How to "QuantCrit:" Practices and Questions for Education Data Researchers and Users

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'QuantCrit' (Quantitative Critical Race Theory) is a rapidly developing approach that seeks to challenge and improve the use of statistical data in social research by applying the insights of Critical Race Theory. As originally formulated, QuantCrit rests on five principles; 1) the centrality of racism; 2) numbers are not neutral; 3) categories are not natural; 4) voice and insight (data cannot 'speak for itself); and 5) a social justice/equity orientation (Gillborn et al, 2018). The approach has quickly developed an international and interdisciplinary character, including applications in medicine (Gerido, 2020) and literature (Hammond, 2019). Simultaneously, there has been ferocious criticism from detractors outraged by the suggestion that numbers are anything other than objective and scientific (Airaksinen, 2018). In this context it is vital that the approach establishes some common understandings about good practice; in order to sustain rigor, make QuantCrit accessible to academics, practioners, and policymakers alike, and resist widespread attempts to over-simplify and pillory. This paper is intended to advance an iterative process of expanding and clarifying how to 'QuantCrit'.

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Introduction

'QuantCrit' (Quantitative Critical Race Theory) is a rapidly developing approach that seeks to challenge and improve the use of statistical data in social research by applying the insights of Critical Race Theory (CRT). The approach began in educational studies and quickly developed an international and interdisciplinary character, including applications in medicine (Gerido, 2020) and even in the art of writing (Hammond, 2019). Simultaneously, there has been ferocious criticism from detractors who are outraged by the suggestion that numbers are anything other than objective and scientific (Airaksinen, 2018). The ideas behind QuantCrit took shape initially through the work of a group of CRT education researchers as they worked to contribute to a special issue of the journal *'Race Ethnicity and Education'* (ed. Garcia, López & Vélez 2018). The growth in attention to these ideas can be gauged by the fact that, prior to the special issue appearing online in 2017, 'QuantCrit' was mentioned in just four published sources; in contrast, between 2017 and early 2021, the number totaled more than 160.[1]

In broad terms, QuantCrit describes an attempt to take the lessons and insights of CRT and apply them to understanding and using quantitative material. This is a challenging exercise because CRT is closely associated with qualitative methods. Scholars have adopted multiple different approaches to this task; one of the most frequently cited is a paper that sets out a series of clear questions and challenges that can shape a QuantCrit approach (Gillborn et al 2018). Inspired by developments in Disability Critical Race Theory (DisCrit) (Annamma et al 2013 & 2018), this strategy takes the signature elements of CRT, sometimes called 'tenets', and translates them into specific principles that can act as a set of sensitizing questions and offer critical guidance when navigating quantitative data which 'have no objective reality beyond the frameworks of meaning and politics that create them' (Gillborn et al, 2018, 169). QuantCrit, therefore, adopts 'a position of principled ambivalence, neither rejecting numbers out of hand nor falling into the trap of imagining that numeric data have any kind of enhanced status, value, or neutrality' (p. 174).

With the mandates from *No Child Left Behind* followed by *Race to the Top*, state, local districts, and the federal government collect massive amounts of student data every year. Unfortunately, the data collected is not easily digestible and/or accessible to parents, teachers, and to some school leaders and policymakers. There is a growing movement by education advocates, funders, and scholars to democratize evidence by making it an accessible resource for *all* stakeholders to use to advocate for their communities (Tseng et al., 2018). However, simply providing statistical data is no guarantee of transparency; key questions and inequities can be hidden or misrepresented, for example, depending on decisions that are made about which data are selected for release, how they are categorized and presented. Crawford (2019) concluded that "knowing misrepresentations of quantitative data are at the heart of an institutional process through which race and racism are produced, legitimized perpetuated in education." QuantCrit is intended to make these issues more visible and to guide more critical discussion and analysis of such data. Research users are not passive receivers of distilled wisdom, they are active agents of critique and creative analysis.

Responding to Sablan's fear that 'more methodological guidance may be necessary for those seeking to move these [critical] premises into research practice' (2019, 185), this paper explores a range of questions that prompt users to be engaged critics in working towards a more just and equitable society by weighing the plausibility of the study, and questioning how the material was produced, analyzed, and presented. Nonetheless, we recognize that applying any framework and/or set of practices will

not dismantle systemic racism, however, it is a *tool* to begin to reimagine the role that research and data can play in an anti-racist society.

For researchers, QuantCrit continues to expand and explore new ways of working critically with numbers, to sustain rigor, make the approach accessible more widely, and resist widespread attempts to over-simplify and pillory (cf. Enache, no date). This paper is not intended to close down or dictate particular ways of working, but rather to help open up debate by making the issues explicit and advancing an iterative process of expanding and clarifying *how* to 'QuantCrit.'

Principles in Practice

As originally formulated, 'QuantCrit' rests on five principles; 1) the centrality of racism; 2) numbers are not neutral; 3) categories are neither 'natural' nor given: for 'race' read 'racism'; 4) voice and insight (data cannot speak for itself); and 5) a social justice/equity orientation (Gillborn et al, 2018). Of course, many quantitative scholars and users of research already apply a critical lens (Ziliak & McCloskey, 2008), but the principles of 'QuantCrit' are intended to clarify some key questions and give us additional tools and language *to explicitly verbalize and interrogate how racism potentially influences every aspect of quantitative data collection and analysis*. This has proven to be the most provocative aspect of QuantCrit in the eyes of its critics; for whom numbers remain a simple, obvious, objective fact (Gillborn, 2019).

In the remainder of this paper, we consider each principle and offer some suggestions for how researchers and users of research might put the principles to work. Of course, researchers and users of research are often the same people, but our aim here is to identify ways in which readers are not passive consumers of research, but active and critical actors in the research and policy process.

The approaches that we discuss are frequently relevant to more than one principle, but we have found it useful to use the principles as an organizing framework which helps to guide critique and question not only how data are presented, but also to identify silences in official presentations and discussions.

The Centrality of Racism

Contrary to traditional approaches, which tend to associate 'racism' with only the most crude and obvious acts of race hatred, CRT reveals racism as a complex, sometimes subtle, aspect of social relations that frequently permeates the entire fabric of institutions (Feigen, 2006; Perez Huber & Solórzano, 2015). This kind of mundane, everyday racism can have devastating consequences but it does not stand out to many people, and so it is not easily quantifiable. Unless researchers have *consciously* sought to understand and expose racism, quantitative analyses, like any other methods of analyses, will tend to remake and legitimate existing race inequities.

Suggestions for Researchers

       i. *Positionality Statement-* a statement about the researcher/s own positioning (in relation to social identities such as race, class, gender, disability) is viewed as best-practice for many qualitative researchers, but rare in quantitative studies – exposing just how rarely statisticians consider any possible contamination by the racialized society within which they live and work (Zuberi & Bonilla-Silva, 2008). However, a striking exception is the collection that launched the idea of

QuantCrit, in which every paper contained a positionality statement of some form.

The general absence of positionality statements in quantitative research speaks directly to one of QuantCrit's most fundamental challenges to current assumptions about the nature of quantitative research. The lack of positionality statements in virtually all quantitative research powerfully symbolizes the belief that the data, analysis, and presentation of the research is entirely separate from the life histories, concerns and biographies of the researcher/s. This is, of course, in line with one of the most frequent operations of *Whiteness* in society, whereby race and 'ethnic' concerns are presented as tangential to mainstream debates and priorities.[2] Whiteness, in this way, masquerades as 'normality,' as the absence of difference (cf. Leonardo 2009). Being open about the backgrounds and expertise of the researcher/team is a good way of starting to make explicit where the silences and absences of experience may lie.

Researchers should write a positionality statement where they seek to reflect on, understand and address their position/s in society and any potential biases and blind-spots. The construction and debate of such a statement could be an active process within a research team (and possibly involving non-researchers with a stake in the issues) – it should not be a token paragraph inserted into an otherwise-complete analysis. Thinking about author positionality can have a profound impact on how a project is shaped and conducted.

Below is an example of a positionality statement by one of the authors, a self-identified Latina who primarily studies quantitative methods and education policy. She describes how her identity and life experiences influence her approach to her research:

> *As a Latina who grew up in a working-class household, is the daughter of undocumented immigrants, is a first-generation college student, and is an English learner, I am motivated to do work in the education policy field because of the barriers and lack of opportunities I experienced throughout my education in the US public school system. I recognize that I cannot separate my life experiences because they have influenced my outlook on the topics I explore in my work. As I continue my research in the education policy space, it is important for me to recognize the biases and assumptions I may hold because of the negative and positive experiences I have had as Latina in the US public school system, higher education system, and career post-college.*

It is important to stress that researchers' positionality does not guarantee anything about the quality and usefulness of their research. As Derrick Bell's writing on the 'rules of racial standing' (1992, 109-26) reminds us, members of historically minoritized groups can sometimes achieve fame and fortune by siding with the oppressor and speaking on behalf of Whiteness. Similarly, researchers who stand outside of a particular identity are not necessarily incapable of producing solid, even inspiring critical research, but such things are less likely unless the researcher has done something to move themselves outside the territory usually inhabited by majoritarian identities.

ii. *Research questions and survey items could be framed from an asset-based perspective.* This is an important way of challenging ourselves to resist the almost automatic lure of deficit thinking in much social policy research. For example, a familiar research question might be phrased as:

'Why are Black boys expelled from our schools at a high rate than other boys?'

For many readers this seems like a perfectly fair way of phrasing a question that seeks to understand the discrepancy in exclusion rates for Black boys and young men. However, policy frequently assumes that the explanation will lie in the boys, their families or communities. This line of thinking can be exposed and challenged by thinking about different ways to phrase the question. One approach used by We All Count Data Equity Framework (We All Count, n.d.) would be to invert the question by removing the presumed responsibility from Black boys and placing it on systemic barriers instead:

'Why do schools expel disproportionate numbers of Black boys?'

This is not merely a question of semantics; the second research question puts the school's agency and intentionality at the heart of the research. It ensures that school policies and teachers' actions are visible and critically examined from the very start.

Suggestions for Users

When reading research, users should consider whether the authors of the research are using the practices mentioned above, such as considering their position in society and consequently writing a positionality statement as well as framing their questions and survey items from an asset-based perspective. Additionally, users might consider the following:

i. Who are the researchers?
   a. What are their backgrounds and how might this influence the way they conduct research? What assumptions might unwittingly shape their research?
   b. Who is funding them? Who do they see as the prime audience for their work?

ii. Who or what interests decided which questions/issues to research?
   a. Was the research agenda influenced and informed by the community/ies they are researching?
   b. Who is benefiting from asking these questions or researching these issues?

Numbers are not neutral

Quantitative data are frequently viewed as objective, neutral and free from bias. Whereas excerpts from interviews are likely to generate a raft of questions from readers (e.g. concerning who is being quoted and how the material has been edited) quantitative material seems to carry additional weight

and authority in the eyes of most readers (Connolly, 2007). In fact, many quantitative analyses encode everyday racism, for example, by 'using tools, models and techniques that fail to take account of racism as a central factor in daily life; and by lending supposedly "objective" support to Eurocentric and White Supremacist ideas' (Crawford et. al., 2019, 126-7).

Suggestions for Researchers

     i.   *Choose your denominator carefully*. An analysis may present averages or model coefficients that are 'accurate' (i.e. meaning that mathematically there is no error), but this is not the end of the researcher's responsibility to present a meaningful picture. You, the researcher, choose who to include in your sample; you quite literally decide "who counts." Your averages and coefficients are only as accurate as the sample of people who are in your study. Take the example of police brutality:

        Some scholars have produced results on the study of police brutality and racial discrimination arguing that Black people are not subject to racial bias (Fryer, 2017; Johnson et al., 2019). However, they suffer from the denominator problem (Knox and Mummulo, 2020):

        Fryer (2017) found that US police shoot White, Black and Latinx individuals, whom they have stopped, at equal rates. The denominator in their study is everyone who the police have stopped. The real-world pattern of racial profiling at police hands is presented as if there were no significant difference: but, in fact, Black people have a higher likelihood of being stopped (Pierson et al., 2020) and the number of stops will skew the results.

        Johnson et al. (2019) concluded that "the probability of being shot by the police did not differ for Black and white Americans." They came to this conclusion by analyzing *only* shooting data rather than shootings as a proportion of encounters with law enforcement. They have since retracted their publication by stating that their mistake lay in "drawing inferences about the broader population of civilians rather than restricting our conclusions to the population of civilians who were fatally shot by the police" (Cesario & Johnson, 2020).

        The research surrounding police brutality against Black and White people in the U.S. demonstrates the importance of carefully choosing the appropriate denominator. Different denominators can lead to drastically different results, which could then have potentially life-threatening consequences for people of color during policy-making.

    ii.   *Model selection:* Think about why you are choosing certain variables to include in your model. A model can tell you how much *variation* is 'explained' by the variables you included, but it will not select the variables for you and each variable is not hermetically sealed from the rest of the world. For example, a model might include variables that control for Socio-economic Status (SES) and/or prior achievement. Remember that SES and prior achievement do not exist independent of racism. Students of color are generally overrepresented in low-resourced schools and tracks, and students in under-resourced schools have less experienced teachers, lower expectations, few role-models, among other

inhibiting circumstances (Heitzeg, 2016; Brown, 2014). Thus, when you control for prior achievement and/or SES you can also think of it in a sense as 'controlling' for racist systems. In the UK, quantitative research that controls for 'prior achievement' at the age of eleven has been criticized for essentially disguising the effects of racism in early years education and elementary schooling and presenting it as if it is a deficit of the individual child, rather than an effect of the system (CRRE, 2021; Gillborn 2010).

When you are selecting a model ask yourself and your team the following question:

    a. Did you choose variables based on prior critical research? Does this prior research use variables that mask inequalities by "controlling away" racism? Are you including interaction terms that may represent the intersectional identities of your research participants? Did you include stakeholders and communities in the model selection process? Including their voice might point you to variables you may or may not have collected, emphasizing the importance of including stakeholders and community members at the beginning of the research project. Stakeholders and community members may also have a-priori knowledge from their experiences on-the-ground that could improve your model.

    b. Are you falling into the trap of '*garbage can*' modelling? That is, are you throwing into the calculation lots of factors which may have a dubious relevance to the research question? 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 judgement about which might be the most relevant. In this way 'the signal is overwhelmed by the noise' (Miller 2020). Sometimes researchers seem to include variables for no reason other than they can; they may think that including the maximum number of variables makes their research more detailed, comprehensive or valid; the opposite is the case (see CRRE 2021).

Suggestions for Users

    i. When using others' research, we should ask critical questions related to both (1) the data collection and (2) data analysis:

        a. What measures/outcome/surveys were collected? Who is *(and is not)* in the sample? How large is the sample? Where, how and when (date/year) was the data collected (think about recruitment)? Who collected it (was it researchers, community members, contractors)? When community members collect data, it may affect who comes forward and what they say about themselves (We All Count, n.d).

        b. Do not be impressed by a large sample alone; e.g. a recent survey of people's attitudes to social inequality post-covid included more than 2000 respondents (Duffy et al., 2021), but the conclusions cannot safely be generalized to the multiracial population of the UK because a disproportionate number of respondents were White.

     c.   Whose perspectives and assumptions are reflected in the analysis? If they used a model, which variables did they include in their model? Are all the variables described and justified?

         i.   Just because something can be included does not mean that it is sensible to do so: variables with weak or no meaningful relationship to the research issues should not be included because of the risk of 'garbage can' modelling.

        ii.   If averages are reported, what denominator has been used and why? Do they use median or mean or report a range? In each case, as users of research we need to think about key issues that might have been (unwittingly) erased or misrepresented.

Categories are neither 'natural' nor given: for 'race' read 'racism'

CRT, along with many approaches to understanding the social world, recognizes that the categories that humans designate as 'races' have no objective reality as meaningful, biologically distinct and separate sub-divisions of the human race. The things which are typically taken as markers of 'race' are superficial characteristics that have become inscribed with meaning through social interaction. Although we are led to believe in race as some sort of bio-cultural marker, in reality the concept of race, how many races are supposed to exist, and how those races are identified, are all issues that vary between different societies and within the same society over time. In an article, reviewing the persistence of attempts to link health disparities to supposed genetic differences rather than the more obvious economic and social inequities, Silverstein (2015) has noted:

> *… it is almost universally agreed that race is a social construct. In 2005, only two years after the sequencing of the human genome, the editors of Nature Biotechnology put it like this: "Pooling people in race silos is akin to zoologists grouping raccoons, tigers, and okapis on the basis that they are all stripey." Perhaps, then, the better question is: Why do we continue to search for a connection between race and genetics… (Silverstein, 2015)*

This is a hugely important fact. It means that whenever social statistics offer some measure of race/ethnicity, the act risks presenting a wholly *social* category as if it were a natural and fixed difference. Where the lines are drawn, and who draws those lines, will exert a huge influence on the patterns that emerge from the data.

As an attempt to subvert deficit thinking, this QuantCrit principle encourages researchers and users alike to substitute the word '*racism'* wherever the category of '*race'* is encountered (Gillborn et al, 2018: 171-3). For example, the covid-19 pandemic has disproportionately impacted Black communities (in terms of the both economic and health and mortality consequences); conservative commentators have reacted, in deficit mode, by supposing this might reveal a behavioral or genetic weakness on their part (Goodhart, 2020), but a critical approach asks how *racism* is implicated, and finds multiple, intersecting and reinforcing processes by which 'these inequalities absolutely are driven by racism and racial discrimination' (Nazroo & Becares 2020).

Suggestions for Researchers

         i.   *When researchers are collecting and analyzing data, they should ensure their categorization is informed and resonates with the communities of interest.* Categories are arbitrary and embedded in past practices and biases. There is no 'objectively' correct set of categories: too *many* or too *few* categories can mask

or illuminate inequalities. For example, it is not uncommon to find large scale research projects that fail to record any measure of their respondents' racialized identity; in this way it becomes impossible to identify areas of racist injustice and the views/experiences of the majority can come to define what is perceived to be 'normal'.

There is no simple or definitive way to decide on the most appropriate size or composition of research samples. Too *many* groups will render the sample numbers too small for sensible discussion but too *few* groups will obscure potentially important differences in achievement and experience. In the UK, for example, it is common to speak of the gap in university degree success between White students and their peers categorized as BME (Black and Minority Ethnic):

> 'Overall, 79.6% of white students received a first/2:1 [good passing standard] compared with 66.0% of BME students, representing *a BME degree attainment gap of 13.6 percentage points*.' (AdvanceHE, 2018: 14, emphasis added)

However, grouping, rather than disaggregating, minoritized students can disguise areas of greater inequity. In the UK, official reports talk of a degree awarding gap of around 13 percentage points (see above) but this overall figure is affected by the higher rates of success for some groups, which obscures much greater inequities experienced by those who are subject to anti-Black racism, for whom the gap is almost twice as big.[3]

ii.   Of course, sample size may affect researchers' ability to disaggregate data. If the researcher is involved in the data collection phase, then we suggest that they should advocate for more detailed data collection that reflects the community of interest. This way, when it is time for analyses, the researcher can make a decision as to whether the sample is large enough for disaggregation, and thus not mask inequities.

For example, if the study focuses on Latinx populations or Asian populations in the US, country of origin data might also be collected and analyzed when sample sizes are large enough. There is no 'magic number' that defines the minimum size necessary for a group to be considered separately; in each case researchers need to consider the problems implicit in using small samples, weighed against the possible significance of processes and experiences, that might be hugely important to a sub-group, but which could be lost if the data is bundled into a larger composite grouping.

Frequently, researchers and policymakers talk about "immigrants" students as if they were one big group with similar experiences (Vela, 2016). In reality, these students have a variety of distinct national origins, regional cultures, dialects, and immigration statuses, among other differences. Accordingly, research shows that many Latinx Americans prefer to identify with their country of origin over "Latino" or "Hispanic" because it is more representative of their culture (e.g., Colombian, Salvadorian) (Taylor et al., 2012).

In Figure 1 below, you can see the variation in college enrollment rates for Latinx students with family origins in Mexico, Central American, and South American countries. Depending on the research question and the demographics of the targeted sample participants, it might be useful to further nuance the data collection by asking about indigenous or tribe affiliation and/or if respondents identify as Afro-Latino; particularly since these subpopulations are often over looked (Ribando, 2007).

Figure 1. Average college enrollment rates of 18 to 24-year-olds in degree granting postsecondary institutions by selected Hispanic subgroups: 2016
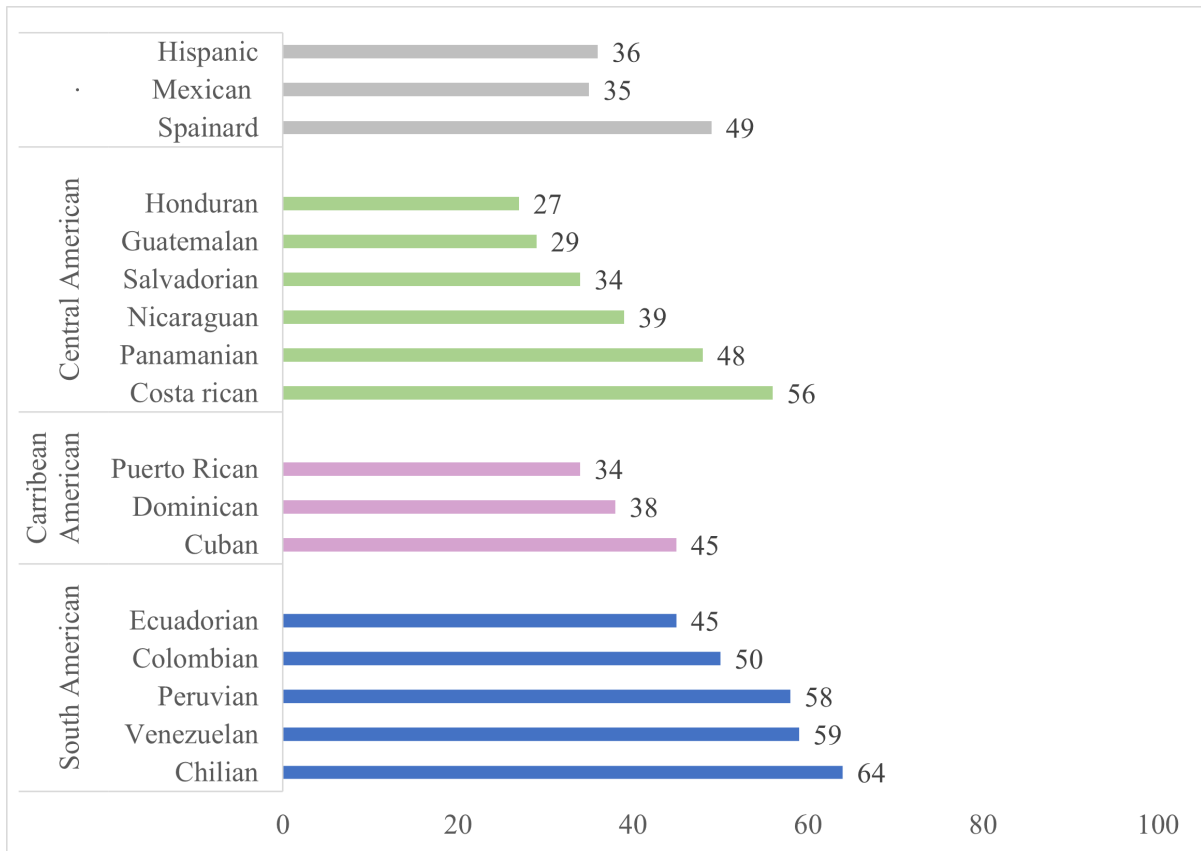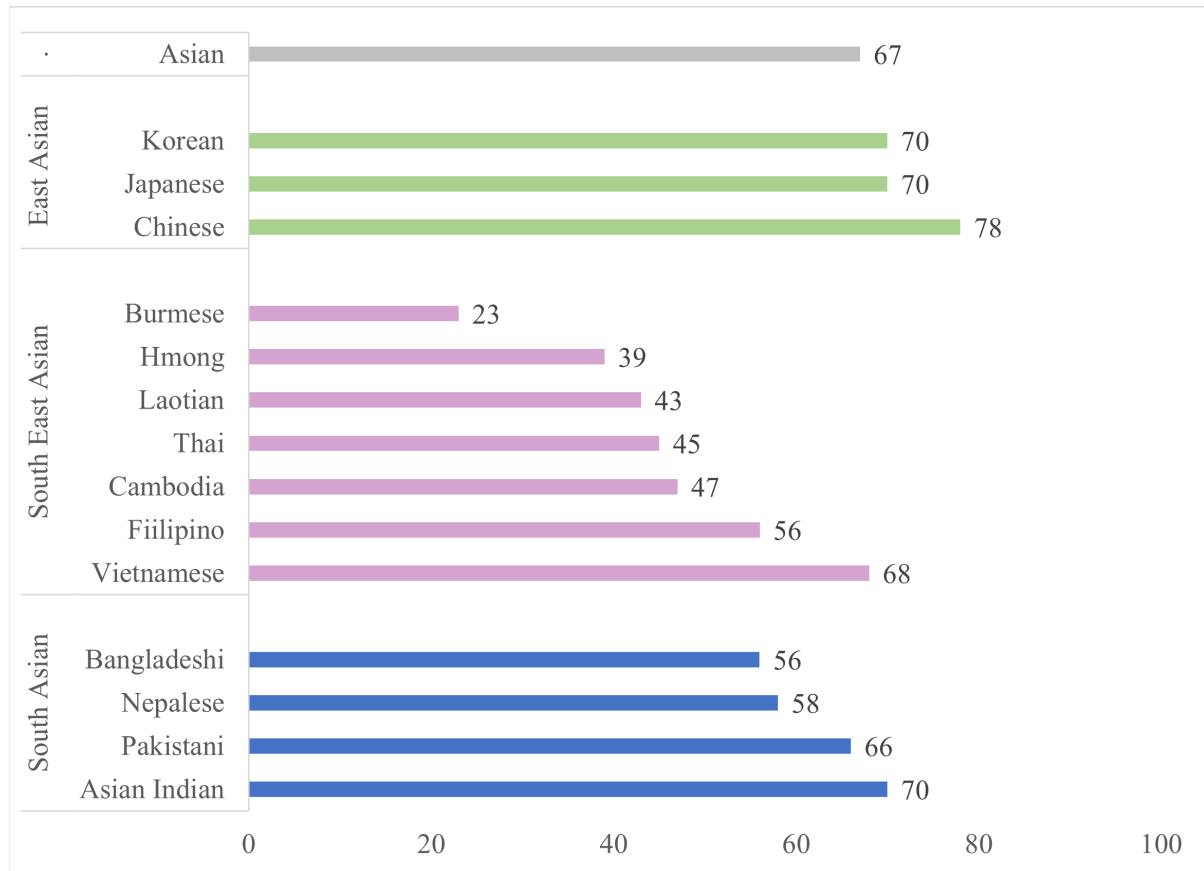

Note: Data are based on sample surveys of the entire population in the given age range residing within the United States, including both noninstitutionalized persons (e.g., those living in households, college housing, or military housing located within the United States) and institutionalized persons (e.g., those living in prisons, nursing facilities, or other healthcare facilities). Although rounded numbers are displayed, the figures are based on unrounded estimates.
SOURCE: U.S. Department of Commerce, Census Bureau, American Community Survey (ACS), 2016. See *Digest of Education Statistics 2017*, table 302.62.

In Figure 2, there is large within region variation in South East Asia: Hmong students enroll at 39% compared to Vietnamese students at 68%. In these examples, we illuminate within racial/ethnic disparities, and demonstrate that Latinx and Asian students are not a monolith.

Figure 2: Average college enrollment rates of 18 to 24-year-olds in degree granting postsecondary institutions by selected Asian subgroups: 2016

Note: Data are based on sample surveys of the entire population in the given age range residing within the United States, including both noninstitutionalized persons (e.g., those living in households, college housing, or military housing located within the United States) and institutionalized persons (e.g., those living in prisons, nursing facilities, or other healthcare facilities). Race categories exclude persons of Hispanic ethnicity. Although rounded numbers are displayed, the figures are based on unrounded estimates.
SOURCE: U.S. Department of Commerce, Census Bureau, American Community Survey (ACS), 2016. See *Digest of Education Statistics 2017,* table 302.62.

Suggestions for Users

  i.   When using research, ask yourself critical questions related to subgroup analysis or lack thereof.
      a.   Did the researchers analyze the data in separate racial categories? If so, how did they decide/define categories?
      b.   Do the categories resonate with the people that they seek to describe or have groups been broken up/grouped together in misleading ways?
      c.   Check the definitions that are supplied to explain the labels that are used. For example, if a publication argues that there is no difference between the rate of success for White and Minority Ethnic students;

this might refer to a comparison that lumps all historically minoritized students into a single group (thereby hiding important differences between groups); or it could be generalizing based on a *single* minority population in ways that ignore the experiences of different groups elsewhere in the country or system.

Voice and Insight (data cannot 'speak for itself')

One of the key understandings that critical researchers bring to their work with data (both quantitative and qualitative) is that *all* data is socially constructed. Contrary to the absurd caricatures promoted by detractors, this does *not* mean that data is simply made up, invented out of thin air; rather it means that data is not found lying around in neatly organized bundles of naturally occurring speech or numbers. All social research is shaped by researchers (and often funders) who decide on what to research, how to research it, and who/what to include in the data gathering. Interview data is generated through researchers deciding on questions and prompts, surveys are created by researchers constructing questionnaires, and statistics are created by numerous decisions about what to count and how to count it. *All* analysis – quantitative and qualitative – is guided by the researchers' beliefs about the key research problems and their theories about the processes that they are exploring. It follows logically that data cannot 'speak for itself' – whether it is an interview, a survey or a census (see Covarrubias & Vélez 2013). For researchers' seeking to apply the insights of CRT, this lesson connects to one of the signature ideas of the approach, namely:

> 'Critical race theory insists on recognition of the experiential knowledge of people of color and our communities of origin in analyzing law and society. This knowledge is gained from critical reflection on the lived experience of racism and from critical reflection upon active political practice toward the elimination of racism.' (Lawrence III, et al 1993: 6)

It follows, therefore, that researchers should not presume to interpret their findings in a vacuum, uninformed by the experiences and insights of the communities that are directly affected by their work. There is no easy way to achieve this; as we noted in relation to positionality (above) a social identity does not bestow a single unproblematic wisdom or insight on anyone; however, the recognition does place a responsibility on researchers to take seriously how their data, analysis and findings make sense to the people implicated in the study.

Suggestions for Researchers

i. How have the perspectives and understandings of traditionally marginalized communities informed the research process? What steps have you taken to ensure that the research does not simply encode majority beliefs, e.g. by drawing on a diverse literature, community groups, campaigns and other sources.

ii. Be *transparent* of the limitations of your research. Be sure to mention the dangers of over-generalization, sample limitations, potential measurement error, potential response bias as well as any other limitations. Unfortunately, many times quantitative researchers have such large confidence intervals that they state their findings are inconclusive and recommend more research. This is not useful for a practitioner, policymaker, or stakeholder. Instead, explain

what the confidence interval *means* and help readers to draw informed conclusions.

For example, say an intervention leads to an average increase in college graduation of 3 percentage points with a confidence interval between -1 and 5 percentage points, this will mean little or nothing to readers that are not trained in statistics. Similarly, a statement that the research findings are not 'statistically significant' may be taken to mean that that the findings are worthless by most non-specialists and this can be extremely dangerous (see Ziliak & McCloskey, 2008). Given sufficient information, users of research can evaluate for themselves if the positive estimate (although with uncertainty surrounding it) is credible enough evidence for them to use in their decision-making.

iii.   Provide *context* for your audience to make the results meaningful; do not simply say that the results were statistically significant. That doesn't mean anything to most people and, indeed, the significance of significance tests is hotly contested. Gordon and Conaway (2020) suggest that by putting your findings in context that people understand, users can begin to assess whether the results are meaningful to them. If you have binary outcomes, using odds ratios makes it much more accessible (if the calculation is explained carefully for non-specialists). If you have a continuous outcome, one approach is to present your model coefficients and your research in general using units people understand like gains/losses in years/days of learning, or units in a test that they are familiar with (e.g. SAT or state test).

iv.   For example, rather than saying 'participating in this program increased Henry's reading score by .12 standard deviations' (although this is great for people who understand effect sizes), an alternative is to say this program increases a student's learning by .05 years or 10 days. To establish whether the results are practically meaningful, it would be helpful to further contextualize by providing relevant comparisons for other interventions.

Suggestions for Users

i.   When consuming research, users should ask critical questions related to how the research and data are being 1) interpreted and 2) communicated:

a.   Are the results being interpreted in a way that makes connections to the experiences of students, teachers, parents etc.? Is there a reference group to compare the results? Are the results practically meaningful?
b.   Was there community/youth input? If they gave input, did they give input throughout, at the beginning, towards the end? How is the research and data being communicated (using graphs, reports, briefs, infographics)? Is the language used accessible (e.g. is it filled with jargon or is it too academic)? Who has access to the results?

A Social Justice/Equity Orientation

Many critical race theorists view a concern with advancing equity as an essential component in CRT (Solórzano & Yosso, 2002). Although numbers have traditionally been used as weapons of the powerful, we want to "flip the script" by empowering researchers and equipping users of research to utilize numbers to work towards a more equitable society.

> 'Critical race theory works toward the end of eliminating racial oppression as part of the broader goal of ending all forms of oppression'. (Lawrence III, et al 1993: 6)

From the very beginning, CRT has sought to make a difference and strive for social justice. This goal infuses all elements of QuantCrit but is worth repeating because of the need to consciously resist the lure of the racist assumptions and practices that are so widespread in society as to appear 'normal, not aberrant, in American society', merely 'business-as-usual' (Delgado & Stefancic, 2000, p. xvi). It follows that research is in danger of remaking and reinforcing racist stereotypes unless researchers have taken steps to interrupt or challenge 'business-as-usual' thinking and practices.

Suggestions for Researchers

i. Think about *interpretation versus result* and make sure your interpretation is acknowledging racism and sensitive to ways in which racism might be operating beneath the radar.

As we noted earlier, when research documents a correlation between achievement and race, it is common for researchers, practitioners and policymakers to assume that there must be an issue, a deficit, on the part of the historically minoritized group. The mental exercise of substituting '*racism'* for the word '*race'*, which we mentioned earlier, can be useful here, by taking racism out of the background and subjecting it to critical scrutiny. In societies that are structured by racist inequity stretching back centuries like the US and the UK this can be an essential aid to analysis. Certainly this approach ensures that we do not fall into the trap of merely following 'business-as-usual'.

ii. *Go beyond the existing and over-used metrics.* In education, test scores are the most frequently reported and available data points (see [Urban Institute Data Portal](#) and [SEDA Education Opportunity Explorer](#)). Before choosing an outcome metric, it is useful to think about 'Who created these metrics?' 'Were they consciously centered on Black and Latinx students or were they centered on White middle-class students?' 'Do Black and Latinx families value these measures?' This may mean that budgets need to be expanded to develop new measures for a particular project or that researchers must do a thorough review of the existing measures to find the 'best' measures for their population. Similarly, the same logic should be applied to instruments such as surveys. Although it is good practice to reuse surveys, the aforementioned questions should be borne in mind to ensure that the survey is culturally responsive to the population/s you are studying.

Suggestions for Users

       i.   When considering research, users should ask critical questions related to applying an anti-racist approach:

          a.   Question the researchers' use of language throughout
          b.   Are their research questions and survey items (if applicable) framed in an asset-based perspective?
          c.   Are the study interpretations acknowledging systemic racism?
          d.   Did the researcher make intentional efforts to address their bias and state their assumptions and limitations clearly?

Conclusion

This paper is intended to broaden awareness, provide initial guidance, and advance the iterative process of distilling and advancing the emerging QuantCrit field strategies for researchers and users of research. To reach an equitable data creation and data dissemination state will require researchers and users of research to continue generating new strategies and pushing our thinking on *how* to QuantCrit. The suggested practices are examples that are meant to challenge the status quo and disrupt common assumptions about how to conduct research, with the aim of advancing the active process of working towards equity and racial justice (See Appendix A for a summary guide for users of research). We acknowledge that none of the suggestions (singularly or in tandem) guarantee that numbers will not be biased and/or that social and systemic issues will be solved; QuantCrit is part of a wider struggle for racial justice, not an end in itself.

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Appendix A: QuantCrit Guiding Questions for Users of Research to Consider

Below you will find a summary of the suggestions from the article on how users of research might apply the principles of QuantCrit to their work when reading data and/or research.

The Centrality of Racism
- Who are the researchers?
- What are their backgrounds and how might this influence the way they conduct research? What assumptions might unwittingly shape their research?
- Who is funding them?
- Who do they see as the prime audience for their work? Who or what interests decided which questions/issues to research? Was their research agenda influenced and informed by the community/ies they are researching? Who is benefiting from asking these questions or researching these issues?

Numbers Are Not Neutral
- What measures/outcome/surveys were collected? Who is *(and is not)* in the sample? How large is the sample? Where, how and when (date/year) was the data collected (think about recruitment)? Who collected it (was it researchers, community members, contractors)?
- Whose perspectives and assumptions are reflected in the analysis? If they used a model, which variables did they include in their model? Are all the variable described and justified?
- If averages are reported, what denominator has been used and why? Do they use median or mean or report a range? In each case, as users of research we need to think about key issues that might have been (unwittingly) erased or misrepresented.

Categories Are Not Natural
- When using research, ask yourself critical questions related to subgroup analysis or lack thereof.
- Did the researchers analyze the data in separate categories? If so, how did they decide/define categories?
- Do the categories resonate with the people that they seek to describe or have groups been broken up/grouped together in misleading ways?

Voice and Insight (data cannot 'speak for itself')
- Are the results being interpreted in a way that makes connections to the experiences of students, teachers, parents etc.? Is there a reference group to compare the results? Are the results practically meaningful?
- Was their community/youth input? If they gave input, did they give input throughout, at the beginning, towards the end? How is the research and data being communicated (using graphs, reports, briefs, infographics)? Is the language used accessible (e.g. is it filled with Jargon or is it too academic)? Who has access to the results?

A Social Justice/Equity Orientation
- Question the researchers use of language throughout:
- Are their research questions and survey items (if applicable) framed in an asset-based perspective?
- Are the study interpretations taking into consideration racism?
- Did the researcher make intentional efforts to address their bias and state their assumptions and limitations clearly?

[1]   We used Harzing's *Publish or Perish* software to identify publications using the term 'QuantCrit' pre and post 2017 (searched date: 3 March 2021). Two of the four pre-2017 occurrences are by authors of work-in-progress (preparing for the REE special issue), while the other two are studies using the term 'QuantCrit' to describe a variable in their calculations (Wicks & Boucher 1993; Solberg, Naesset & Bollandsas 2006).

[2]   By 'Whiteness' we do not refer simply to the behaviour of White-identified people, but rather to the ideologies and practices, that saturate societies such as the US and UK, and which systematically put the interests, assumptions, fears and fantasies of White power-holders at the centre of policy and practice across all the main institutions of society.

[3]   The achievement gap between 'White' and 'Black' undergraduates, in 2018, was 24.1 percentage points (table 3.13, p. 136, Advance HE, 2018).