

Using Quantitative Data to Identify and Address Inequities

An Introduction for Practitioners



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Why: Introduction

To eliminate racism and other barriers to equity in education, it is crucial for states, districts, and schools to identify and address systemic inequities and their root causes. This effort includes analyzing disaggregated quantitative data in order to understand the extent of inequities experienced by different groups of students (Toldson, 2020).

Disaggregating data refers to the process of breaking down data into smaller subsets based on certain criteria or characteristics. To effectively address barriers to equity in education, it is essential to disaggregate data by various factors, such as race/ethnicity, gender, socioeconomic status, Individualized Education Plan (IEP) status, disability, and multilingual learning status (Bollmer et al., 2007; Fergus, 2017; Hernández et al., 2022).

It is also important to examine the data across student groups and at the intersections of marginalized identities (e.g., race/ethnicity and gender) in order to identify inequities and disparities. Disaggregating data facilitates the analysis of the performance, progress, and experiences of specific groups of students, which can help identify inequities and disparities that might otherwise go unnoticed in broader analyses.

Educational systems can use several measures to identify disparities for students. For example, when conducting a [systemic equity review](#), WestEd uses three common data measures—composition index, risk index/rate, and relative risk ratio—to evaluate the level of inequities faced by specific groups of students in comparison with their peers.

What: Overview of Data Measures

In practice, [disproportionality](#) is often discussed in the context of special education. The Individuals with Disabilities Education Act (IDEA) is a U.S. federal law that aims to ensure that children with disabilities receive the appropriate education and related services designed to meet their unique needs. IDEA also requires states to examine disproportionality based on race/ethnicity. Although IDEA does not explicitly define *disproportionality*, the term refers to the over- or underrepresentation of a specific group of students in an educational context, including identification for special education services, educational environment (i.e., where a student receives special education services), or disciplinary action. However, data measures can be useful in a variety of educational contexts with any population.

Examples of disproportionality include the following:

- » Black students make up 10 percent of a school population but receive 30 percent of all suspensions.
- » Latine¹ students graduate at a rate of 50 percent, whereas all other students graduate at a rate of 70 percent.
- » LGBTQIA+ students are three times more likely to receive dress code violations than are other students.

This brief focuses on three common data measures used to determine disproportionality: the composition index, risk index/rate, and relative risk ratio. These measures can be used to determine whether a student group is represented proportionately in an outcome given the group's proportion of an overall student population, the rate at which something is happening to student groups, and a comparison of rates between student groups.

¹ In this brief, the gender-neutral ethnic category Latine includes students of all gender identities who identify with this ethnic category.

- » The **composition index** allows educators to determine the proportion of particular student groups in a specific outcome. It compares the percentage of the group in a school, district, or state to the percentage of that group in the outcome being examined.
- » The **risk index/rate** refers to the frequency or rate at which a particular student group experiences a particular outcome.
- » The **relative risk ratio** compares the risk of a particular student group experiencing an outcome to the risk of all other students experiencing the same outcome.

Composition indexes, risk indexes/rates, and relative risk ratios are valuable tools for identifying and measuring differences in outcomes and experiences among student groups.

How: Applying Data Measures

Consider the following scenario:

A district serves 120,000 students. To identify potential disparities in the assignment of detention based on student social identities (e.g., race/ethnicity, gender, IEP status), the district wants to examine its detention data. Latine students are the particular group of interest.

Composition Index

The district starts by calculating the composition index, or the proportion of particular student groups in a specific outcome.

Step 1: Identify the composition, or proportion, of overall enrollment by student social identity. (In this case, the district is focusing on race/ethnicity.) This entails determining the percentage each group comprises of overall student enrollment.

To begin, the district looks at its overall enrollment data. The racial/ethnic composition of the district is 60,000 Black students, 20,000 Latine students, and 40,000 White students.

To calculate the composition of a *particular group of interest* (Latine students) within the overall student enrollment, the district creates a fraction in which the number of students in the particular group is the numerator and the whole group total is the denominator.

$$\frac{\text{(Enrollment of Latine students)}}{\text{(Total student enrollment)}} = \frac{20,000}{120,000} = 0.16 * 100 = 16\%$$

The composition of Latine students in the district is 16 percent. Applying the same process to determine the composition of Black and White students, the district finds that Black students comprise 50 percent of overall students and White students comprise 33 percent (Table 1).

Table 1. Composition of Overall Student Enrollment by Race/Ethnicity

DATA MEASURE	BLACK	LATINE	WHITE
Composition of overall enrollment	50%	16%	33%

Step 2: Identify the composition of the *outcome of interest* (in this case, detentions) by student social identity. This entails determining the percentage the group of interest (Latine students) comprises of all students experiencing the outcome of interest (detentions).

The district looks at its detention data from the previous school year. It discovers that 6,000 students were given detention and that the Black, Latine, and White student groups each received the same number of detentions: 2,000 (Figure 1). This is despite the differences in the number of students of each race/ethnicity in the district (Figure 2).

Figure 1. Composition of Number of Detentions per Student Group

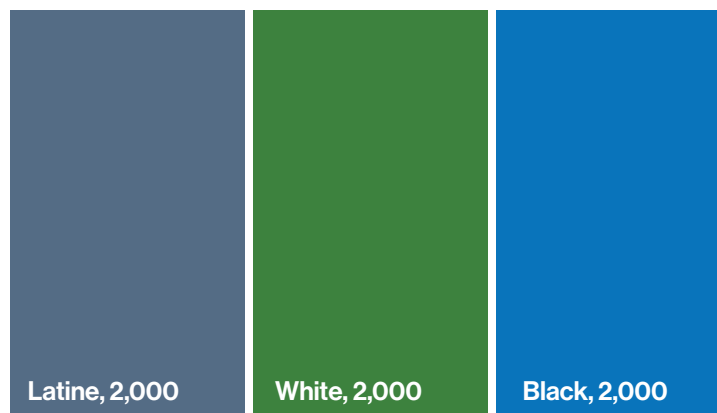
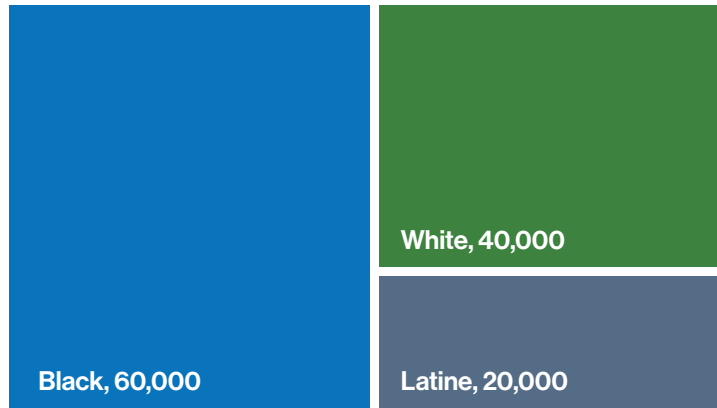


Figure 2. Racial/Ethnic Composition of District Enrollment



To identify the composition of the outcome of interest by student social identity, the district creates a fraction in which the number of students in the particular group who experience the outcome (Latine students who received detention) is the numerator and the number of all students who experience the outcome is the denominator:

$$\frac{\text{(Latine students receiving detention)}}{\text{(All students receiving detention)}} = \frac{2,000}{6,000} = 0.33 * 100 = 33\%$$

Solving the equation shows that the composition of Latine students who received detention (33%) is different from the composition of Latine students in the district (16%) (Table 2).

Table 2. Composition of Students in Enrollment and Detentions by Race/Ethnicity

DATA MEASURE	BLACK	LATINE	WHITE
Composition of overall enrollment	50%	16%	33%
Composition of all detentions	33%	33%	33%

Comparing composition indexes has identified a disparity for Latine students. Educators can verbalize these data in this way:

Despite making up the smallest percentage of district enrollment (16%), Latine students make up a third (33%) of all detentions given. If there were no disparities between these groups of students, we would expect each group’s percentage of detentions received to mirror their percentage of enrollment in the district.

Risk Index/Rate

Seeing this disparity in detention by racial/ethnic group after calculating the composition index, the district then calculates the risk index/rate for each student group, or the rate at which a particular student group experiences a particular outcome.

Step 1: To calculate risk for a particular group, create a fraction that can be used to calculate the proportion of all students in the group of interest experiencing the outcome of interest.

In this case, the numerator of the fraction is the number of Latine students who *do* experience the outcome of interest (Latine students who received detention) and the denominator is the number of Latine students who *could* experience the outcome of interest (all Latine students).

$$\frac{\text{(Latine students receiving detention)}}{\text{(All Latine students)}} = \frac{2,000}{20,000} = 0.1 * 100 = 10\%$$

Out of all 20,000 Latine students, 2,000 (10%) received detention.

Step 2: Next, the district calculates the risk for the district’s other student groups.

$$\frac{\text{(White students receiving detention)}}{\text{(All White students)}} = \frac{2,000}{40,000} = 0.05 * 100 = 5\%$$

$$\frac{\text{(Black students receiving detention)}}{\text{(All Black students)}} = \frac{2,000}{60,000} = 0.03 * 100 = 3\%$$

Even though all student racial/ethnic groups received the same number of detentions, each group has a different risk index/rate of receiving detentions (Table 3).

Table 3. Risk Index/Rate of Detention by Race/Ethnicity

DATA MEASURE	BLACK	LATINE	WHITE
Risk/rate of detention	3%	10%	5%

Educators can verbalize these data in this way:

Ten percent of all Latine students received detentions in the previous school year. Their risk index/rate is higher than that of all other groups of students.

Seeing this, the district wants to know how much more likely it is for Latine students to receive detention than it is for other students in the district. To get an accurate picture of how the risk index/rate of detention for Latine students compares to the risk index/rate of all other students, the district calculates relative risk ratios.

Relative Risk Ratio

Relative risk ratios offer a standardized way to compare the risk index/rate at which something is happening to any *given group* of students with the rate at which it is happening to *other groups*, or all other students, making them a useful tool for identifying potential disparities in an outcome (e.g., the assignment of detention) based on student groups (Bollmer et al., 2007).

Step 1: Calculate the *risk index* of the group of interest (Latine students) by dividing the number of Latine students who received detention by the total number of Latine students enrolled.

$$\frac{\text{(Latine students receiving detention)}}{\text{(All Latine students)}} = \frac{2,000}{20,000} = 0.01 * 100 = 10\%$$

Step 2: Calculate the *risk index* of all other students, making sure to exclude the group of interest. To calculate the risk of all other students, add together the number of all other students who received detention (Black and White students) and divide it by the total number of Black and White students enrolled.

$$\frac{\text{(Black + White students receiving detention)}}{\text{(All Black + White students)}} = \frac{(2,000 + 2,000)}{(60,000 + 40,000)} = 0.04 * 100 = 4\%$$

Step 3: Calculate the *relative risk ratio* by comparing the risk index of the group of interest (Latine students) with the risk index of all other students (Black and White students).

To compare risk indexes, divide the risk index of Latine students (0.10, or 10%) by the risk index of all other students (0.04, or 4%). Ten percent of Latine students received detention compared with 4 percent of all other students. So, the risk ratio of Latine students is

$$\frac{10}{4} = 2.5$$

Conclusion: Latine students received detention at a rate of 2.5 times that of all other students.

The next two sections show the calculations for determining the risk ratios of each of the other racial/ethnic groups (Black and White students) in the district.

Relative Risk Ratio for Black Students

Step 1: Calculate the *risk index* of Black students.

$$\frac{\text{(Black students receiving detention)}}{\text{(All Black students)}} = \frac{2,000}{60,000} = 0.03 * 100 = 3\%$$

Step 2: Calculate the *risk index* of all other students, excluding Black students.

$$\frac{\text{(Latine + White students receiving detention)}}{\text{(All Latine + White students)}} = \frac{(2,000 + 2,000)}{(20,000 + 40,000)} = 0.06 * 100 = 6\%$$

Step 3: Calculate the *relative risk ratio* by comparing the risk index of Black students to the risk index of all other students.

$$\frac{\text{(Risk to Black students)}}{\text{(Risk to all other students)}} = \frac{3}{6} = 0.5$$

Conclusion: Black students received detention at a rate that is half that of all other students, as indicated by a relative risk ratio of 0.5.

Relative Risk Ratio for White Students

Step 1: Calculate the *risk index* of White students.

$$\frac{\text{(White students receiving detention)}}{\text{(All White students)}} = \frac{2,000}{40,000} = 0.05 * 100 = 5\%$$

Step 2: Calculate the *risk index* of all other students, excluding White students.

$$\frac{\text{(Black + Latine students receiving detention)}}{\text{(All Black + Latine students)}} = \frac{(2,000 + 2,000)}{(60,000 + 20,000)} = 0.05 * 100 = 5\%$$

Step 3: Calculate the *relative risk ratio* by comparing the risk index of White students to the risk index of all other students.

$$\frac{\text{(Risk to White students)}}{\text{(Risk to all other students)}} = \frac{5}{5} = 1$$

Conclusion: White students received detention at a rate that is equal to that of all other students, as indicated by a relative risk ratio of 1 (Table 4).

Educators can verbalize these data in this way:

Latine students are 2.5 times more likely than all other students are to receive detention. Black students are half as likely and White students are equally likely as any other student is to receive detention.

Table 4. Relative Risk Ratio by Race/Ethnicity

DATA MEASURE	BLACK	LATINE	WHITE
Relative risk ratio	0.5	2.5	1.0

Other Considerations When Measuring Disparate Outcomes

Calculations are only as good as the data underlying them. If you have incomplete data or small numbers of students, your calculations may be misleading (Bollmer et al., 2014). For example, if a racial/ethnic group has only one student in it and that student experiences the outcome of interest, the risk to that group will appear as 100 percent. However, these data issues are not a reason to ignore small groups of students or patterns of outcomes that feel extreme—every number used represents a student, and the outcome of every student matters. There are ways to compensate for incomplete data and mathematical options for handling small numbers of students (see Bollmer et al., 2014).

This brief has focused on the quantitative measures of identifying disproportionality, but these measures provide only a snapshot of what is happening. [Qualitative data](#)—“information that is not expressed numerically, such as descriptions of behavior, thoughts, attitudes, and experiences” (American Psychological Association [APA], n.d.-a)—can provide context to [quantitative data](#)—“information expressed numerically, such as test scores” (APA, n.d.-b). Some methods of qualitative data collection that provide nuance and context to quantitative data include focus groups, surveys, ethnographies, empathy interviews, and meeting observations (Safir & Dugan, 2021).

In addition, a more robust definition of disproportionality was created by students who participated in the Youth Technical Assistance Center for Disproportionality (YTAC-D). YTAC-D defined disproportionality in this way:

Disproportionality is the outcome of institutionalized racism and bias that result in discriminatory beliefs, policies, and practices, which negatively affect historically marginalized groups in contrast to privileged groups. (Hernández et al., 2022)

To address disproportionality as defined by YTAC-D, other forms of data—such as student interviews, teacher focus groups, and case studies—must be synthesized alongside the numbers to build a more accurate contextual and explanatory understanding.

Conclusion: Looking Beyond the Numbers

Regularly looking at quantitative data related to student outcomes such as test scores, course passage, attendance, and behavior is a necessary and important part of culturally responsive and equitable data usage. However, quantitative data review alone has not been shown to guarantee that beliefs, policies, practices, and procedures shift in meaningful ways that improve experiences and outcomes for marginalized students (Bertrand & Marsh, 2021; Hernández et al., 2022; Lasater et al., 2021; Safir & Dugan, 2021; Toldson, 2020). In addition to using the quantitative measures described in this brief, leaders for educational equity should take the following steps:

- » Include students, families, and community members in data and policy review processes and on school and district teams (Green et al., 2015).
- » Review data from focus groups, empathy interviews, student/family surveys, and listening sessions alongside quantitative data to contextualize information (Safir & Dugan, 2021).
- » To implement systems change, build individual and collective awareness and knowledge of the ways in which various systems of oppression and othering (e.g., racism, ableism, sexism, classism, nativism, homophobia) impact student outcomes and experiences, and become familiar with and reflect upon the ways in which various forms of bias and stereotypes impact educator practice and perspectives (Carter et al., 2017).

Reviewing experience data will allow educators to “uncover stories of hope and harm while revealing students’ assets, cultural wealth, and learning needs” (Safir & Dugan, 2021, p. 57). Therefore, educators are encouraged to use qualitative data in order to contextualize quantitative data; to avoid reproducing the inequitable and deficit-based practices that contribute to systemic inequities; and to inform their everyday decisions along with larger policies, practices, and procedures and the underlying beliefs at play (Hernández et al., 2022).

“ *The first thing we have to do is destigmatize anecdote. If you have the numbers, you need anecdotes to understand what those numbers represent. We can do a lot more if we acknowledge the incompleteness of the data and that the only way to complete the picture is to get the proper story.*”

—Ivory Toldson, 2021, [*The People in the Numbers: Rethinking Data for Black Student Success*](#)

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