

Review

# Beyond students: how teacher psychology shapes educational inequality

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Although researchers investigating psychological contributors to educational inequality have traditionally focused on students, a growing literature highlights the importance of teachers' psychology in shaping disparities in students' educational achievement and attainment. In this review, we discuss recent advances linking teachers' attitudes, perceptions, and beliefs to inequality in students' outcomes. First, we identify specific aspects of teacher psychology that contribute to educational disparities, including teachers' biases, perceptions and expectations of students, beliefs about the nature of ability, and beliefs about group differences. Second, we synthesize mechanisms underlying the effects of teacher psychology on educational inequality, including teachers' disparate assessment of students' work and abilities, interpersonal interaction with students, and psychological impact on students. Implications for future research and interventions are discussed.

## Teacher psychology and educational inequality

Educational inequality is widespread and complex, driven by both broad structural forces, such as income inequality and unevenly resourced schools, and individual psychological influences. Research on the psychological component of educational disparities has primarily focused on student cognition, especially how the attitudes, beliefs, and feelings of students from marginalized groups shape individual achievement [1–3]. Emerging research, however, highlights the importance of the psychology of another group in shaping educational disparities: teachers. In this review, we synthesize recent international research on the role of teacher cognition in perpetuating or mitigating educational disparities. In doing so, we aim to articulate a model of the ways in which teachers, often despite best intentions, may contribute to educational inequality.

Our review is divided into two parts. First, we review research identifying specific teacher attitudes, perceptions, and beliefs that can contribute to inequality in educational outcomes, with a focus on the most relevant recent developments in this area. Second, we discuss the mechanisms by which these aspects of teacher cognition can create or exacerbate social disparities. To conclude, we situate teacher effects within the broader educational context affecting student outcomes and discuss implications for future research aiming to explain and address educational inequality.

Our primary focus is racial, ethnic, gender, and socioeconomic disparities in educational achievement and attainment. We use 'teachers' to refer to educators broadly defined, from pre-K-12 teachers to university professors. Additionally, we focus on teacher psychology – specifically, teachers' attitudes, perceptions, and beliefs – rather than teacher characteristics, although there is also a growing literature on the latter [4–6].

## Highlights

Emerging research traces the effects of teachers on inequality in students' educational achievement and attainment, moving beyond a historical focus on students.

This research has identified specific aspects of teacher psychology that contribute to disparities in students' outcomes as well as the mechanisms underlying these effects.

These advances have important theoretical and practical implications for the field's understanding of the sources of educational inequality and efforts to promote equity. In particular, this literature suggests that teachers may be a high-impact target for psychological interventions to reduce educational inequality.

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## Which teacher attitudes, perceptions, and beliefs contribute to educational inequality?

In this section, we identify four aspects of teacher psychology that research has linked to inequality in student achievement and attainment: biased attitudes (broadly defined to include both implicit and explicit stereotypes and prejudice), perceptions and expectations of students, beliefs about ability, and beliefs about group differences. Importantly, although we discuss these constructs separately, understanding how they are interrelated is a key direction for future research (Box 1).

### Biased attitudes

Although often considered a particularly egalitarian group, teachers suffer from the same biases as everyone else. A meta-analysis of 34 studies measuring teachers' implicit biases in Europe, Asia, and the USA revealed that teachers held significantly more negative implicit attitudes toward marginalized groups than advantaged groups (estimating a medium average effect size) [7]. For example, across studies and countries, teachers consistently demonstrated implicit preference for ethnic majority groups over ethnic minority groups. Analyses of large US datasets further show that teachers hold anti-Black/pro-White explicit and implicit attitudes at levels largely consistent with those observed in the general population [8–10]. For example, about 15% of teachers and non-teachers in a nationally representative dataset explicitly reported more positive attitudes toward White people than Black people and 55% exhibited more positive affective responses toward images of White faces than Black faces on an implicit task [10].

These biases predict group disparities in students' achievement and attainment [11–16]. Teachers' bias can predict worse outcomes for students belonging to the disfavored group [11, 12], better outcomes for students belonging to the favored group [13], or both [14]. For example, in research examining teachers' gender bias in Turkey, girls randomly assigned to teachers with stereotypic gender role beliefs had lower performance on math and verbal tests, with outcomes worsening with increased exposure to the teacher [11]. Similarly, in Italy, girls assigned to math teachers with more implicit bias against women in science, technology, engineering, and

### Box 1. Relationships between teacher attitudes, perceptions, and beliefs

Although we discuss different teacher attitudes, perceptions, and beliefs documented in research literature as though they are conceptually independent, research suggests that these aspects of teacher psychology may co-occur or even derive from a shared source.

For example, bias has been linked to all three of the other constructs discussed in this review. Teachers with stronger stereotypes and implicit bias can also have lower, stereotypic expectations of individual students from marginalized groups [15, 122]. Fixed ability beliefs have been associated with greater stereotyping and less desire to overcome bias [123, 124]. White people exposed to colorblind ideologies have subsequently exhibited greater racial bias [125]. Given these links, it is possible that biased attitudes may be a particularly important contributor to the effects of teacher psychology on educational inequality.

Psychological essentialism (the belief that people have essential characteristics that are innate, immutable, and often biological determined) is also closely conceptually related to each of these attitudes and beliefs and thus may be important to examine further as a potential underlying ideology. Essentialism predicts both explicit and implicit bias [126], is inherent to fixed and non-universal mindsets of ability, and is a core dimension of beliefs about group differences. Essentialism could also predict more rigid expectations of students if teachers' belief in the immutability of students' attributes leads them to feel more certain about what students will accomplish in the future.

Future research investigating the relationships between these constructs will be important to determine the primary attitudinal drivers of teachers' effects on educational inequality, whether they are bias, essentialism, or another underlying ideology. Such insight will both advance theoretical understanding of the etiology of intergroup cognitive processes and allow more efficient interventions that target psychological contributors to inequality at their source.

mathematics (STEM) performed worse on math standardized tests and attended less advanced high schools [12]. At the same time, favored groups can benefit from teacher biases. Israeli boys and girls randomly assigned to primary school teachers who favored their gender performed better on standardized national exams during middle and high school and were more likely to complete advanced math coursework, with especially strong effects for boys [14]. These effects emerged regardless of teacher gender across studies.

Similar findings have emerged for teachers' racial/ethnic bias. For example, students in New Zealand performed substantially better in math when their teacher implicitly favored their ethnic group [13] and Dutch teachers' implicit bias predicted the size of ethnic achievement gaps in their classes [15]. Additionally, test score and disciplinary disparities between Black and White students in the USA are larger in counties where teachers hold more implicit and explicit anti-Black/pro-White bias [16].

### Perceptions and expectations of students

Teacher expectations are perhaps the longest-studied aspect of teacher cognition. Research conducted over 50 years ago demonstrated that teachers' perceptions of students' current capabilities and expectations for their future achievement affect how much students ultimately achieve [17,18]. A recent resurgence of research has strengthened the evidence for teacher expectancy effects by addressing some limitations of earlier research (e.g., leveraging longitudinal designs that better isolate expectancy effects from teacher accuracy, accounting for classroom-level nesting).

This research confirms earlier findings that teachers often hold more negative perceptions and expectations of students from marginalized groups compared with advantaged groups, over and above their actual achievement. Longitudinal analyses of nationally representative US datasets revealed that teachers were more likely to underestimate the math abilities of Black, Latinx, and female students (versus White and male students) and the English abilities of Black, Latinx, and Asian students (versus White students) relative to students' actual achievement [19–22]. In math, teachers perceived girls to be as skilled as similarly performing boys only when they also perceived the girls to work harder, engage in better learning behaviors, and be more eager to learn [21,22]. These patterns held even accounting for students' test scores, homework completion, and other factors on which teachers could reasonably base their perceptions. White teachers also overestimated White students' future educational attainment significantly more than Black students' future attainment, whereas Black teachers did not show this gap [23,24].

In turn, teachers' perceptions and expectations predict students' long-term achievement, including disparities between marginalized and advantaged groups. For example, having a teacher who expected that a student would complete a 4-year degree significantly increased the likelihood that a student completed a college degree, amplifying Black–White disparities in college completion [23,24]. Lagged analyses from kindergarten to eighth grade showed that a teacher overestimating a student at one time point predicted larger gains in math standardized test scores at the next time point, and underestimation predicted smaller gains, with effects strengthening as students aged [20]. These effects were larger for girls of all races and Black and Latino boys (versus White boys). Teachers' gender-biased perceptions of math ability accounted for a substantial portion of the growth of a math achievement gap between similarly performing girls and boys in grade school, with no substantive change in these patterns from 1999 to 2011 [21,22].

Teachers' perceptions of other student characteristics besides ability or achievement potential may also be important. For example, in one study, teachers perceived low-income Black and

Latinx students as less motivated than students reported they were, and these teacher–student discrepancies in motivation ratings significantly predicted students' final grades [25]. Teachers' perceived similarity to students and perceptions of how involved students' parents are may also vary based on students' social group and contribute to academic disparities [26,27].

#### Beliefs about the nature of ability

Teachers' beliefs about the nature of ability also contribute to disparities in achievement and attainment. First, teachers differ in the extent to which they view intelligence and other aspects of ability as fixed, innate qualities (fixed mindset) versus malleable qualities that can be developed (growth mindset). Teachers' fixed mindsets exacerbate educational disparities. For example, a US university-wide study of STEM courses revealed that professors who believed ability was fixed had twice-as-large racial achievement gaps in their courses as professors who believed ability was malleable, controlling for other teacher attributes [28]. Another expression of fixed mindset, the belief that raw, innate ability is required for success, is also associated with group disparities. For example, the more a discipline's faculty believe that raw, innate talent is the primary requirement for success, the more women and Black Americans are under-represented among that discipline's PhD recipients [29]. Additionally, when faculty described innate talent as important for their major, women were less interested and men were more interested in pursuing the major [30].

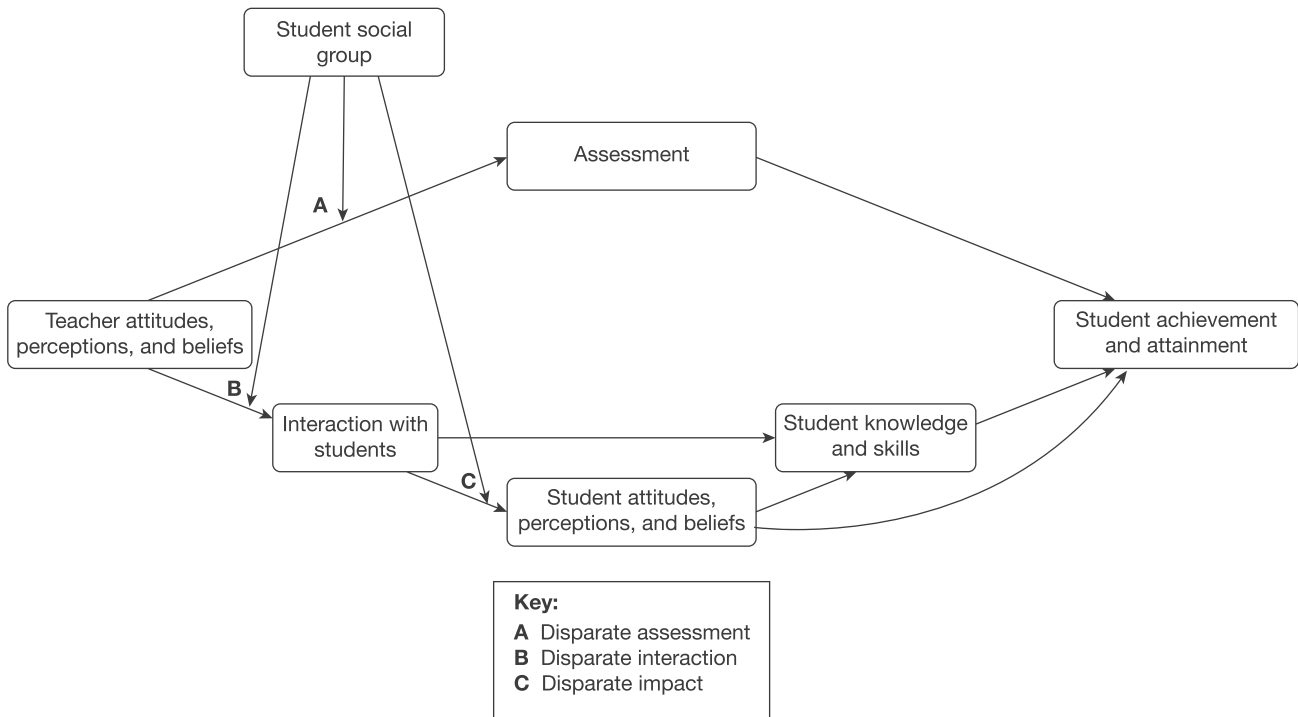
Second, teachers differ in the related belief that only some students – versus all students – have the potential to succeed at the highest levels (a non-universal versus universal theory of ability) [31]. When students perceived that their teachers believed that only some students had the potential to succeed in STEM, women and members of racial groups under-represented in STEM received lower course grades, controlling for prior performance [32]. Teachers' belief in the universality of ability may also shape their beliefs about the purpose of education: selection and weed-out (differentiating the 'cream of the crop' from those who have lesser abilities) versus promotion of learning for all [33]. Experimental induction of a selection purpose among educators has led to greater socioeconomic disparities in grades [34] and academic track recommendations [35].

#### Beliefs about group differences

Finally, teachers' beliefs about the significance and nature of group differences may contribute to educational disparities. Evidence suggests that colorblind ideologies – the belief that group differences (particularly racial/ethnic categories) do not matter and should be minimized or ignored – are common among teachers in the USA [36–38]. In turn, a recent experiment showed that teachers' expression of colorblind beliefs in class undermined the achievement of students of color, but not White students, compared with when teachers expressed multicultural beliefs (that group differences should be recognized and celebrated) [39]. Teachers' beliefs that group differences are biologically rooted and fixed (essentialist beliefs) may also contribute to educational disparities. Teachers with essentialist beliefs were more likely to make stereotypical track recommendations, recommending boys to STEM-oriented schools and girls to language-oriented schools [40]. Conversely, expressing contextual beliefs about group differences to students – that differences arise from normal variation in life experiences and can be an asset – has closed socioeconomic disparities in achievement [41–43].

#### How does teacher psychology exacerbate or mitigate educational inequality?

Next, we turn to how these attitudes, perceptions, and beliefs may affect educational disparities. In Figure 1, we diagram mechanisms by which teacher psychology affects students' achievement and attainment. In particular, we identify three points at which students' social group membership

**Trends in Cognitive Sciences**

**Figure 1. Mechanisms underlying the effects of teacher psychology on student educational achievement and attainment.** A, B, and C identify three points where students' social group membership can moderate teacher effects, introducing group disparities in educational outcomes. **A: Disparate assessment.** Student group membership moderates the effects of teachers' psychology on assessment, such that teachers give some groups of students more favorable grades, placement recommendations, and other evaluations than others. These disparate assessments create gaps in achievement and attainment that do not reflect underlying differences in students' abilities or performance. **B: Disparate interaction.** Student group membership moderates the effects of teacher psychology on interaction with students, such that teachers behave more constructively toward some groups of students than others. Disparate interaction engenders inequality in students' educational achievement and attainment either by directly creating gaps in students' knowledge and skills (e.g., by teaching some groups more effectively than others) or through differential effects on the psychological conditions necessary for optimal learning, performance, and persistence (e.g., belonging, engagement, trust). **C: Disparate impact.** Teachers' psychology uniformly influences their behavior toward students. Student group membership then moderates the psychological effects of teachers' behavior, such that the same behavior is experienced differently by students of different groups due to varying social and material circumstances. These psychological effects lead to differences in learning, performance, and persistence, contributing to disparities in student educational achievement and attainment.

can moderate teacher effects, introducing disparities that directly or indirectly affect achievement and attainment.

First, teachers themselves make judgments and decisions that directly affect student achievement and attainment, such as giving grades and making recommendations to schools about students' course level and track placement. Disparate assessment occurs when student group membership moderates these judgments, such that teachers assess some groups of students more positively than others, absent underlying differences in the quality of student work.

Second, teachers' psychology can affect the way they interact with students, including verbal and nonverbal behavior in both formal teaching and informal contact. These interactions affect student achievement and attainment both through the knowledge and skills students learn and through effects on students' engagement, belonging, trust, and other psychological factors needed for optimal performance and persistence. Disparate interaction occurs when student group membership moderates teachers' behavior toward students, such that teachers interact more constructively with some groups of students than others. This disparate interaction –

whether through teaching some groups more effectively than others or through differential psychological effects – leads some groups to learn, perform, or persist better than others.

The third mechanism is similar to the second – teachers' psychology affects their actions – but in this case, teachers behave uniformly toward all students. However, because this behavior occurs within a broader socially stratified society, where social groups face unequal social and material circumstances, the same behavior can differentially affect members of different social groups. Disparate impact occurs when student group membership moderates the effects of teacher behavior on student psychology, again leading some groups to learn, perform, or persist better than others.

We next review evidence for each of these three mechanisms.

#### Disparate assessment

Growing evidence suggests that teachers around the world assess students from marginalized social groups more negatively than students from advantaged groups, over and above objective performance. For example, analyses of teachers' grading in high-stakes national exams in New Zealand [44], Sweden [45], and the UK [46] revealed that teachers systematically evaluated students from marginalized ethnic groups less favorably than students from advantaged ethnic groups, either when controlling for students' actual performance [44] or when compared with assessments made by blind evaluators [45,46]. Middle-school math grades in Brazil showed a similar pattern compared with blindly graded exams [47]. Such effects can be sizeable. For example, in the Swedish national exam, teachers graded Swedish students' written tests ten percentage points higher than those of first- or second-generation immigrant students, whereas there was no gap when grades were assigned blindly [45]. In this case, the gap was explained by greater favoritism toward Swedish students (rather than derogation of non-Swedish students): compared with blind graders, teachers boosted Swedish students' scores by 16% but boosted immigrant students' scores by only 4%.

Further evidence of disparate assessment comes from experiments where teachers evaluate identical tests, essays, or other assignments randomly ascribed to students of different groups. In such experiments, German teachers gave the same assignments worse grades, more negative evaluations, and less advanced school placement recommendations when the test taker had a Turkish (versus German) name [48–50]. US teachers evaluated ostensible Black, Latinx, and female students as lower in math ability than White and male students based on identical tests [51] and gave the same essay a lower grade when it was ascribed to a Black (versus White) student [52]. Indian teachers gave lower grades to the same exams identified as coming from lower-caste (versus high-caste) students [53] and Swiss teachers recommended lower academic tracks to students identified as having lower (versus higher) socioeconomic status [35]. Notably, these studies suggest that teachers engage in disparate assessment more when evaluation criteria are less clearly defined (e.g., when teachers assign an overall grade or evaluate students' general ability level versus when they assess the correctness of a specific math solution or assign a score using a detailed rubric) [49,51,52], consistent with prior work on the role of shifting standards in discrimination [54].

Research probing the relationship between teacher psychology and disparate assessment is nascent but growing. One set of studies suggests that teachers' beliefs about ability may influence disparate assessment. Teachers experimentally prompted to think about education as differentiating students with higher ability from those with lower ability more harshly evaluated identical materials attributed to students with lower (versus higher) socioeconomic status,



whereas those who thought about education as promoting learning for all did not exhibit disparate assessment [34,35,55]. Other experiments suggest that teachers' biases may also predict disparate assessment, although results have been mixed. Some operationalizations of bias – such as gender-stereotypic implicit associations [40] and explicit stereotypes of a marginalized ethnic group as less evolved or advanced (i.e., dehumanization) [56] – have predicted more negative evaluation of identical materials attributed to marginalized (versus advantaged) groups, whereas other operationalizations have not [49,52]. Further research must investigate whether this pattern of results reflects a conceptual distinction between the types of bias that influence disparate assessment or merely challenges with measuring bias.

### Disparate interaction

Through disparate assessment, teachers introduce inequality independent of students, creating 'achievement gaps' that do not necessarily reflect any underlying difference in students' actual or demonstrated abilities. By contrast, through disparate interaction, teachers introduce inequality by interacting differently with different groups of students, producing true gaps in students' knowledge and skills, performance, and/or likelihood of pursuing further education. In these instances, teachers' behavior toward students from marginalized groups may not facilitate learning as well as their behavior toward students from advantaged groups or may create psychological conditions (e.g., distrust, stereotype threat, reduced belonging) that undermine performance and discourage future educational attainment.

Recent research has identified several examples of these types of behaviors. Teachers called on students from marginalized groups less often and asked these students simpler questions that did not push them to deepen their thought process [57,58]. Teachers provided less critical, substantive, and sophisticated essay feedback to Black, Latinx, and Aboriginal students (versus White students), restricting their opportunities to learn from errors and refine their writing skills [59–61]. Teachers were less responsive to attempts to engage in extracurricular educational experiences by students of color and White women (versus White men) in an audit study [62]. Teachers were more likely to closely surveil and harshly discipline Black students than identically behaving White students [63,64], contributing to disparities in achievement and attainment by reducing Black students' time in the classroom (e.g., through suspension) and by undermining trust and the student–teacher relationship [65]. Additional examples of disparate interaction include disparaging remarks or behaviors on the basis of a student's group membership, which can undermine wellbeing, learning, and engagement [66–68], as well as unevenly distributed encouragement, help, and advocacy [69].

Research has begun to investigate how teachers' psychology is related to their likelihood of engaging in disparate interaction. For example, White instructors higher in anti-Black/pro-White implicit bias were more anxious and gave objectively lower-quality lessons (as rated by blind observers) when teaching Black (versus White) students [70]. As a result of this disparate interaction, Black students performed worse on a post-lesson test than White students, as did a second sample of non-Black students who watched videos of the original lessons delivered to Black students. Bias has also predicted disparate interaction in the context of disciplinary action. Teachers with stronger socioeconomic stereotypes chose harsher disciplinary actions for the same misbehavior when it was ostensibly performed by a lower-class child (e.g., scolding lower-class children in front of the whole class vs pulling middle-class children aside for a discreet private talk) [71].

Teachers also engage in disparate interaction on the basis of their perceptions and expectations of students. Research suggests that teachers engage in more positive verbal and nonverbal behaviors when interacting with high- (versus low-) expectation students, including making

more eye contact, showing more approval and encouragement, giving more feedback, having longer interactions, and providing more support for students' psychological needs [18,72,73]. In turn, these high-expectancy teaching behaviors increase student achievement [74]. Disparate interaction with high- and low-expectation students may be further compounded by teachers' beliefs about ability. For example, research suggests that teachers with fixed mindsets are more likely to provide consolation-oriented support to students whom they have judged as having low potential based even on a single mediocre test performance (e.g., reassuring them that 'not everyone has math talent', trying to reduce pressure by calling on them less in class or assigning them less homework) rather than constructive support oriented toward improvement [75]. Unfortunately, this consolation behavior conveys to students that they have low hope for growth, reducing their engagement and motivation [75,76]. Thus, teachers' expectations of students and ability beliefs may interact to heighten disparate interaction and resulting disparities in achievement, particularly if teachers have lower expectations for some groups of students than others.

### Disparate impact

Finally, the ways teachers behave and organize their classrooms can differentially affect members of different groups even when teachers treat all students uniformly. Whereas disparate assessment and disparate interaction entail treating student groups differently, disparate impact involves teaching behavior or practices that are applied equally across students but are experienced differently by members of different groups due to varying social circumstances (e.g., prior experiences with discrimination, awareness of broader societal stereotypes or inequality, differential access to resources, different socialization).

Research has identified pedagogical practices that have disparate impact on students of different social groups. For example, practices that create a competitive classroom culture (e.g., grading on a curve, making statements like 'look to your left, look to your right – only one of you will be here by the end of the semester') [77], facilitate social comparison (e.g., having students raise their hands when they finish solving a math problem) [78], or assume access to resources (e.g., remote and computer-based learning) [79] can be particularly damaging for students from lower socioeconomic backgrounds. Disproportionate rewarding of individualistic behavior and performance (e.g., reliance on individual assessments, classroom discussions requiring interruption to participate) can disadvantage both working-class and female students, who are often socialized more collectivistically, while advantaging their wealthier and male counterparts raised with a focus on individualism [80,81]. In contexts where stereotypes of a student's group are salient (e.g., female students entering a majority-male computer science class, Black students who have previously experienced discrimination from teachers receiving critical feedback on an essay), stereotype-congruent language, behavior, and cues from teachers may also have disparate impact on these students relative to those from other groups [82–89].

Little work has examined the relationship between teachers' psychology and their likelihood of engaging in practices that have disparate impact on marginalized and advantaged students. However, we suggest that there are three ways teachers' psychology might shape their likelihood of employing practices with disparate impact. First, teachers with certain beliefs may gravitate toward particular practices with disparate impact. For example, a teacher with fixed, non-universal ability beliefs who believes the purpose of education is to filter high-ability from low-ability students may be more likely to use pedagogical practices and language that create classroom competition (e.g., the 'look to your left, look to your right' class introduction), to the detriment of marginalized groups. Second, certain beliefs may cause teachers to be more or less motivated to change teaching practices to avoid disparate impact. Some work suggests that teachers who have group



biases or endorse colorblind ideologies are less likely to adopt inclusive teaching practices geared toward preventing disparate impact and ensuring equal opportunity to learn [90,91]. Third, certain beliefs may in and of themselves have disparate impact if expressed to students. In a recent experiment, when a teacher expressed a colorblind (versus multicultural) ideology in class, students of color perceived that the teacher was more racially biased and performed worse on a quiz at the end of the class, whereas White students were not affected [39]. Additionally, although teachers' expression of fixed or non-universal ability beliefs may harm all students [92], members of marginalized social groups may be disproportionately affected due to prevalent negative stereotypes about their ability [28,32,93,94]. For example, a recent series of studies found that the negative effects of a teacher expressing non-universal ability beliefs on students' anticipated performance, belonging, and interest in a class were 36–64% larger among women than men [94].

### Concluding remarks

Research on the role of teachers in educational inequality is burgeoning. In this review, we aimed to provide a lens for understanding how teachers influence disparate outcomes among students.

Critically, teachers are just one of many contributors to educational inequality. Systemic factors such as income inequality, residential segregation, and disparities in school resources and quality contribute to many educational disparities, including socioeconomic and racial/ethnic disparities [95]. Even at the psychological level, the attitudes, perceptions, and beliefs of myriad others influence students' academic outcomes. School administrators are often responsible for final decisions on matters such as academic placement and discipline, and research shows that principals [96] and school counselors [97] can exhibit racial bias in these decisions even with no input from teachers. Parents may be differentially likely to recognize the potential of their children and advocate for advanced placement [98], perhaps in part due to psychological factors such as their own biases (e.g., gender stereotypes [99]) or cultural factors. Additionally, teachers' attitudes, perceptions, and beliefs may in part reflect issues in the broader educational system and society, including school policies, culture, and norms [100–102], the surrounding community [31,103,104], and teachers' own education and training [105,106].

Nevertheless, teachers remain an important focus for research on educational inequality. Teachers play a fundamental role in shaping students' experiences in school, with lasting influence on students' skill development and life outcomes [107–110]. The effects of teachers' disparate assessment, interaction, and impact on educational inequality are not only immediate but can also proliferate recursively over time, such as by causing students from marginalized groups to feel distrust and apprehension toward subsequent teachers [65,111]. Furthermore, teachers' attitudes and behavior can spread to students. For example, if students witness a teacher treating groups of students differently, even through subtle nonverbal cues, students can internalize biases [112,113]. Such transmission may amplify teachers' influence, creating a peer culture that reinforces teachers' attitudes and beliefs.

Teachers' importance makes them high-impact targets for intervention. Historically, the majority of psychological interventions to reduce inequality have targeted students [114]. However, changing the way students think or feel may not always be sufficient or effective, particularly if the students' environment (including their teacher) does not provide the necessary affordances for the intervention to take root [115,116]. For example, one experiment showed that an intervention encouraging students to view learning as serving a broader purpose did not have any effect unless students also received a purpose-affording handwritten note from their teacher [108]. In another experiment, a values-affirmation intervention administered in over 100 classrooms improved Black and Latinx students' performance only in classrooms with indicators of higher-

### Outstanding questions

Do other teacher attitudes, beliefs, and perceptions contribute to educational disparities? To what extent are these attitudes, beliefs, and perceptions distinct and independent versus overlapping and/or stemming from a common underlying ideology?

What factors moderate the effects of teachers' attitudes, perceptions, and beliefs on educational disparities? We expect moderators to range from psychological (e.g., motivation to control prejudice), to situational (e.g., cognitive load), to contextual (e.g., culture).

The potential influence of culture is particularly important to understand given that research on different aspects of teacher psychology has been geographically clustered (e.g., recent studies of teachers' bias have been concentrated in Europe and the Middle East whereas teachers' beliefs about ability have been most often studied in the USA). Do cultural differences moderate the effects of teacher psychology and do different aspects of teacher psychology predict disparities in different cultural contexts?

What intervention approaches effectively change teachers' attitudes, perceptions, and beliefs or modify behaviors associated with disparate assessment, interaction, and impact? How might these approaches vary for teachers working with different age groups (e.g., pre-K versus college)? What is the time course of intervention effects for both teachers and students and what supports are needed for effects to persist?

Research on the role of teachers in educational inequality have typically considered disparities along one identity dimension at a time (e.g., race, gender, or socioeconomic disparities). Do teacher attitudes and effects differ as a function of students' multiple intersecting identities? For example, do teachers hold specific biases or uniquely low expectations for low- (versus high-) income Black students? Do effects of teacher psychology differ for ethnic minority girls versus ethnic minority boys and White girls?

quality instruction [115,117]. Interventions targeting multiple levels – such as students and teachers simultaneously – may thus be a more effective means to produce positive change than targeting students alone [118]. Alternatively, focusing interventions on teachers may substantially reduce inequality in educational outcomes even without concurrent efforts to target students [119,120].

Existing research on intervening with teachers to reduce educational inequality is sparse, but suggests two general approaches. First, interventions can reduce disparities by changing teachers' attitudes, perceptions, or beliefs. For example, an intervention targeting teachers' differential perceptions of White/Asian and Black/Latinx students provided teachers with similarities they shared with their students, leading to improved perceptions of Black and Latinx students and reductions in racial grade gaps [26]. Second, interventions can reduce opportunities for teachers' assessment, interaction, or impact to be moderated by students' social group, regardless of teachers' psychology. For example, implementation of blind grading can eliminate disparate assessment, while programs training teachers to engage all students in high-quality instruction can reduce disparate interaction [119]. To date, psychological interventions have most often focused on reducing disparate impact, with research showing that the implementation of practices that are responsive to students' diverse experiences and orientations – such as adding group work to the curriculum [80], giving 'wise' feedback [87–89], and framing assessments as opportunities for growth and learning [121] – can reduce group disparities in performance and other outcomes. More research identifying and scaling effective teacher-focused interventions is needed both to successfully reduce inequality and to shed light on the causal processes connecting teacher psychology to student outcomes using experimental methods.

Many questions remain about the role of teacher psychology and behavior in exacerbating or mitigating educational disparities (see [Outstanding questions](#)). Additional research on these questions will further understanding of not only teachers' effects on students, but also intergroup cognition and processes more broadly. As public and scholarly interest in the complex factors sustaining social inequality continues to grow, partnerships between researchers and educators can advance efforts to understand and disrupt inequality in schools.

#### Declaration of interests

No interests are declared.

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