# Challenging the stigma of a small N: Experiences of students of color in Calculus I

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*Because students of color are underrepresented in undergraduate mathematics classes, their experiences are often ignored in studies drawing on large data sets or are inferred based on the experiences of other underrepresented populations, specifically women. This exclusion and misrepresentation of students of color is often attributed to methodological limitations. In this study, we reexamine the data studied for a previous analysis attending to student race and ethnicity rather than to gender. Due to the smaller numbers of non-white students, we utilize different analytic tools, and draw on students' open-ended responses to a survey question asking about their experiences in Calculus I. In addition to adding to the literature on students from marginalized populations in undergraduate mathematics, this paper argues for a reframing of how we value papers with a small N, and what this value indicates about our value of the students making up the small samples.*

*Keywords:* equity, quantitative methods, calculus

A number of recent studies have been published that draw on a large data set to make strong claims about students' gendered experiences in undergraduate mathematics (see e.g., Ellis, Fosdick, & Rasmussen, 2016; Laursen et al., 2011). In each of these studies, the researchers had access to the students' race and ethnicity, but were unable to conduct the same statistical analyses differentiating by race and ethnicity as they did by gender because of the small sample of students from non-white populations. For instance, in discussing learning gains between the active learning courses (specifically Inquiry Based Learning; IBL) and non-active learning courses, Laursen and her colleagues (2011) state: "We could only compare [the learning gains of] white and Asian students, because the number of other students of color in our sample was very low (see Appendix A3)" (p. 55). Similarly, in a recent publication investigating factors related to students' and instructors' experiences in calculus: Hagman, Johnson, and Fosdick (2017) state: "We do not investigate the association between race or ethnicity and [opportunities to learn] due to the small proportion of non-white students and instructors in our study" (p. 5).

Because of the underrepresentation of students of color in undergraduate mathematics courses, their experiences in these courses are made invisible in studies that draw on large data sets, or are inferred based on the experiences of other underpenetrated populations, specifically women. For instance, researchers use Laursen and her colleagues' (2011) paper as evidence that active learning benefits students from "underrepresented" groups. As a prototypical example of this, Webb (2016) states: "Research has shown that undergraduate students who are involved in active learning techniques can learn more effectively in their classes, resulting in increased achievement and dispositions… particularly so for underrepresented groups (Laursen et al., 2011)" (pp. 1-2). While Laursen et al. (2011) are able to make substantive claims about the benefits of IBL for women and typically low-achieving students, which are both underrepresented groups in STEM, these findings are being generalized to make claims about underrepresented students in general, which is often taken to specifically include students from underrepresented racial and ethnic minorities.

While there are some studies about such students' actual experiences in undergraduate mathematics (see Adiredja & Andrews-Larson, 2017 for a review of this literature), such studies

are "limited [in] number" (Adiredja & Andrews-Larson, 2017, p. 451) and, due to the underrepresentation of such students in undergraduate mathematics, draw on a smaller data set and often employ qualitative methods. For instance, McGee and Martin (2011) studied the experiences of 23 Black mathematics and engineering college students, Levya (2016) studied the experiences of five Latin@ engineering college students, and Adiredja and Zandieh (2017) studied the experiences of 8 Latina's in a Linear Algebra course. In comparison, Laursen et al. (2011) drew on survey data from 1,100 students and Ellis, Fosdick, and Rasmussen (2016) analyzed data from 2,266 students, with about 50% identifying as female in each study.

Studies drawing on large data sets are viewed as more reliable and objective than studies drawing on smaller data sets, are able to use statistics to generalize findings, can seek to identify cause and effect relationships, and aid in testing hypotheses (Creswell & Clark, 2007). However, there are a number of issues that arise when considering a quantitative design in the study of race and ethnicity (Adiredja & Andrews-Larson, 2017; Teranishi, 2007). One such issue is simply that the sample size (and the population itself) of non-white populations may be too small in even very large data sets to utilize these benefits. Another issue, as Adiredja and Andrews-Larson (2017) explain, lies in generalizing:

> [G]eneralizability of findings from quantitative studies as a result of a large sample size is always in tension with their reliance on aggregate outcomes and averages. Attending to this tension means being mindful of the reality that the effects on each student in the study are not the same, despite the closing of any gap between groups…The use of averages unfortunately also has the potential to deemphasize any perpetuated inequities. (p. x).

Taken together, these perspectives indicate that both quantitative and qualitative studies can be valuable as we seek to better understand students' experience in undergraduate mathematics courses, especially understanding experiences of students of color. Qualitative studies are powerful in understanding the nuanced differences of such students, and are able to discuss the experiences of students as individuals rather than as groups. Quantitative studies are powerful in understanding the strength and prevalence of such experiences.

Because students of color are underrepresented and their numbers are small, their experiences are often ignored or are inferred based on the experiences of other underrepresented populations, specifically women. This "exclusion and misrepresentation of [students of color] in education research" is often attributed to methodological limitations (Teranishi, 2007, p. 38). In this study, we reexamine the data studied for a previous analysis (Ellis, Fosdick, & Rasmussen, 2016) attending to student race and ethnicity rather than to gender. Due to the smaller numbers of non-white students, we utilize different analytic tools, and draw on students' open-ended responses to a survey question asking about their experiences in Calculus I. In addition to adding to the literature on students from marginalized populations in undergraduate mathematics, this paper seeks to argue for a reframing of how we value papers with a small N, and what this value indicates about our value of the students making up the small samples.

**Related Literature and Theoretical Perspective**

In K-12 education, African American, Latin@, and Native students continue to be denied equitable access to a high quality mathematics education (Kitchen, Ridder, & Bolz, 2016), including high level mathematics courses (US Department of Education Office for Civil Rights, 2016). This is problematic in higher education due to advanced mathematics courses frequently being used as gateways (pre-requisites) for college credit mathematics and science courses, as well as entrance and continuation in undergraduate mathematics and science courses and majors.

This racialized disparity in K-12 mathematics education access directly and continually negatively impacts the numbers of students of color in higher education mathematics.

Access to resources however represents only part of the marginalized experiences many students of color face in mathematics education. Students of color continue to face systemic racism and racialized negative narratives in mathematics classrooms (Anderson & Tate, 2008; Jackson, Gibbons, & Sharpe, 2017; Spencer & Hand, 2015). Despite the large and still-growing academic research and literature unveiling these disparities and systems of oppression, dominant mathematics education narratives continue to defend the "objectivity" of mathematics as a color-blind discipline (Martin, 2013; Shah, 2017). While this color-blind narrative put forth in defense of the continued practice of marginalization of students of color has been challenged for many years (Gutiérrez, 2007; Martin, 2003; Nasir & Hand, 2006), the issue remains of low concern and priority in higher education, perhaps largely due to the continued low numbers of students of color in college mathematics courses. This underrepresentation, while itself an area of high concern, has set up those students of color who do gain access to college mathematics to have their experiences and even their entire presence often completely erased in research surrounding college/university mathematics education research. One significant contributor to this phenomenon is the practice of removing would-be outliers and/or subgroups within large data sets that have small Ns.

The issue and outcomes of racialized invisibility (Haynes, Stewart, & Allen, 2016) in mathematics education research has been challenged and countered by two notable collectives or research, one housed in the socio-cultural theoretical framework (Boaler, 2008; Hand, 2010; Nasir, 2008; Stinson, 2008) and the other in critical theories (Gutstein, 2006; Leonard & Dantley, 2002; Martin, 2009). Both approaches have made significant contributions toward challenging the dominant narratives and research practices that have worked to erase the presence and experiences of students of color in mathematics education, as well as to elevate the voices and experiences of students of color in mathematics classrooms. While these research endeavors and traditions have elevated the voices, experiences, and presence of students of color in mathematics education, the stigma of the small N remains a significant (albeit socially contrived) barrier for researchers (and their publication reviewers) in quantitative research. Little work has been done to look closely at and provide suggestions and guidance for quantitative researchers whose research involves large data sets and for whom students of color are not an expressed focal point.

Leveraging the notion that the invisibility of students of color in mathematics education research has become a socially acceptable norm, along with the foundational premise of the sociocultural and critical theory research identified above that racial identity, racial experiences, and the presence of students of color in our classrooms are important and they should not be erased by any measures, including a methodological approach. Thus, we take a pragmatic approach to a re-analysis of the data from a previous study focused on persistence in calculus and gender (referred to as the gender-comparison study) with the goal of making an early contribution toward a re-thinking of how the undergraduate mathematics education research community makes its methodological decisions with consideration to students of color.

## Methods

In this study, we conduct three analyses of the data coming from a 2010 survey of Calculus I students, with decreasingly coarse approaches. By doing so we seek to highlight the benefits and drawbacks of each approach, and take all three together to better understand the experiences of students of color in Calculus I.

**Background and Data Collection**

The data used for these analyses draws on a national data set made available by the Mathematical Association of America. This data was collected by surveys sent to Calculus I students at the beginning and the end of the course. Data used for this analysis comes from both surveys, focusing on demographic data, persistence data, and a reflective free response question. To determine students' persistence in calculus, we use data from both the beginning and end of term surveys. Students are identified as Persister if they intended to take Calculus II at both the beginning and end of Calculus I, and as Switchers if they originally did intend to and then no longer intended to by the end of Calculus II. For demographics, we rely on three questions: "What is you gender?", with options given only as male and female, "What is your race? (Mark all that apply)" with options given White, Black, Asian, Pacific Islander, American Indian or Alaska Native, and Other (please specify), and "Are you of Hispanic origin?" with responses Yes or No. A new variable was created identifying the students' race and/or ethnicity, where the race and ethnicity questions were combined. Students who wrote in a real race or ethnicity were either grouped with the most aligned category (for example, Puerto Rican students were identified as "Of Hispanic Origin") and students who wrote in something other than a real race or ethnicity category were grouped together with the students who chose not to report their race or ethnicity (for example "human" or "race is a social construct"). Students who identified as multiple non-white races and ethnicities were grouped together. The last question used in this study was a free-response question on the end of term survey, that asked students "Is there anything else you want to tell us about your experience in Calculus I?". Table 1 illustrates the number of students from each race or ethnicity category in the large data set and in the free response data set.

***Table 1.*** *Race and ethnicity for data used*

| | **Large Data Set** | | **FR Data Set** | |
|---|---|---|---|---|
| **Race or Ethnicity** | **Number** | **Percentage** | **Number** | **Percentage** |
| White and/or non-Hispanic/Latin@ | 6674 | 68.2 | 348 | 67.0 |
| Non-white and/or Hispanic/Latin@ | 2921 | 29.8 | 157 | 30.2 |
| *Black* | 431 | 4.4 | 28 | 5.4 |
| *Asian* | 1334 | 13.6 | 63 | 12.1 |
| *Pacific Islander* | 70 | 0.7 | 3 | 0.6 |
| *Native American or Alaska Native* | 107 | 1.1 | 11 | 2.1 |
| *Of Hispanic origin* | 844 | 8.6 | 48 | 9.2 |
| *Multiple non-white identities* | 135 | 1.4 | 4 | 0.8 |
| Race or ethnicity identity not listed | 112 | 1.1 | 6 | 1.1 |
| Chose not to report | 86 | 0.9 | 9 | 1.7 |
| Total | 9793 | | 520 | |

**Data Analysis**

The first analysis is the coarsest, and attempts to mimic the analysis of the Ellis, Fosdick, & Rasmussen (2016) analysis as much as possible by grouping students into two race and ethnic categories: (a) White and/or non-Hispanic/Latin@ and (b) Non-white and/or Hispanic/Latin@. For this proposal, we conduct chi-square statistics to test if there are significant difference in the persistence in calculus between these binary categories of students. (Note: At the time of submitting this proposal the statistician involved in both studies is on maternity leave and is actually taking a break for work. We honor this break, and thus for this proposal the analyses are

not as robust as they were in the initial analysis, nor as robust as they will be for the presentation of this study in February.) The second analysis is similar but disaggregates by race and ethnicity categories. The third analysis is the least coarse and draws on students' free responses on the end of term survey. To analyze these responses, we draw on a thematic analysis conducted for a previous study (Ellis & Cooper, 2016).

## Results

### Analysis 1: Most Coarse

The output variable used for the gender-comparison study was student persistence through the calculus sequence. In that study, we looked at the relationship between gender and student persistence, controlling for a number of factors that may be related, such as career intentions and previous calculus experience. Through that analysis, we found that female students were 50% more likely to be identified as Switchers compared to male students, after controlling for a number of factors. This result was very statistically significant, which we were able to test for because of the large number of students and, more specifically, the large number of students who identified as male (N=1,236) or female (N=1,030).

For the first analysis in this paper, we attempt to mimic the above analysis as much as possible by identifying students as either white, non-Hispanic/Latin@ (N=2213) or not (N=864). In the data set used for this analysis (N=3077), we do not find a significant different between the persistence of white, non-Hispanic/Latin@ students compared to non-white or Hispanic/Latin@ students [$X^2$ (1, $N$ = 3077) = 0, $p$ = .997]. We note that this result holds when students identifying as Asian are included with the white, non-Hispanic/Latin@ students. Among both groups of students, 19.6% of students were identified as Switchers. For reference, 14.5% of all male students and 25.3% of all female students were identified as Switchers. When looking at the intersection between gender and racial and ethnic identity, 26.1% of female, white, non-Hispanic/Latin@ students and 23.8% of female, non-white or Hispanic/Latin@ students were identified as Switchers.

Such a coarse analysis allows us to make claims about statistical significance and compare the findings to the gender-comparison analysis, but this comes at the cost of identifying all non-white, Hispanic/Latin@ students together. However, what this analysis does tell us is that generalizing the experiences of female students as a marginalized population in mathematics to students from racial and ethnic minorities in mathematics does not work, at least in this setting.

### Analysis 2: Less Coarse

In this second analysis, we disaggregate by race and ethnicity identity. As shown in Table 2, while we saw no numerical nor statistical differences in the first analysis, we do see numerical difference in the persistence rates among different race or ethnicity identity groups of students. However, due to the small sample sizes in some groups we cannot make any claims about the significance of these differences.

This analysis shows that there are differences in the persistence rates among students in our sample with different race or ethnicity identities. The most drastic outliers from the general trend are students who identify as Native American or Alaska Native, with 27.9% of the 43 students identified as Switchers, students who reported multiple non-white identities, with 36.4% of the 33 students identified as Switchers, and students who identify as Asian, with 17.3% of the 398 students identified as Switchers. While these results are not statistically significant since we could not test the significance, they convince the authors that students from these populations are

likely not persisting through the calculus sequence at the same rates as students from other racial or ethnic groups.

***Table 2.*** *Persistence by race and ethnicity*

| Race or Ethnicity | Persister % | Switcher % | Total N |
|---|---|---|---|
| White and/or non-Hispanic/Latin@ | 80.4 | 19.6 | 2213 |
| Non-white and/or Hispanic/Latin@ | 80.4 | 19.6 | 864 |
| *Black* | 80 | 20 | 95 |
| *Asian* | 82.7 | 17.3 | 398 |
| *Pacific Islander* | 82.4 | 17.6 | 17 |
| *Native American or Alaska Native* | 72.1 | 27.9 | 43 |
| *Of Hispanic origin* | 80.3 | 19.7 | 249 |
| *Multiple non-white identities* | 63.6 | 36.4 | 33 |
| Race or ethnicity identity not listed | 82.8 | 17.2 | 29 |
| Chose not to report | 83.3 | 16.7 | 24 |

While the above analysis does not group all non-white and/or Hispanic/Latin@ together, it still problematically groups all Asian students together (Teranishi, 2007), for example. Also, while this analysis allows us to identify trends between the different racial and ethnic groups of students, we cannot identify the strength of these trends due to the small N.

**Analysis 3: Least Coarse**

In order to take a more nuanced look at students' reports of their experiences in Calculus I and how this may relate to their race or ethnicity identit(ies), we rely on students' free responses to the question "Is there anything else you want to tell us about your experience in Calculus I?". Of the 9,793 students for whom we had race and ethnicity data, 520 provided responses to the open-ended question. These responses were analyzed using thematic analysis (Clarke & Braun, 2006), and was originally studied in order to explore the relationship between persistence and gender (Ellis & Cooper, 2016). The original two authors each coded subsets of 50 student responses to develop and refine codes. Affect was the most frequently used code, and was defined to include statements about "Student's emotions, attitudes, and beliefs about (a) the calculus course, (b) mathematics, (c) themselves as learners." (p. X). Each code was weighted with the values -1, 0, or 1 to indicate a negative, neutral, or positive connotation, respectively, and each student response was coded with as many codes as appropriate.

In this section, we focus on student responses coded with Affect. White, non-Hispanic/Latin@ students have similar frequency of Affect codes and a similar frequency of positive Affect codes when compared to non-white or Hispanic/Latin@ students, with around 45% of responses from each group identified as related to Affect and around 42% of those comments coded as positive. However, among non-white or Hispanic/Latin@ students there are differences within the race or ethnicity identify group – for instance, of the 28 responses from Black students, 57% were coded as related to Affect but only 37.5% of these were coded as positive. While these numbers are too small to make generalizations, they do inspire curiosity among the authors to better understand the experiences of the students in our sample who provided open-ended responses. We highlight a few of the responses from students who identify as Native American or Alaska Native and students who reported multiple non-white identities because of the higher Switcher rates in the second analysis. We also highlight responses from

Black students due to the high number of responses coded as Affect but the low number of those responses identified as positive.

> *This class made me lose my love for math. The teacher was absolutely awful. I had to learn it on my own, and books were not efficient enough to do so. The tutoring program available is a complete and total waste of time unless you wait in there four hours for the two tutors available to help you. Thank you [University] for such a terrible academic standard of professors.* – Male Switcher; Native American or Alaska Native

> *The class was extremely helpful for trying to further investigate modern mathematical applications. The instructor was genuinely concerned with the students' success, and I thought highly of him and his methods of teaching unfamiliar material.* – Male Persister; Native American or Alaska Native

> *Although the material for Calculus 1 was the same in both high school and college, I had much more trouble learning the concepts this year in college than I did in high school. I do not know if that was because my high school teacher taught in a way that I could better understand the concepts; I do know, however, that I did much better in Calculus 1 in high school than in college.* – Female Switcher; Asian and Puerto Rican

> *This Calculus I experience made me dislike Calculus greatly. I found myself confused and lost throughout most of it. My peers had to constantly reiterate what the professor taught in class and I still did not understand.* – Female Switcher; Black

> *I had a great experience. It was much more fulfilling, satisfying, and doable than I had thought it would be.* – Female Persister; Black

The above quotations are presented to help give student voices to the quantitative data. They do not allow us to generalize student voices, to learn how prevalent these voices may be, or how they compare to white voices. Instead, they help to answer the call put forth by Adiredja and Andrews-Larson (2017): "While our ability to conduct quantitative analyses with large sample sizes may be limited, we can still highlight and prioritize the experiences of these students in research" (p. 459). We position these responses as examples of the kinds of powerful differing voices that can be erased when traditional small N decisions are made. In other words, the results are not the trends in what was said, but show that meaningful things were said that indicate racialized experiences exist and should not be erased.

## Brief Discussion

The goal of this paper is to bring attention to the normative practice in our community of ignoring the experiences of students of color in our quantitative studies. While our qualitative colleagues work to richly understand and document the experiences of students of color in our undergraduate classes, and while we eagerly wait for the representation of students of color to increase in our classes and in our data sets, we must challenge and overcome the stigma of a small N. This paper indicates that the experiences of students of color are (a) different from the experiences of women, (b) not all the same, and (c) are more complex that statistics can indicate.

## References


Adiredja, A. P., & Andrews-Larson, C. (2017). Taking the Sociopolitical Turn in Postsecondary Mathematics Education Research. *International Journal of Research in Undergraduate Mathematics Education,* 1-22.

Adiredja, A. P., & Zandieh, M. (2017) Using Women of Color's Intuitive Examples to Reveal Nuances about Basis. *Paper presented at the 20th Annual Conference on Research in Undergraduate Mathematics Education*, San Diego, CA.

Anderson, C. R., & Tate, W. F. (2008). Still separate, still unequal: Democratic access to mathematics in U.S. schools. In L. English (Ed.), Handbook of International Research in Mathematics Education (pp. 299–318). New York: Routledge.

Boaler, J. (2008). Promoting "relational equity" and high mathematics achievements through an innovative mixed ability approach. *British Educational Research Journal*, 34(2), 167–194. https://doi.org/10.1080/01411920701532145

Creswell, J. W., & Clark, V. L. P. (2007). Designing and conducting mixed methods research.

Ellis, J., & Cooper, R. (2016, February). Gender, switching, and student perceptions of Calculus I. Paper presented at the 19th Annual Conference on Research in Undergraduate Mathematics Education, Pittsburgh, PA.

Ellis, J., Fosdick, B.K., Rasmussen, C. (2016). Women 1.5 Times More Likely to Leave STEM Pipeline after Calculus Compared to Men: Lack of Mathematical Confidence a Potential Culprit. *PLoS ONE* 11(7): e0157447. doi:10.1371/journal.pone.0157447

Gutiérrez, R. (2007). (Re) defining equity: The importance of a critical perspective. In N. S. Nasir & P. Cobb (Eds*.), Improving access to mathematics: Diversity and equity in the classroom* (pp. 37–50). New York: Teachers College Press.

Gutstein, E. (2006). *Reading and writing the world with mathematics: Toward a pedagogy for social justice. New* York: Taylor & Francis.

Hagman, J.E., Johnson, E., & Fosdick, B. (2017). Factors Contributing to Experiencing a Lack of Time in College Calculus. *International Journal of STEM Education, 4*(12). DOI 10.1186/s40594-017-0070-7

Hand, V. M. (2010). The co-construction of opposition in a low-track mathematics classroom. *American Educational Research Journal*, 47(1), 97–132. https://doi.org/10.3102/0002831209344216

Haynes, C., Stewart, S., & Allen, E. (2016). Three paths, one struggle: Black women and girls battling invisibility in U.S. classrooms. *The Journal of Negro Education,* 85(3), 380. https://doi.org/10.7709/jnegroeducation.85.3.0380

Jackson, K., Gibbons, L., & Sharpe, C. J. (2017). Teachers' views of students' mathematical capabilities: Challenges and possibilities for ambitious reform. *Teachers College Record*, 119(7), n7.

Kitchen, R., Ridder, S. A., & Bolz, J. (2016). The legacy continues: "The test" and denying access to a challenging mathematics education for historically marginalized students. *Journal of Mathematics Education at Teachers College*, 7(1). Retrieved from http://journal.tc-library.org/index.php/matheducation/article/view/1154

Laursen, S., Hassi, M. L., Kogan, M., Hunter, A. B., & Weston, T. (2011). Evaluation of the IBL mathematics project: Student and instructor outcomes of inquiry-based learning in college mathematics. *Colorado University*.

Leonard, J., & Dantley, S. J. (2002). Why Makik can "do" math: Race and status in integrated classrooms. *Race, Ethnicity and Public Education Article,* 14(1), 61–78.

Leyva, L. A. (2016). A critical look at undergraduate mathematics classrooms: Detailing racialized and gendered experiences for Latin@ college engineers. In T. Fukawa-Connelly, N. E. Infante, M. Wawro, & S. Brown (Eds.), *Proceedings of the 19th Annual Conference on Research in Undergraduate Mathematics Education* (pp. 1040-1046), Pittsburgh, PA.

Martin, D. B. (2003). Hidden assumptions and unaddressed questions in mathematics for all rhetoric. *The Mathematics Educator,* 13(2), 7–21. https://doi.org/10.1167/iovs.10-7062

Martin, D. B. (2009). Researching race in mathematics education. *Teachers College Record,* 111(2), 295–338.

Martin, D. B. (2013). Race, racial projects, and mathematics education. *Journal for Research in Mathematics Education,* 44(1), 316–333. https://doi.org/10.5951/jresematheduc.44.1.0316

McGee, E. O., & Martin, D. B. (2011). "You would not believe what I have to go through to prove my intellectual value!" Stereotype management among academically successful Black mathematics and engineering students. *American Educational Research Journal*, *48*(6), 1347-1389.

Nasir, N. S. (2008). Everyday pedagogy: Lessons from basketball, track, and dominoes. *Phi Delta Kappan,* 89(7), 529–532.

Nasir, N. S., & Hand, V. M. (2006). Exploring Sociocultural Perspectives on Race, Culture, and Learning. *Review of Educational Research, 76*(4), 449–475. https://doi.org/10.3102/00346543076004449

Shah, N. (2017). Race, ideology, and academic ability: A relational analysis of racial narratives in mathematics. *Teachers College Record,* 119(7), n7.

Spencer, J. A., & Hand, V. M. (2015). The racialization of mathematics education. In *The race controversy in American education* (Vol. 1, pp. 237–258). Santa Barbara: ABC-CLIO. Retrieved from http://books.google.com/books?hl=en&lr=&id=2ZIeCgAAQBAJ&oi=fnd&pg=PA237&dq=%22success+is+told+without+regard+to+the+realities+of+racism,+which%22+%22the+%EF%AC%81eld+of+mathematics.5+The+argument+we+develop+in+this+chapter+is%22+%22and+its+living+wage.+The+historical+realities+of+racism,%22+&ots=rxh62MOdCv&sig=-_BmCtYljAxBjt7MpMBFWoJPZSw

Stinson, D. W. (2008). Negotiating sociocultural discourses: The counter-storytelling of academically (and mathematically) successful african american male students. *American Educational Research Journal,* 45(4), 975–1010. https://doi.org/10.3102/0002831208319723

Teranishi, R. T. (2007). Race, ethnicity, and higher education policy: The use of critical quantitative research. *New Directions for Institutional Research*, *2007*(133), 37-49.

US Department of Education Office for Civil Rights. (2016). 2013-14 CRDC data highlights: A first look. Washington, DC: US Department of Education. Retrieved from http://www2.ed.gov/about/offices/list/ocr/docs/2013-14-first-look.pdf