the healthy nutrition and exercise program in the Los Angeles Unified School District (Bogart et al., 2014), since district leadership felt ownership, they scaled the program across the entire district. Additionally, a member of the CAB had a connection to a state-elected official and shared the study results with them: school leaders could not provide drinking water. This interaction resulted in drafting legislation and having project leaders testify to help pass California SB 1413, which requires schools to provide students with clean and free drinking water during meals.

Take Action: Data Contextualization

Data require contextualization to be meaningful or useful. The communities from which data are drawn are best positioned to contextualize them. As mentioned in the previous sections, we advocate for this by forming community advisory boards, forging deep and authentic relationships with communities, throwing "data parties," and "groundtruthing" data. Still, this does not mean that communities should solely bear the burden of contextualizing the data. It is also the responsibility of data users and researchers to put whatever data they are presenting in context by doing as much of the heavy lifting as possible before presenting it to community stakeholders. For example, when a data user or researcher presents the average college enrollment rate for Latino/a/x/e students in a particular community, they should provide some qualitative and/or sociohistorical context, such as trends on Latina/o/x/e college enrollment in the community and data users and researchers should also provide contextualization by stating where the data are coming from, such as who counts as enrolled in college, whether all students or only recent high school graduates, and whether two-year institutions were counted. Additionally, they should provide information on how the data were measured and their validity and reliability for that particular community. In this example,

contextualization might include information on who is represented in the data (whom are they counting and who are they not?) and other relevant college enrollment rates such as national, state, local, and/or for particular groups of students at those levels.

However, to really incorporate QuantCrit into their practice, data users and researchers need to contextualize their results within the nature of ongoing and historic racism. Van Dusen and colleagues (, 2021) attempted this in their QuantCrit study by, rather than presenting their results in "effect size," a technical statistical term, they transformed the "effect size" units, using Ladson-Billings (2006) framing, into education debts owed by society. In the quote below, the authors describe their results as societal educational debts owed to students due to racism and patriarchy:

> Society's educational debts before instruction were large enough that women and Black men's average scores were lower than White *[sic]* men's average pretest scores even after instruction. Society would have to provide opportunities equivalent to taking the course up to two and a half times to repay the largest educational debts.
>
> <div align="right">(Van Dusen et al., 2021, p. 25)</div>

Applying this QuantCrit practice highlights the idea that disparities in educational outcomes are not a function of individual inherent deficits of students of Color. Rather, they are due to the socially constructed racist structures that exist in society. When encountering data that show a racial difference in an educational outcome, that result can be interpreted in many ways. A QuantCrit scholar might interpret that result as being attributable to racism. Castillo and Gillborn (2022) suggest that researchers should substitute "racism" when they encounter "race" as a variable. This means that, for example, finding a difference in reading achievement test scores between white and Black students, a researcher should ask how racism has shaped that outcome. Thinking with CRT in mind, there is no biological or essential nature to race and certainly no essence of race that would give rise to an automatic or natural difference in reading achievement. So, what factors drive this disparity? QuantCrit (and CRT) would lead to interpreting that result as resulting from racism. This interpretive shift is important: Researchers and data users may not always be able to change what data are collected, institute robust data collection around individual, structural, or systemic racism, and may thus be left with problematic racial comparisons as the only available result. In those cases, the shift of interpretation becomes especially vital in working for justice and equity.

In another example, an often-reported statistic is that Black students in the United States graduate high school at a much lower rate than white students (Murnane, 2013; Weir, 2016). Researchers often point to "home and neighborhood environments and school factors" in addition to how teachers interact with students by race (para. 1). Blaming the students' home environment

often ignores the structural and systemic factors that present differential challenges for various families. What, exactly, is meant by "home environment"? Perhaps access to financial resources, the presence of one or more caretakers who can attend to helping with homework and facilitating learning during after-school hours, access to quality nutrition, or access to conditions that are conducive to high-quality sleep (Milner, 2013). Framing these as about the "home environment" can evade the ways that those are all structured by structural and systemic racism and perhaps most notably by wealth disparities. It can also evade the realities of the history of education. Black families, for example, do not need to go very far back in their history to find *de jure* segregation in schooling that facilitated massive learning disparities (Strunk et al., 2017). This, in turn, might affect the ability or confidence of caretakers to engage in children's school subjects and homework (Banerjee et al., 2016; Suizzo et al., 2014). The presence of one or more caretakers in that role also assumes a family income that supports an adult being home in the afternoons or evenings, which may not be a reality for families working multiple jobs to survive. It may also not be the reality for families affected by the mass incarceration of Black people, especially Black men, in the United States (U.S.) as an extension of racialized laws and policing practices (Alexander, 2012). In other words, the home environment is not a matter of willpower or how deeply one cares about education—it is shaped by structural and systemic factors. Interpreting a disparity like this one in the data might require a careful articulation of the sociohistorical and sociopolitical factors at play that drive differences in how Black children experience school and out-of-school learning.

Lastly, to offer another potentially familiar example: Colleges and universities often fail to hire and retain Black faculty, especially in tenure-track and tenured lines. As of 2021, only about 6% of full-time college and university faculty were Black (National Center for Education Statistics, 2023). That number is similar to the 5.5% in 2019 and 5.2% in 2010. It is also disproportionate to a population that is 13.6% Black in the United States nationally (U.S. Census Bureau, 2023). The numbers are worse at the ranks of tenured associate or full professor. Retention is harder to measure at the national level, but anecdotally, black faculty are also more likely to leave universities as they experience racism, disparate pressures, and locate more attractive or lucrative opportunities. How might one interpret the pattern of a lack of Black faculty, lower rates of tenure among Black faculty, and higher turnover/lower retention? One phrasing that might be found in newspaper headlines and op-ed pieces is that universities *struggle* to hire and recruit Black faculty. That framing implies a sort of victim status for institutions who, try as they might, cannot quite hire enough Black faculty or keep them around. Instead, one might ask what choices universities are making about resources and supports that lead to fewer Black applicants or higher turnover among those who are hired. Universities sometimes complain that applicant pools are not sufficiently racially diverse to enable them to make more Black hires. To the extent that this is true (and an analysis of institutional human resources data could

help verify or refute such a claim), what wider systemic problems does that indicate, and how are universities complicit? For example, it is possible via the Survey of Earned Doctorates to know, with some degree of certainty, how many doctoral graduates (who might be eligible to apply for faculty positions) were Black in any given year. The answer is that in 2012, it was 4.9%. In 2017 it was 5.4%, and in 2022 it was 5.9% (National Science Foundation, 2022). Numerically, there may be something to the claim of less diverse pools of faculty applicants—the proportions of doctoral graduates match the proportions of faculty fairly closely. However, a QuantCrit interpretation does not need to end there. Who produces doctoral graduates, if not the very universities that then use the lack of doctoral graduates as a reason they do not hire Black faculty? In what ways might one interpret this pattern as a systemic problem with anti-Black racism in the academy? With other available data, one could delve into the barriers that prevent Black entry into graduate school (Daniel, 2007; Solórzano & Villalpando, 1998), question the ways that Black graduate students have disparate experiences that lead to higher rates of leaving doctoral programs (Acosta et al., 2015; Blockett et al., 2016), and barriers to gaining meaningful teaching and research experiences that might qualify one for a faculty job (Allen et al., 2018; Belgrave et al., 2019). Importantly, though, a QuantCrit interpretation can lead researchers and other data users to interpret the results of few Black graduates and few Black faculty through the lens of racial justice. Perhaps this might lead to asking questions about the responsibility of colleges and universities to rectify entrenched patterns of racial inequity in higher education. Perhaps it might lead to activism to fight for improved resources, outreach, supports, and cultural change that lead to more Black people entering, persisting in, and ultimately working as faculty in higher education contexts. Related to previous tenets, the numbers are not neutral, the data do not speak for themselves, and they must be interpreted with an equity and justice orientation.

Take Action: Data Counter-storytelling

Many Indigenous, Latina/o/x/e, Black, and Asian cultures have strong roots in storytelling (Courlander, 1996; Delgado, 1989; Sium & Ritskes, 2013; Wang et al., 2015). Due to a complex socio-political history of racism, classism, sexism, and other system of oppression, their stories have not become the majoritarian narrative. The methodology of counter-storytelling quite literally attempts to subvert this pattern. It is a method of telling stories of the most marginalized that are not often told; rather, they are counter to the dominant white majoritarian narrative. It is also a tool to analyze and challenge the majoritarian story (Delgado, 1989). Counter-storytelling serves to build community for marginalized communities and highlights the stories of the marginalized by giving them a space in education theory and practice, challenging established systems by providing additional context and showing new possibilities (Delgado, 1989).

Although counter-storytelling is a core qualitative practice of CRT research (Solorzano & Yosso, 2001), it can and has been applied in quantitative research (Garcia et al., 2022) because, behind every number, there are people with stories. Furthermore, statistics do not apply to every individual; instead, they reflect the average or typical case. However, the average person is not a "real" person. Thus, counter-storytelling adds a human element to the numbers by telling stories of marginalized communities, challenging systems with numbers infused in the narrative, and showing what it means for communities to use data to tell their stories. However, this does not mean telling stories that highlight students of Color who are exceptions to the rule by intentionally or unintentionally proposing deficit-based narratives. Rather, this means telling counter-stories from their students' lived experiences to humanize data and help the public understand it better.

For example, Garcia et al. (, 2022) used data on the school-to-prison pipeline to show how statistics have been used to justify the school-to-prison pipeline and use the counter-stories of thirty-nine former high school students to share their experiences of racism, classism, and sexism that led them to be pushed out of high school. To uplift their voices as valuable sources of knowledge, Garcia et al. (2022) juxtapositioned statistics that tell one story with narratives from students themselves telling their stories. To illustrate, the statistic "54.1% of Hispanic youth are arrested for misdemeanor offenses as compared to their Black (16.1%) and white (23.6) counterparts" (Garcia et al., 2022, p. 279) is contrasted with the excerpt below, where a student contextualizes the data by explaining how they used drinking and drugs to deal with their life stressors.

> I'm not gonna lie, I smoke weed. It just gets me relaxed. I smoke weed casually too. It started when like my friend in middle school told me like "you wanna smoke weed?" And I was like I guess we can try it then from that day just started smoking then he died, so then I was like "fuck" and started to smoke some more.
>
> (Garcia et al., 2022, p. 280)

A data user or researcher can still take the data counter-storytelling one step further by integrating those most impacted into the data critique and analysis process. In the example above, the students could be asked to respond to the data by prompting them to respond to questions like the following:

1 How accurately do the data points reflect your experience with the schooling and criminal justice system?
2 What is missing, and is anything being hidden in the data?
3 What data indicators should be collected that would better represent your experience?
4 How else would you analyze (or cut) the data to understand what is happening?

5 How would you interpret these results and communicate them to your peers?
6 Given this data, what policy recommendations and supports would be the most effective?

These questions may pique students' interest and make them want to learn more about the data collected and used to make decisions about them. This may also lead them to take ownership of the data and even do their own analysis. Other user-friendly platforms also exist that allow one to analyze data on their school and community, such as the Education Data Opportunity Project EdNavigator and the Opportunity Insights Opportunity Navigator.

Furthermore, if communities take ownership of data, they may also be more inclined to contribute to and promote policy change and be involved in political activism. Researchers have demonstrated that being more involved in research through YPAR approaches leads young people to want to become active in advocating and organizing for policy reform (Fox et al., 2020; Warren & Marciano, 2018). This type of activism can take many forms, including organizing via protest, speaking at school board meetings, writing to elected officials, running for office, and writing op-eds, among many other forms. By combining counter-storytelling with PAR, communities can use and critique data to interweave it with stories they tell about their lived experience and use data to create change.

Summary

Applying QuantCrit means recognizing that numbers and data will not speak for themselves; people will. Researchers and practitioners engaging with QuantCrit should start by recognizing that we bring our biases and assumptions to the interpretation and "voice" of the data, and we socially construct the meaning of the data. Based on the principle that "data cannot speak for itself," we have suggested several ways for practitioners and researchers to approach their quantitative work. All of the following suggestions are with the understanding that the data user and researcher are being mindful of not asking too much from communities and compensating them when possible for their time as well as giving them credit for their input:

- Incorporate community voices throughout the entire research process, from the early phases of research question formation through the dissemination phase, either through formal processes (e.g., CAB) or informally through meetings and focus groups.
- In early research stages, use "data parties" to make meaning of the data and help guide the remainder of the analysis. At later stages, use "data parties" to co-create practice and policy recommendations, guide future data collection, and address data needs.
- "Groundtruth" the data to ensure data users and researchers value the expertise of communities and "ground" the data interpretation on their lived experiences.

- Contextualize the data by making it accessible through jargon-free language and do as much of the heavy lifting in terms of providing other data points of contextualization, such as state and national averages.
- Contextualize using Ladson-Billings' (2006) education debt to society framing or other lenses that reframe form using deficit-based narratives.
- Use data counter-storytelling to tell stories that counter majoritarian narratives and provide more context to those told by only using statistics.
- Infuse narratives with data and incorporate YPAR to allow for critiques of the data with the goal of using it to advocate for change.

In the next chapter, we examine the tenet of a justice and equity orientation and consider strategies for action-oriented work in quantitative educational research.

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6 The Necessity of a Justice and Equity Orientation

Justice and Equity

The final tenet of QuantCrit is the necessity of a justice and equity orientation. The concepts of justice and equity have varied definitions and intellectual lineages. They are sometimes defined and used in ways that overlap or are even synonymous. Others define them as distinct concepts. Broadly, equity refers to the equalizing of life chances or educational opportunities (Strunk & Locke, 2019). That equalization might require unequal resources, at least for a time, to rectify historic and systemic patterns of inequality. Politically conservative critics of the idea of equity often call it equal outcomes rather than equal opportunities. This is incorrect. Rather, equity calls for equal opportunities, even if equalizing those opportunities requires unequal resourcing. For example, chronically underfunded schools would not suddenly become equal if their annual budgets were set to the same amount as affluent schools. Factors like staff burnout, deferred facilities maintenance, and other long-term debts and costs would mean that even at a dollar-for-dollar equal funding level to an affluent school would not make the schools equal. Instead, it might take more investment in the chronically underfunded school to catch up to the school that always had enough resources.

The basic idea of equity is that to equalize life chances, individuals and groups might need differential resources. Taken at an individual level, this is intuitive. If one student struggles with mathematics and another struggles with reading, it would make no sense to supply them both with a reading tutor. That resource may be immensely helpful to the student struggling with reading but is likely not useful for the student struggling with math. Treating the students exactly the same way is obviously the wrong approach. More equitable treatment might mean providing one with mathematics tutoring and another with reading tutoring. These are obviously different or unequal resources. And other students may be doing well in both mathematics and reading and thus have no need for a tutor in either area. It would make no sense to provide the same resources to that student. It would be hard to argue that providing these students with different resources is unfair—they have different needs, so of course, those resources should be different.

On a broader scale, the same can be true of schools, communities, and institutions. They each have unique needs and thus require different resources to succeed. Additionally, those differential needs are often connected with historic and contemporary patterns of racism and other forms of injustice and oppression. The conditions that lead to the current disparities are deeply unfair and are the result of decades or centuries of systematic exclusion, marginalization, and under-resourcing. Equity means correcting those historic patterns and providing equitable opportunities, which often require differential resourcing. QuantCrit scholars use quantitative data to call for and move toward racial equity.

One commonly discussed form of justice, social justice, has its roots in the Jesuit intellectual tradition (Cosacchi, 2019). In its earliest iterations, the term usually referred to the distribution of wealth and property, with an emphasis on things like charity. Its roots in Catholicism make the term contested for some, as the explicit appeal to Christian religiousness inherent in the history of the term can create tensions with other religious and non-religious perspectives. Over time, the term was taken up by additional religious groups and expanded to extend to things like civil rights, suffrage, and even freedom of speech (Jost & Kay, 2010). More recently, the term is often used to refer to the struggle for justice in various arenas, including environmental justice, racial justice, LGBTQ+ justice, economic justice, and more, usually without reference to or connection with its religious connotations. Despite the fact that some Critical Race Theory (CRT) scholars are critical of the term "social justice" (Chapman, 2013), it has taken off in societal discourse and become a term that is often used interchangeably with equity.

Justice, as a term, often conjures legal imagery. One might imagine a courtroom, the iconic scales of justice, and catchphrases like "justice is served." Many people's imagination of what justice might involve is linked to the criminal justice system. While that system is itself replete with racism (Alexander, 2012), the ideals are often seductive. The image of the scales of justice calls to mind a balancing or rebalancing, and the image of the judge calls to mind an impartial, objective arbiter who helps set things right. What, then, would racial justice mean? It might mean balancing resources, access, and opportunities. It might mean setting a racist, white supremacist social order right by upending the racial hierarchy in favor of a more egalitarian social system.

An equity and justice orientation, then, means orienting oneself as a researcher toward the goals of achieving justice and equity in education. From a QuantCrit perspective, the emphasis might be particularly on racial justice and equity, given that QuantCrit emerges from CRT. How do the data and research (and data users and researchers) contribute to disrupting systems of racism, inequity, and injustice? Taking an equity and justice orientation might also mean taking up an action orientation. How can this inquiry be part of action toward a more equitable society? How might this work contribute to larger social movements and moments? How might the work with data itself be an action that aims to achieve justice and equity? Taking a step further,

QuantCrit work might be activist work or might itself be a form of activism. How would thinking about research as a form of activism reshape how researchers and practitioners engage with data, analysis, and interpretation? These reflective questions can help to guide individuals in thinking about the role of their work with quantitative data and statistics in the work of racial justice and equity in particular.

Take Action: Consider Positionality

One key component to consider when adopting an equity and justice orientation is the question of positionality. Positionality is about the individual's social position relative to the topic of study or the particular research questions. It is not a matter of simple biography or social classification (e.g., being a Latina, pansexual, cisgender woman or white, queer, cisgender man as the authors of this book are might be relevant to positionality, but is not in and of itself positionality). This is a common pitfall in writing about positionality—the devolution into listing social identities (Rios & Patel, 2023). The identities might be relevant, though, to understanding how one is positioned relative to the topic. For example, being a white person writing about QuantCrit and CRT, and more broadly doing racial justice work, is certainly a relevant factor to consider. A white person does have experiences with racism, but is the beneficiary of a racist social structure that provides certain benefits and advantages to white people. Being Latina offers a different experience of racialization as a member of a group that is minoritized and marginalized by that same social structure. Who is the researcher? Who is the person doing the data collection and analysis? Who is interpreting those results? And, who are they as related to this question? These questions raise other important questions, such as: Why did they choose this topic? How did they select these data? What decisions did they make as they selected the analysis? Through what lens did they interpret those results? Tuhiwai Smith (2021) further asked, "Whose research is it? Who owns it? Whose interests does it serve? Who benefits from it?" (p. 10). Further, Patel (2015) asked to whom the research is answerable.

To be clear, positionality is not about "bias" as such. Critical race theorists broadly reject the notion of unbiased or impartial researchers. Every researcher, data user, and practitioner will see the world in slightly different ways. The unique social position that every person occupies yields unique insights and analytic perspectives. That unique standpoint is not best understood as "bias" or limitation but rather as a particular, embodied, and vital way of viewing the world. The point of positionality is not to try to minimize, eschew, or negate that position or the insights it might yield but rather to ask how that position is unique and what that uniqueness contributes.

Importantly, positionality is also not about guilt or confession. This is a particularly important point for white people doing QuantCrit work. There is often an impulse to confess and seek absolution for the ways that one has

benefited from white supremacy, the ways that one has contributed to or been complicit in racism, or the evils of a racist society in general (Strunk & Kulick, 2023). Positionality is not a confessional booth. It is a way of examining and explaining the vantage point from which one views the world. While it might be appropriate and even good for a white person to work to repair the damage racist systems have caused and to work against racism in society, positionality is not exactly about that.

On a related note, positionality is not a value judgment. There are no "good" and "bad" positionalities. Each positionality would yield different and unique insights, though, which may be more or less well aligned to answer particular sets of research questions. The disclosure of positionality in a research report, publication, or other means of sharing results allows readers to evaluate how their positionality differs from that of the author(s) and to make their own inferences about how to interact with and interpret the work. A useful practice would be to discuss positionality in any report of research results (sometimes called a "positionality statement" or "reflexivity statement," though it need not be a discrete statement and might be incorporated in other ways as well). Researchers and those working with data can report on their positionality individually, collectively, or both.

Qualitative researchers are far ahead of quantitative researchers in this area. Qualitative work often includes positionality statements or other discussions of positionality in published articles, chapters, and books. Such statements are much more rare in quantitative research. Even in QuantCrit work, they only appeared in 45% of empirical studies (Castillo & Babb, 2024. By and large, that is due to the post-positivist nature of most quantitative work, which assumes a neutral and detached stance in which the researcher and their positionality are not relevant questions. The only relevant question is about the bias of the data, which is typically discussed more as a matter of the statistical properties of tests or the nature of sampling strategies in post-positivist work. However, QuantCrit comes from CRT, which involves the rejection and repudiation of post-positivism (see Table 5.1 in Chapter 5). There is, for such scholars, no such thing as a neutral, detached, unbiased observer. Every person who produces research, analyzes data, or interprets results has existed in society, subject to various systems of oppression and marginalization (whether as the beneficiary or victim of those systems), socialized in a racist society, and currently existing at a particular social location with all of the attendant benefits and detriments it conveys. QuantCrit practitioners and researchers, thus, must consider and discuss positionality (see authors' positionality in Chapter 1).

Positionality is also related to the idea of reflexivity. To some extent, reflexivity involves intentional reflection on one's positionality. It involves asking what one knows and how one knows it, but also from what vantage point or perspective one knows. Individuals might ask how they are positioned in power relations and whether the research work they seek to undertake might be exploitative versus engaging in reciprocity. The researcher should also reflect on their own ideological stances, beliefs, and

assumptions about the social world. They should reflect on their familiarity with the theories involved, their understanding of sociohistorical factors, and how those ideas shape their inquiry. For example, Pillow (2003) suggested that reflexivity involves key activities for reflexivity: researchers should know themselves and critically reflect on themselves and their role and approach to the research, and they should recognize the "other" that they seek to understand/study—to recognize the limits of their familiarity and ability to adequately represent others. Pillow further suggested that reflexivity is a process of discomfort, and researchers must become comfortable with the discomfort that reflexivity brings. Reflexivity is also ongoing and constant, not a one-time event that one "does," because social identities, power dynamics, and one's positions in society are fluid and evolving as well (Rios & Patel, 2023). QuantCrit practitioners and researchers should engage in reflexivity in the process of understanding and grappling with their positionalities.

Take Action: Rethinking Research Questions

A justice and equity orientation also means rethinking which research questions are useful. We discussed this in a prior chapter as well—that the use of CRT in QuantCrit should lead to different research questions and analytic approaches. Specifically, though, a justice and equity orientation should lead researchers to ask questions about how to enact change, realize equity, and achieve liberation. One example is that rather than placing the onus on an individual to change their behavior, the onus of change should be placed on systems and institutions. Similarly, as mentioned in previous chapters, beginning with the assumption that racism is pervasive and operates in schools. Below in Table 6.1 are a few concrete examples of traditional research questions and how they might be reframed in a QuantCrit framework.

These are just suggestions and examples. There are myriad ways to reframe questions toward thinking about systems of oppression and away from

Table 6.1 Traditional versus Potential QuantCrit Framing of Research Question

Traditional Question	Potential Reframing
Do fifth-grade students' reading test scores differ by racial category?	How are schools and society underserving youth of Color in the area of reading? How does access to early reading programs and resources to enhance reading vary by race? What programs, resources, or variables alleviate the structural disparities that lead to test score differences? What resources or supports would be needed to rectify the historic under-resourcing of communities of Color?

(Continued)

Table 6.1 (Continued)

Traditional Question	Potential Reframing
Are high school graduation rates lower for students of Color?	What are the structural, resource, and systemic factors that influence graduation rates? How are those factors distributed differentially by race? What are schools and society providing white students that they are not providing students of Color? What programs, resources, or variables support success for students of Color? What resources would be needed to rectify decades of neglect for schools that enroll predominantly students of Color?
Are Black students less likely to persist in STEM majors in college?	How are STEM disciplines racialized? What is the composition of STEM faculty? How do Black students experience the campus climate in STEM departments and programs? What programs, resources, or inputs are correlated with warmer campus climate, reduced racism, and more thriving for students of Color in STEM? What resources and supports would colleges need to invest to account for the history of exclusion and marginalization of people of Color from STEM?
Do students from different racial groups go to college at different rates?	How often do school counselors and guidance counselors discuss higher education with students from different racial groups? How are college preparation courses and resources distributed between schools, and how does that correlate to school segregation and demographics? How frequently are college recruiters visiting students in different schools? What resources, factors, or programs reduce the disparities in access to knowledge, information, and resources about college? How can schools, colleges, and universities rectify the long history of exclusion and segregation in higher education?
What mental health disparities exist in schools by race?	How do experiences of racism (individual, structural, and systemic) explain mental health outcomes? How do counselor caseloads differ across schools with varying demographic characteristics? How are experiences of trauma distributed by race? What factors or programs support students of Color in their mental health?
How does this specific program (insert any program or intervention) affect Black boys' college attainment?	What reductions in structural and systemic barriers are associated with the intervention or program? How does the intervention or program affect other barriers and resources? Does this intervention also correlate with reductions in racism and systemic oppression? In what ways does this intervention work to rectify resource and support disparities?

individualizing and essentializing outcomes. Beyond reframing the questions, though, researchers and data users can also reframe how they interpret the results (see Chapter 5's section on Data Contextualization).

Take Action: Go Beyond Overused Measures

One way to apply the QuantCrit tenet of "a justice and equity" orientation is to think "outside the box" beyond the measures researchers already collect and rethink what communities consider indicators of a high-quality education/school. In education, due to accountability laws, standardized test scores are the most frequently found and reported data points. As mentioned in Chapter 3, many of these tests were created largely by white men centering on white middle-class children. So, it is important to think about measures that center on students of Color, were created by communities of Color, and are valued by communities of Color.

When parents choose schools, they think about factors beyond test scores, such as extracurriculars, distance, accountability measures, and school demographics (Glazerman & Dotter, 2017; Harris & Larsen, 2015). There are, as of the time of this writing, no repositories (like the EdNavigator at Stanford or the National Center of Education Statistics) that report the availability of extracurricular activities by school or district. Although parents can call to inquire about the availability, this is an additional unnecessary hurdle and time burden. Data on extracurriculars should be readily available. Going one step further, there could also be a data point on school/district multicultural activities and events, particularly those that reflect the culture of the communities they serve (e.g., mariachi band, drumline, etc.). Another alternative data point to test scores is access to dual language programs and biliterate high school diplomas that certify you are literate in two languages. These programs are common in California public schools and are available because families demanded them. Research on Latina/o/x/e and Korean families shows satisfaction with these programs (Ee, 2018; Olivos & Lucero, 2018). Families of Color may also value indicators beyond school demographics, such as measures of integration and belonging.

Researchers bear the onus of developing new measures that are centered on students of Color and are cocreated with communities and researchers of Color. QuantCrit scholars have already begun this process. Reynold and Tabron (2022) created a rubric to measure racial inequality in the principal pipeline. Rather than compare the number of principals of Color to white principals, the rubric outlines where in the pipeline candidates of Color get pushed out. The rubric has the following stages: preparing the job description, collecting application materials, recruiting applicants, screening applicants, and written criteria. Each phase in the pipeline is scored as either suppressing, reproducing, or diversifying the principal workforce. In another education example, Priddie (2021) created a new STEM survey for Black higher education students. Although many STEM survey items and

constructs exist, none have centered on the unique experiences and barriers Black students encounter. So rather than building on the existing literature that has largely centered on white individuals, Priddie (2021) developed a survey that measured constructs specific to Black students, including the following constructs: Africentric worldview orientation, Black student friendships with same-race peers; Black stereotypes and microaggressions, "Acting White," Black women tropes Black students seeking support, Black students achievement and Black student communication style. If researchers responded to the call to action to create measures centered on students of Color, education research, policy, and practice would be revolutionized due to the insights and identification of strengths and weaknesses for students of Color that have never been assessed.

Take Action: Implement and Advocate for Programs and Interventions that Work to Reduce and/or Eliminate Racism

Given the action-oriented nature of CRT and the last tenet of QuantCrit, it is important to adapt and implement interventions, policies, and/or practices with quantitative evidence of successfully reducing or eliminating racism. Prioritizing quantitative evidence here is not to discount lived experience and other forms of evidence or regard them as inferior. Instead, it is intended to facilitate using existing quantitative evidence for justice. When examining anti-racist approaches, it is important to be explicit about what type of racism the intervention, program, policy, or practice is targeting because changing attitudes or beliefs is not the same as changing laws or policies. Although a student might develop a more positive self-image and empowerment through an intervention that targets internalized racism, researchers and practitioners must acknowledge that this doesn't change the structures they exist in, and thus, one must also think about targeting institutional and systemic racism.

Depending on what type(s) of racism you, the practitioner (e.g., teachers, school leaders, or policymakers, such as district leaders or school board members) are targeting, an appropriate approach must be selected. Table 6.2 shows a non-exhaustive list of interventions, policies, and practices with quantitative evidence. The list may seem rather short because, to be included in this list, the authors must have stated that the purpose of the study/policy/intervention was to combat racism/prejudice. Some interventions target multiple types of racism. For example, a diverse teacher workforce can reduce individual racism while also targeting institutional and systemic racism by improving outcomes for students of Color (and all students) who have been historically underserved in public schools.

On the rightmost column, there is an indication of ease of implementation because, legally, some interventions and policies are difficult or impossible to implement. In 2023, affirmative action in college admissions, despite showing positive outcomes for students of Color, was struck down by the

Table 6.2 List of Interventions, Policies, and Practices to Combat Racism

Which Type of Racism Is This Combatting?	Programs/Interventions/Practices	Evidence	Ease of Implementation
Individual	History lessons on racism in elementary school (Hughes et al., 2007)	**Reduced racial biased attitudes:** Classrooms were randomly assigned to receive lessons consisting of two short biographies daily about Black and white well-known Americans. In the treatment group, the lessons included explicit information about discriminatory experiences faced by Black Americans at the hands of European Americans. The control group lessons made no reference to racial discrimination. Among white children, racism condition participants showed less biased attitudes toward Black individuals than control condition participants. Among Black children, attitudes did not vary by condition.	Difficult
Individual and Institutional	Cultural responsivity and student engagement through double-check coaching of classroom teachers (Bradshaw et al., 2018)	**Fewer Office Disciplinary Referrals (ODRS) and higher student cooperation**: In a randomized controlled trial, researchers found relative to comparison teachers, treatment teachers had significantly more proactive behavior management and anticipation of student problems, higher student cooperation, and fewer disruptive behaviors in classrooms. Treatment teachers assigned Black students fewer Office Disciplinary Referrals (ODRs) (Bradshaw et al., 2018).	Easier
Individual and Institutional	Equity-focused positive behavior and supports: racial equity through assessing data for vulnerable decision points, culturally responsive behavior strategies, and teaching about implicit bias and how to neutralize it (React) (McIntosh et al., 2021)	**Decreased Office Disciplinary Referrals (ODRs):** In a randomized controlled trial, React schools had significant decreases in racial disparities in school discipline and rates of ODRs for Black students compared to control schools that had minimal change (McIntosh et al., 2021).	Easier

(*Continued*)

Table 6.2 (Continued)

Which Type of Racism Is This Combatting?	Programs/Interventions/ Practices	Evidence	Ease of Implementation
Individual	Reading stories about friendship with refugee students (Cameron et al., 2006)	**Reduced prejudice towards refugees:** Students were randomly assigned to read stories with English and refugee children in friendship situations. The refugee and English characters were all presented in a positive light. Discussions followed the reading of the stories. The dual-identity model was the most effective at reducing prejudice against refugees. In this model, the goal is to encourage people to feel a strong sense of belonging to a larger group while also allowing them to hold on to their individual group identities. This approach can help people relate to both their specific subgroup and the larger group, making it easier to understand and connect with others.	Easier
	Policies/Laws	*Evidence*	
Institutional and Systemic	Affirmative action	**Increases pre-college outcomes:** Using Texas administrative data, Akhtari et al. (2024) find that AA narrowed racial gaps in pre-college outcomes in grades, attendance, and college applications. (Akhtari et al., 2024). **Increases racial diversity in selective institutions:** When bans of AA were evaluated in California, there was a 40% decline in CA for Black, Latina/o/x/e, and Indigenous enrollment two years later Bleemer (2022) and a 3 percentage point decline in Michigan for Black students. **Improves life outcomes for Black and Latina/o/x/e individuals:** Higher graduation rates at elite institutions and higher later life wages (Kane, 1994; Bowen & Bok, 1998).	Difficult

(*Continued*)

Table 6.2 (Continued)

Which Type of Racism Is This Combatting?	Programs/Interventions/ Practices	Evidence	Ease of Implementation
Individual, Institutional, and Systemic	Integrated schools	**Reduce prejudice and promote positive interracial relations:** Using pre-post results of the Multiple-response Racial Attitude survey (MRA) with elementary school-aged children (Rutland et al., 2005). A meta-analysis of over 515 studies also found that intergroup contact reduces prejudices (Pettigrew & Tropp, 2006). **Improved academic outcomes:** For students of Color during desegregation in the 1970s (Borman & Dowling, 2010; Mickelson et al., 2008) as well as a reduction in the racial "achievement gap" during this time (Orfield, 2001). **Improved life outcomes:** Using data from adults born between 1932 and 1951, Reynolds and Carr (2022) estimate long-term educational benefits for Latina/o/x/e adults and greater wealth building for Black adults over 65. Johnson (2011) used data from adults born between 1945 and 1968 and finds improved outcomes for Black individuals in health, earnings, incarceration, and education.	Difficult
Individual, Institutional, and Systemic	Diverse teacher workforce	**Positive outcomes of a Black teacher**: Black students with one Black teacher by 3rd grade are 13% more likely to enroll in college, and those with two Black teachers are 32% more likely (Gershenson et al., 2022). **Positive outcomes for all students:** In a randomized controlled trial, teachers of Color improved social-emotional, academic, and behavioral outcomes for their students compared to white teachers (Blazar, 2021). **Indirect positive effects on peers:** When Black students have at least one Black teacher teaching their grade level, they score 10% better on ELA end-of-year tests and are 10% less likely to be suspended (Gershenson et al., 2023).	Medium

Table 6.2 (Continued)

Which Type of Racism Is This Combatting?	Programs/Interventions/ Practices	Evidence	Ease of Implementation
Internalized, Institutional, and Systemic	Ethnic studies programs	**Improved high school academic outcomes, graduation, and absences:** Using an experimental design, ethnic studies participation increased attendance by 21 percentage points, GPA by 1.4 grade points, and credits earned by 23 (Dee & Penner, 2017). Another study found that high school graduation increased by 15.7 percentage points, and increased postsecondary enrollment by 1.5 percentage points (Bonilla, 2021). **Improved sense of self/student identity:** In experimental studies, ethnic identity and self-concept increased (Lewis et al., 2012; Belgrave et al., 2000).	Difficult
Institutional and Systemic	Removing legacy admissions in higher education	**Increased racial diversity:** Arcidiacono et al. (2022) projected that removing legacy preferences while keeping affirmative action would increase the Black, Latina/o/x/e, and Asian American admits by 4, 5, and 4 percent, respectively, while decreasing white admits by 4 percent. Johns Hopkins removed legacy admissions in 2013. The percentage of the legacy student body decreased from 9 to 2 percent while the percentage of Black, Latina/o/x/e, and Indigenous students increased from 18% to 39%.	Medium

Supreme Court. The first intervention in the table seems rather straightforward: teach the realities of our racist history. However, recent legislation introduced in 44 states to ban the teaching of CRT (not the same as history lessons on racism) or how teachers discuss racism and sexism makes teaching history lessons on racial discrimination more difficult to implement. Similarly, ethnic studies (the eighth intervention on the table) programs were once banned in Arizona in 2010 only to be recently reinstated, while in 2023, Advanced Placement (AP) African American courses were banned in Florida. Finally, the lack of integrated schools in our country stems from centuries of systemic racism, including racist housing policies and practices (e.g., redlining, mortgage denials, white flight, etc.). Successfully integrating schools will likely require efforts at the federal, state, and local levels, making it a more difficult policy to implement.

Using the evidence in Table 6.2, there are clear implications for K-12 practitioners who want to implement anti-racist practices/interventions/ approaches/policies, and some of these insights can also be applied to higher education policymakers and practitioners.

K-12 policymakers:

- At the primary level, implement curricula that include history lessons on racial discrimination while ensuring compliance with the laws of your state/ locale regarding what is acceptable to teach.
- At the high school level, implement ethnic studies courses while ensuring compliance with the laws of your state/locale regarding what is acceptable to teach.
- Build and expand on teacher pipelines and develop campaigns and incentives to diversify your teacher workforce.
- Develop required teacher professional development seminars, such as Double Check Coaching and ReAct, adapted to reflect the cultural context of the students you serve to reduce racial biases and inequities.
- Advocate and push for policies that integrate schools.

K-12 teachers and school leaders:

- When you can choose stories, read stories/novels about friendship with diverse individuals.
- Make a concerted effort to work in schools with other teachers of Color.
- Support efforts to implement curricular changes that include the history of racism and ethnic studies, as well as efforts for schools' racial integration.
- Prioritize attending professional development aimed at reducing racial inequities and bias.

For higher education policymakers, the evidence is clear that the student body can be diversified without affirmative action by removing legacy

admissions and targeting recruiting. However, perhaps higher education can learn from the findings in K-12 and require an ethnic studies course for all students as part of the core curriculum, increase the diversity of faculty, and require professional development for faculty and staff that aims to reduce racial inequities and bias. Similarly, higher education practitioners can proactively advocate for the policies and proactively attend related professional development.

Summary

QuantCrit is more than how the data are collected and analyzed, and it is more than a merely theoretical orientation. It calls on researchers, users of data, and practitioners to actively work for equity and justice in education (and given it is a CRT perspective, especially racial equity and justice). This might mean taking up an activist stance by using quantitative data or research to evaluate, advocate for, and enact changes toward equity. Said differently using data for justice. In this chapter, we presented several strategies that might be useful in taking up a justice and equity orientation, including:

- Reframing research questions with equity and justice at the heart of the inquiry.
- Rethink existing metrics in education and developing new ones.
- Evaluating which interventions, policies, or programs might be meaningful or effective for reducing or eliminating racism.

In the final chapter, we summarize how one might "do" QuantCrit in quantitative educational research and offer thoughts for researchers and practitioners seeking to move the field forward.

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7 Conclusion

Quantitative Methodologies for Racial Justice

Quantitative Methodologies for Racial Justice

This chapter culminates our exploration of QuantCrit with a focus on where to go from here and what is next. In this book we have presented QuantCrit as an alternative and transformative framing that anchors on Critical Race Theory (CRT) to use numbers and conduct quantitative research to towards racial justice. Importantly, this chapter emphasizes that the strategies in this book are not definite and "correct," rather QuantCrit is a reorientation of the research process by thinking about how CRT and the permanence of racism, can inform every stage of the research process from the research question formation phase to the data interpretation phase. Through this reorientation comes a commitment of reflexivity, of reading CRT, and of understanding methods all while paying attending to changing social dynamics. Not all research studies or projects using numbers will require a QuantCrit framing, and new methods do not necessarily need to be employed. However, when the project necessitates, new methods should be developed. Given the complexity of the interconnected nature of confronting systemic racism, the future of applying QuantCrit and other critical frameworks likely lies in employing mixed methods and intersectional approaches. While this book and this chapter acknowledges the aspirational nature and challenges of applying QuantCrit, the goal of doing this work is to strive for continuous improvement by *embracing* rather than *avoiding* the complexity and unpacking it. Through this process practitioners and researchers can heal while creating new ways of doing research with a focus on racial justice.

QuantCrit Is an Approach, Not a Checklist

QuantCrit is most definitely not a static, fixed set of rules or a checklist to be followed. There is no ideal, perfect, or surefire way to do racially just educational research, whether quantitative or otherwise. While we have presented various potential strategies throughout this book, we wish to be absolutely clear: Those strategies are not a prescription. There will never be and should never be a single, set prescription. The practice of doing equity work is fluid

and iterative, requires thoughtful reflexiveness, and will vary with every new situation, new dataset, and as social dynamics shift and change. There is no checklist one can follow to "do QuantCrit" or "be QuantCritical," QuantCrit is, instead, a methodological orientation, a tool—a way of thinking about and approaching quantitative research. QuantCrit starts by asking how Critical Race Theory might inform methodological, analytic, and interpretive decisions, in addition to shaping the research questions themselves. It does not prescribe a set of rules to be followed. "Doing QuantCrit" is not about following the rules or checking the boxes. It is about reorienting the entire research process.

This impulse toward seeking a checklist to follow or boxes to check off is, perhaps, natural, and it is very common. As we discussed in Chapter 6, people often want to "check off" positionality by writing a formulaic positionality statement. As we discussed in Chapter 2, they might try to swap methods (like using effect coding as we explained in that chapter) to do the "right" analysis. This impulse is understandable. Most researchers and practitioners are well-intended. They want to "do the right thing" and improve education and the world. However, one of the lessons to be learned from the Diversity, Equity, and Inclusion (DEI) movement in the higher education sector, is that it can easily be deluded and co-opted into a checklist (Smith, 2020). Similarly, one of the insights of CRT, and critical theoretical perspectives more broadly, is that there may not be any one right answer. And the "thing" that is "right" today may not be "right" tomorrow or the next day. The thing that is "right" for one situation and context will probably not be "right" for another situation or context. So again, the impulse to "do the right thing" is understandable, but ultimately can be counterproductive. CRT theorists call on individuals to be comfortable with discomfort, to engage with tension, and not seek easy, clean ways out (Nicolai et al., 2024), even though data might be easier to clean using status quo practices.

Moreover, the desire and impulse to find clear solutions rather than engage with the complexities can be an impulse rooted in whiteness (in the desire to serve as a savior) and settler moves to innocence (in the desire to affirm one's own goodness). Many of the issues we discussed in this book can lead to places of incommensurability (Tuck & Yang, 2012). The idea of incommensurability is rooted in decolonizing scholarship, and points to the ways that decolonization might be incommensurable with other approaches, with reconciliation, and may leave much unsettled and uncertain. It also points to the idea that a framework might not need to, and might be unable to, answer all of the questions and provide all of the solutions. It is in that unsettling, that incommensurability, that possibilities might emerge and new paths might be forged. And thus, applying QuantCrit is a process of unlearning the traditional statistics approach taught in coursework, training, workshops, and informal learning that anchor on the neutrality and objectivity of data, and relearning how to do quantitative work with a new framing. It is not a checklist—it is a reorientation.

**Not Everyone Is a QuantCrit Researcher, and Not
Every Project Will Be a QuantCrit Project**

Along with the recognition that QuantCrit is not a checklist comes the rec-
ognition that not everyone will center QuantCrit in their work and, even for
those who do, QuantCrit will not be the best approach to every project every
time. Just as CRT is not the best framework for every research question, study,
or initiative, QuantCrit will not always be the best or most generative meth-
odological orientation for every instance. Even racial equity research will not
necessarily proceed from a CRT framework or QuantCrit methodology. Other
approaches exist and will be conceived in the future that also take up the
question of racism centrally, and that aim to produce or facilitate racial jus-
tice. Theorists, methodologists, and researchers will continue to create new
and innovative theoretical and methodological approaches that offer vari-
ous advantages, insights, nuances, and perspectives. This is a good thing. So,
while we believe QuantCrit may be useful for many researchers and prac-
titioners, it is not the only way or even the gold standard for approaching
quantitative data for racial justice.

Similarly, even researchers who utilize QuantCrit or think of themselves as
QuantCrit scholars need not use QuantCrit as the framework for everything
they encounter. Some research questions will call for different approaches,
some data will call for different analytic strategies, and some contexts call
for different theoretical engagements. And again, that is okay, even a good
thing. Flexibility and willingness to grow and change are important for equity-
oriented researchers and practitioners, and they should seek to find the best
match or most authentic fit for each new problem, question, and dataset.

However, we believe that, regardless of whether one considers oneself
a QuantCrit researcher or is applying QuantCrit to any particular research
question or even to a singular analysis within a study, QuantCrit still offers
important considerations that all researchers should take up in their work.
Some critics claim that QuantCrit is just good research practice. And while *it
is* good research practice, QuantCrit also provides the specificity to focus on
racial equity and raise questions like the following.

- How might racism be related to the variables or outcomes that they are
  studying?
- What are the sociopolitical, sociohistorical, and ideological entangle-
  ments of the data?
- How were the measures conceived and constructed, and what does that
  mean for how they should be interpreted?
- Who decided, and on what basis, to select the variables that are in the
  data?
- In what ways might the process of data collection, as well as the underly-
  ing phenomena being measured, be influenced by racism and white su-
  premacist ideologies?

- What categories have been constructed for use in this research, and what are the ideological and political stakes of those categorizations?
- In what ways is the work answerable to the communities it affects?
- How have those communities been involved, and in what ways are their voices represented?
- In what ways can this work contribute to or harm the goals of racial equity?

These and other questions we have raised throughout the book are relevant questions for all researchers, users of data, and practitioners, and asking them can lead to harm reduction or even revolutionary shifts in the production and use of research evidence.

Those Engaging QuantCrit Must Read Critical Race Theory

Those who do engage QuantCrit as a methodological framework cannot do so without engaging CRT theorists and scholars. Utilizing QuantCrit as a methodological framework requires one to gain an understanding and working knowledge of CRT. This might mean reading Derrick Bell, Gloria Ladson-Billings, Richard Delgado, Jean Stefancic, Nolan Cabrera, Kimberlé Crenshaw, Adrienne Dixson, Shaun Harper, Cheryl Harris, Richard Milner, Daniel Solórzano, William Tate, and others who have written about, clarified, expanded, and utilized CRT. For those without prior training in CRT, they may wish to start with survey books, introductory books, and course textbooks. Examples include Crenshaw et al.'s (1995) edited volume, *Critical Race Theory: The Key Writings That Formed the Movement,* that contains some of the foundational readings in CRT with useful context and commentary. Another more recent volume that is intended to be an accessible introduction to CRT is Ray's (2023) book *On Critical Race Theory*. Leonardo's (2013) *Race Frameworks* is not solely focused on CRT, but provides some meaningful comparison and integration of various critical frameworks and how they take up race. Delgado and Stefancic (2023) *Critical Race Theory: An Introduction* is another edited volume that provides a broad view of the landscape of CRT scholarship while introducing key concepts. Other more expansive edited volumes specific to education include Taylor et al. (2023) *Foundations of Critical Race Theory in Education*, and Lynn and Dixson (2021) *Handbook of Critical Race Theory in Education*. Familiarizing oneself with the landscape of CRT scholarship is an important aspect of utilizing QuantCrit. Naming QuantCrit without engaging CRT is intellectually dishonest and disparages the work of the scholars who built the field.

Those Engaging QuantCrit Must Know Their Methods

QuantCrit research does not necessarily mean using different methods of data collection or different statistical analyses. When existing methods can do the "job," there is no urgent need to create new ones. However, this does mean

that researchers must recognize and reckon with the racist origins of statistics in order to turn them "on their head" and use them for justice (Garcia et al., 2018). This also means that rather than using seminal techniques from known eugenicist like Galton, Pearson, and Fisher, researchers should be knowledgeable of other methods not developed by racist individuals that can accomplish similar calculations. For example, Chatterjee (2021) developed a new correlation coefficient that may be more efficient in some circumstances since it does not rely on a linear distribution of variables. While this new technique it is not centered on equity, it does move the work away from the eugenics roots of statistics while still getting the estimates we need, and in this case more efficient estimates.

However, inevitably since QuantCrit prompts data users and researchers to think about research through a new perspective and ask new questions, existing methods may not always suffice. Thus, the proliferation of additional tools for collecting data in ways that are more equitable and culturally responsive can be a very useful move for those engaging QuantCrit. Similarly, it may be that new statistical analyses can open new pathways for doing research that moves education toward racial justice. For some researchers, it will make sense to innovate on existing methods and analyses, create new ones, and radically alter the process of data collection and analysis. But, it's entirely possible to do QuantCrit without any new methods at all. As other researchers have shown (e.g., Campbell-Montalvo, 2020; Cobian, 2019; Garibay et al., 2020; Garcia et al, 2022; Guenther, 2021; Street et al., 2022), even the simplest descriptive statistics can be revolutionary in the struggle for racial justice.

That said, those doing race-focused research should be aware that their work will be scrutinized in ways and to levels that far exceed the scrutiny of work that does not center race and racism. Those using QuantCrit should know the methods and analyses thoroughly and be prepared to defend their methodological choices and analytic decisions. They should thoroughly understand and evaluate the assumptions of their statistical models, even when those assumptions are at odds, epistemically, with CRT. For example, most statistical analyses used in educational research derive from the General Linear Model, which makes several assumptions about the data under analysis. Those include the assumption of linearity, that data are normally distributed, that independent variables are fixed, that samples are random, that interventions are randomly assigned, and that variability is equally distributed (Strunk & Mwavita, 2024). QuantCrit, as we discussed in Chapter 4, refuses the notion that categories (and other variables, too) are fixed, which creates a tension with that assumption of the General Linear Model. The assumption that variability is equally distributed (e.g., homogeneity of variance or homoscedasticity of residuals) is often violated when sample sizes are unbalanced, which they often are in racial comparisons. QuantCrit researchers must know their methods well and be prepared to evaluate, deal with, and discuss the assumptions of their models and how and when they are violated. Knowing the

methods well also means becoming aware of their limitations, their strengths and weaknesses, and alternative analytic approaches.

QuantCrit Research Must Be Intersectional

QuantCrit work must also be intersectional. While QuantCrit and CRT are race-focused frameworks, they also center intersectionality, as we described in Chapter 1 and revisited throughout this book, one of the tenets used in the field of CRT is the intersectional and action-oriented approach. QuantCrit researchers cannot study race and racism alone without attending to the other interlocking systems of power and domination that shape students' educational opportunities, experiences, and outcomes. They must attend to systems of sexism, heterosexism, trans antagonism, ableism, nationalism, exploitative capitalism, and colonialism, as well as the identities that are differentially impacted by those intersecting systems such as queer and trans people, women and girls, (dis)abled people, international students and immigrant communities, low-income families, Indigenous people and communities, and others. As we described in Chapter 1, one of the reasons that scholars initiated CRT was due to the inattention to race and racism happening in Critical Legal Studies and other Marxist frameworks. QuantCrit must not, then, become a single-issue methodological framing. Lourde (1982) remarked that "there is no such thing as a single-issue struggle because we do not live single-issue lives … our struggles are particular, but we are not alone" (para. 14). Similarly, there can be no such thing as single-issue equity and justice research. It must always be intersectional, even if it focuses on or centers a particular issue or population.

QuantCrit Research Must Be Dynamic

Applying one or multiple QuantCrit strategies presented in this book, will not upend systemic racism. Dismantling racism requires deconstructing inter-related systems that perpetuate racism and rebuilding across all sectors, public and private. The process of improving our quantitative work in education will be iterative and aspirational in nature. It is important to recognize that although we can and should improve our quantitative approaches, racism is so complex, layered, and nuanced that attempting to understand the drivers and causes unveils the limitations of numbers. Perhaps the future (beyond the scope of this book) lies in true mixed methods approaches that intentionally address systemic racism by fully integrating, rather than sequentially or in parallel, quantitative and qualitative methods, and at each research phase influence the formation of the next phase in a truly complimentary, yet concurrent approach (Schoonenboom & Johnson, 2017).

Applying QuantCrit is active, iterative, and inevitably mistakes will happen. It is the responsibility of data users, practitioners, and researchers to be vulnerable and share their learnings both from their failures and successes.

While "perfection should not impede progress," having a good grasp of both theory and methods, as explained in the above sections, is a necessary component. Nonetheless, no one has perfected the methodology, and the goal is not to be perfect, but to make progress and be better than the status quo. Regardless of "perfecting" the method or even the theory, practitioners and researchers can still remain committed to asking questions that help them understand and break down systems of oppression by collecting better data, and analyzing and interpreting it in ways that resonate communities of Color that take into account systemic racism.

Some say eliminating racism and truly quantifying racism is aspirational in nature. Similarly, QuantCrit is also aspirational because it is improbable to stay true to the theory of CRT, which has no common agree-upon tents, when using methods that were created to prove the very prejudices and systems CRT is critiquing. This might leave you, the reader, wondering if QuantCrit is even a worthwhile research endeavor. For this we turn to bell hooks' quote on "the healing" that happens not through the theory alone, but by "the doing." In the case of practitioners and researchers, "the doing" occurs through "doing QuantCrit," "QuantCriting," or "Being QuantCritical" Although theory is not inherently healing, it is possible to find healing, liberation, and revolution in the act of putting QuantCrit theorizing into practice. "For in its production lies the hope of our liberation" (hooks, 1991, p. 12).

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Terminology

Below is a list of terms that we refer to in this book. We seek to follow our own guidance in this book to be explicit and define all terms that may not be widely understood. Our aim is to explain how each term was used in the book, not to provide definite meanings.

Ableism   An ideology and set of actions that privilege particular sets of abilities while oppressing, denigrating, and marginalizing other sets of abilities. Can also mean direct discrimination against disabled people.

Achievement gap   The long-standing disparity in achievement outcomes, usually in the form of standardized tests, between students of varying racial and ethnic identities, gender identities, income levels, and mental and physical abilities.

ANOVA (analysis of variance)   A general linear model statistical technique for comparing the means of two or more groups. Tests the null hypothesis that the group means are equal.

Asset-based approach   In response to deficit-based approaches, asset-based approaches anchor on funds of knowledge that students of Color and other marginalized students already possess and see these funds as a strength.

Bias   The cognitive or emotional state of preferring certain identities or of avoiding and/or denigrating other identities. This is an internal state of preference, judgment, emotional reaction, or biased beliefs about certain identities. For example, bias in education might involve a teacher having lower expectations for a Black student compared to a white student or assuming a white student is more intelligent. Bias can lead to discrimination. However, bias is the cognitive or emotional state, while discrimination is behavior.

BIPOC (Black Indigenous and People of Color)   A term that centers the experiences of Black and Indigenous people, recognizing that they experience a unique history and trauma caused by white supremacy in a U.S. context.

Critical legal studies (CLS)   A school of legal scholarship that seeks to critique the sociohistorical roots and consequences of law and jurisprudence.

Critical quantitative inquiry or quantitative criticalism   One broad approach to incorporating justice and equity aims in quantitative inquiry. It is

loosely informed by Critical Theory but also often used as a broader term for non-positivist quantitative inquiry.

Critical Race Theory (CRT)   A theoretical framework that stems from the legal field, specifically Critical Legal Studies (CLS), that goes beyond CLS (e.g., class and gender) to criticize our society's laws, policies, and institutions for having pervasive and persistent embedded racism as a central part of all of our systems. There are no agreed-upon tenets; however, the centrality of racism is the foundation of CRT and, thus, QuantCrit. It can also be used as a framework to study and challenge white supremacy and other oppressive systems.

Critical theory   A philosophical approach that seeks to confront the social, historical, and ideological forces and structures that produce and constrain it. It was coined by the Frankfurt School and emerges from Marxist thought.

Data counter-storytelling   Integrating data into storytelling to highlight or construct narratives that counter the dominant, white-centric, and deficit-based narrative. The stories are intentionally told by those with lived experiences seeing their experiences as a valuable source of knowledge.

Data parties   A tool for engaging diverse stakeholders to review and interpret data through participatory analysis and sense-making.

***De facto* segregation**   De facto refers to what actually occurs regardless of laws, and de facto segregation refers to segregation by race that occurs not due to laws but because of cultural, social, and economic conditions. For example, white flight, the exodus of white families from a particular city or area, tends to occur in areas that become more racially/ethnically diverse.

***De jure* segregation**   De jure refers to laws, and de jure segregation refers to segregation by race as specified by the laws of local, state, or federal government (e.g., red lining and Jim Crow laws).

Deficit approach   This approach views differences from the dominant cultures' norms, practices, and values as deficits of the individual or cultural group. In this book, the dominant culture is white supremacy. A deficit approach views students negatively based on differences from the dominant culture and what they lack rather than viewing students based on what they have to offer.

Discrimination   Either denying privileges or giving additional privileges based on an individual's identity. For example, discrimination in a classroom might involve referring a white student to gifted education but not a Black student with similar qualifications. Discrimination goes beyond bias, which is a cognitive or emotional state; rather, it is an act or lack thereof.

Disparity   Differences in life outcomes or life chances (e.g., education, workforce, health, criminal justice) driven by systemic racism and other systems of oppression.

Epistemology   A theory of knowledge used to understand the world and determine what is knowable, how knowledge is produced and the limits of knowledge.

Equity   While equality might refer to equal treatment under the law or identical resources, equity involves evaluating how to correct for historic and contemporary disparities. For example, providing the same amount of funding per resident for water infrastructure might be equal treatment. But, because some neighborhoods (which disproportionately house people of Color) have been neglected leading to lead in the water and crumbling infrastructure, it would actually take far more resources to correct the situation beyond the resources needed to simply maintain relatively good infrastructure. Similarly, correcting educational disparities might require unequal distribution of resources to account for historic neglect, underfunding, and marginalization.

Ethnicity   Refers to an identity based on cultural similarities. It is related to race, but it is distinct because it is not based on phenotype or other physical characteristics; it is based on place or origin, cultural expression, language, and other factors.

Eugenics   The pseudo-scientific theory that centers on the idea of genetic superiority and aims to create a genetically superior society through methods like sterilization, selective breeding, and sometimes genocide. In eugenics, the theory invariably assumes the genetic superiority of white people and seeks to create a whiter society. Eugenics is also always ableist, with one of the goals being to irradicate disability (especially developmental or intellectual disability) and the people with such disabilities.

***F*-test**   Short for Fisher's exact test. See ANOVA.

Gay   Commonly used to describe a man who experiences romantic or sexual attraction to other men. It is also used broadly to describe individuals who are attracted to the same gender.

Gender   Gender is a social construct which is related to but distinct from sex as assigned at birth. While sex as assigned at birth is based on external genital presentation at the time of birth (which are also not binary, but newborns with external genital presentation that does not neatly align to the sex binary of male/female are often surgically altered to more closely fit), gender is both a social and individual identity. It can be thought of as relating to how one views oneself as related to social expectations, especially around masculinity and femininity. Gender includes individual identities such as man, woman, nonbinary, genderqueer, agender, and more. Gender is also often used to refer to whether a person identifies as cisgender (e.g., a man assigned male at birth or a woman assigned female at birth) and transgender (any other combination of gender and sex assigned at birth), though notably not everyone identifies with either cisgender or transgender labels.

Groundtruthing   A participatory approach uses the knowledge of communities and views them as experts to "ground" and contextualize data. Without their expertise, numbers are conjectural, and to understand them within society, researchers need the expertise of the communities.

Individual racism   Refers to an individual's racist ideologies or implicit biases, assumptions, beliefs, and/or behaviors that attempt to dehumanize people of Color. Can involve overt acts of discrimination, microaggressions, biases, or even violence, but can also involve more subtle forms of color-evasive racism.

Intersectionality   Developed by Black women and women of Color who wanted to describe their oppression more precisely. Intersectionality encompasses multiple interconnected systems of marginalization and oppression. For example, a Black woman might experience the intersection of racism and sexism or patriarchy. Intersectionality focuses on the ways that particular social identities and locations might position one at the intersections of these systems of power and oppression.

Justice   Justice, as a term, often conjures legal imagery. Broadly speaking, it is about imparting fair and equal treatment to all people.

Microaggression   Is more than a bias; it is an act of discrimination that is based on stereotypes and bias rooted in our systems of oppression. They can be so commonplace in day-to-day life that individuals often second guess whether they actually occurred. Microaggressions are small, subtle, and can easily be dismissed. Individuals experiencing them might even question if they happened, but they nevertheless have a cumulative effect over time.

Nonbinary   Most often means a person whose gender identity is outside of the traditional man/woman binary.

Opportunity gap   Differences in educational opportunity stemming from systems of oppression that impact things like school funding formulas and de facto segregation. For example, schools across the country, based on their racial/ethnic composition, have access to varying quality and quantity of college preparation courses, teacher workforce, support staff, and extracurriculars, among other resources. The achievement gap is explained by varying levels of opportunity. This framing turns the onus on the systems that did not provide the opportunities rather than achievement gap which focuses on the individuals who experience the effects.

Oppression   Systems that ensure disparities persist and opportunities accumulate mostly to dominant social groups. For example, white supremacy is a system of oppression which affords greater opportunities and resources to white people. Oppression can involve active efforts by dominant group members, but can also be endemic, systemic, and structural.

(Youth) Participatory Action Research (PAR)   A community-based research method that attempts to include those who are most impacted by the research into the research process with the aim of doing research WITH and not ON communities. It is a partnership between researchers and communities to co-create knowledge and create long-lasting change. When young people are the research partners rather than adults it is referred as YPAR.

People of Color, students of Color, communities of Color   In a U.S. context, these terms are meant to highlight the racialized experiences of people

who are not white. While the term can be useful for that purpose, it also runs the risk of homogenizing experiences of people who experience social structures very differently.

Positionality The social position and standpoint of a researcher from which they view the world. Positionality naturally affects the ways that researchers ask questions, interpret results, and make sense of patterns. Positionality is not about bias and should not be seen as a limitation. But rather it is about recognizing and being mindful of one's own perspectives into how the research is framed and understood.

Positivism The belief that there is one universal, absolute truth that can be ascertained through sufficiently objective methods.

Post-positivism The belief that there is one universal, absolute truth. However, there will always be some degree of uncertainty about whether observations and inferences actually get all the way to that absolute truth. As such, there is an emphasis on biases and error, as those are the difference between the observations and inferences and truth.

QuantCrit A framework that incorporates the tenets of Critical Race Theory to approach quantitative material and methodologies with the aim of working toward social justice and racial equity.

Quantitative methods Any approach to research, analysis, or sense-making that uses numeric data. Often also involves statistics and statistical analysis, but some quantitative approaches are not statistically oriented.

Queer Originally a negative slur used to identify LGBTQ+ individuals, it has, to some extent, been reclaimed by LGBTQ+ individuals and communities as an affirmative identity. The use of "queer" as an identifier is often an intentional move toward disrupting normalized social conventions and ways of relating. Queer is also used as a verb, which similarly means to disrupt, disorient, or upend the normative social order. In some survey research, queer is also used as a catch-all term for LGBTQ+ people and identities.

Race A socially constructed concept with roots in white supremacy to separate those who are not white from those who are. Though it is based on physical features including phenotype, it is not a natural or biological category. Instead, it is a social categorization that has changed and shifted over time in service of racist social orders. Individuals, though, often strongly identify in affirmative ways with racial categories to which they feel they belong, and that social identity can be a source of strength and cultural wealth. While race is a social construction, it has very real material consequences.

Race-evasive Most commonly refers to forms of racism that are superficially nonracial. For example, claiming not to see color, or denying that race plays a role in shaping social situations or outcomes. Less commonly, can mean using euphemisms to avoid referring explicitly to race and/or racism.

Reflexivity Reflexivity might involve being aware of and working with a recognition of one's positionality. But it is also about a continual state of

reflection and evaluation of how the researcher is engaging in the work and in what ways they might be contributing to oppression or liberation. It is also not about bias, but about recognizing the inherent subjectivities of research and working to orient their work toward equity.

Sense-making   To analyze and assign meaning to data both quantitative and qualitative. Usually it leads to real world recommendations and policy implications.

Social justice   With roots in religious groups as a way of doing charity, more recently, the term is often used to refer to the struggle for justice in various arenas, including environmental justice, racial justice, LGBTQ+ justice, economic justice, and more, usually without reference to or connection with its religious connotations. It has taken off in societal discourse and become a term that is often used interchangeably with equity.

Statistics   Broadly refers to numeric and analytic representations of quantitative data, which might include descriptive statistics (e.g., means or averages, standard deviations, medians) and/or inferential statistics.

Structural racism   Refers to the formal and informal structures (laws, institutions, policies, and cultural norms) that reinforce white supremacy and subjugate and oppress people of Color. This does not refer to specific "racist" individuals but rather to the historical and current structures. These can include laws and policies that disproportionately favor white people, as well as factors like access to healthcare, proximity to environmental hazards, quality and upkeep of local infrastructure, and more.

Street race   Not one's self-identified racial identity, but the identity strangers on the street might perceive one as.

Systemic racism   Can be defined to include structural racism, but also broader systems, ideologies, and collective experiences that harm and minoritize people of Color. Systemic racism is so deeply infused in society that it does not require the force of law or individual intent. Because of that, it is particularly difficulty to disrupt. Systemic racism is also resilient, changing over time to adapt to new social conditions and interventions.

Systems of oppression   A sociopolitical and cultural system that values the dominant culture or groups. In this book we refer to the dominant culture as white culture and upholding white supremacist cisheteropatriarchy. Through these sociopolitical and cultural systems institutions and individuals are consciously and subconsciously oppressing those who are not part of the dominant group.

White supremacist cisheteropatriachy   Names the ways that white supremacy, cisgenderism, heterosexism, and patriarchy are all enmeshed to form an intersectional system of oppression. It also names the fact that white supremacy is entangled with and often gives rise to systems that marginalize and oppress queer people, trans people, and women. This also involves acknowledgment that white queer and trans people, for example, will experience this system differently as aspects of their social position are privileged, normalized, and dominant due to white supremacy,

even while other aspects are marginalized, oppressed, and policed due to heterosexism (the belief in the superiority or normalcy of heterosexuality), cisgenderism (the belief in the superiority or normalcy of cisgender people), and patriarchy (the belief in the superiority and dominance of men or people assigned male at birth).

White supremacy   Both an ideology that individuals might adhere to which holds that white people are superior (perhaps genetically, socially, or otherwise), and a social and governmental system built upon the belief that white people are superior. White supremacist systems center white people and their experiences and disproportionately benefit them in terms of resources, opportunities, infrastructure, and more.

Whiteness   Describes ways of knowing, beliefs, actions, feelings, rhetoric, and symbols that endorses the idea that white is dominant, normal, and superior. It can be practiced by an individual or held by systems in society by denying people of color rights and their humanity.

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