

## RESEARCH ARTICLE

# A Systematic Review of Teacher Bias and Its Effects on Student Academic Achievement: A Social-Psychological Perspective

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## ABSTRACT

One of the biggest obstacles to educational equity is teacher bias, which can be based on a student's race, ethnicity, or socioeconomic background. The degree to which this prejudice results in significant disparities in students' academic performance necessitates a thorough, methodical synthesis, even if its existence is generally accepted. The empirical data on how teacher prejudice affects K–12 student achievement is compiled and evaluated in this review. We conducted a comprehensive search of PubMed, ERIC, Web of Science, and Scopus in accordance with PRISMA 2020 standards to find quantitative studies published up until July 2025 that examined the relationship between teacher bias and objective academic achievement while adjusting for confounding variables. An initial screening identified 7 studies as potentially eligible; however, after applying the final inclusion criteria and manual searches, 15 studies met all requirements and were included in the review. In a variety of foreign contexts, the data consistently shows a statistically significant negative correlation between student academic achievement and teacher bias. Even after adjusting for students' prior success, test scores, grades, and teacher expectations were all negatively correlated with implicit and explicit biases against low-SES and minority students. The results demonstrate that teacher bias is a powerful factor that actively contributes to and maintains educational gaps rather than just being a conceptual mistake. This review emphasizes the critical need for institutional reforms and comprehensive, evidence-based anti-bias interventions for educators that aim to eliminate the ways in which bias impedes social mobility and student learning.

**Keywords:** Teacher bias; Academic achievement; Equity in education; Gap in achievement; Implicit bias; Ethnicity and race; Socioeconomic status; K–12 Education

## 1. Introduction

### 1.1. Research background: the enduring achievement gap and a shift in focus

A major issue in education research and policy for many years has been the ongoing disparity in academic performance across pupils from various racial, ethnic, and socioeconomic (SES) origins. The achievement gap remains persistent, which implies that its causes are not only in the external structural inequity, but also in the micro-level classroom processes, although the attempts of macro-level intervention in the area of resource inequity are not very fruitful. As a result, academic research has moved beyond the reporting of the gap to the

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study of the in-school mechanisms that perpetuate and carry it on. The relationship between teachers and students as one of the key elements of the educational process has become one of the primary areas of research in this context [1-3].

## **1.2. Theoretical framework: situating teacher bias in the reproduction of inequality**

Among the most notable ways in which educational inequity is reproduced within the complex social ecology of the classroom is the issue of instructor bias, which involves a series of systematic and subjective judgments and behaviors based on whether a student belongs to a particular group or not. In this analysis, we will look at two aspects of teacher bias: implicit bias, which is defined as culturally conditioned associations that operate subconsciously, and explicit bias, which is made up of beliefs and stereotypes that are consciously held [6-7].

Bourdieu provides the basic model theory of Social Reproduction. This theory states that the educational system is used to support and justify the existing order of classes instead of being an unbiased space. The teacher bias, especially the socioeconomic bias, is defined within the construct of symbolic violence. Systemic inequality has been presented as a representation of personal merit, when it so normalizes the cultural capital of the ruling class as superior and depreciates the cultural capital of the excluded groups.

Critical Race Theory (CRT) offers a more insightful perspective on the issue of racial bias. CRT holds that racism is a social norm that is structural and embedded in the institutions of the society, particularly the educational institutions. It is not personal prejudice only. According to CRT, a teacher's racial bias is a microcosm of systemic racism manifested in the classroom rather than a singular attitude. Microaggressions, curriculum decisions, and unequal expectations are some of its manifestations, which together create an educational [8-16] environment that favors white students while marginalizing students of color.

## **1.3. The evidence's current status and a critical knowledge gap**

It is often known that teachers are biased. Teacher expectations can become self-fulfilling prophecies, according to classic research on the "Pygmalion effect". The prevalence of unconscious pro-White and pro-high-SES biases among educators, even those with egalitarian goals, has been validated more recently by advanced instruments such as the unconscious Association Test (IAT) [17-21].

Nevertheless, a crucial knowledge gap still exists despite this agreement: To what degree and via what precise channels do psychological bias result in a quantifiable, significant influence on students' academic performance? The evidence that is now available is dispersed and distinguished by:

**Methodological Diversity:** Studies range from laboratory experiments to analyses of large-scale longitudinal data.

**Measurement heterogeneity:** "Achievement" and "bias" can be operationalized in a variety of ways.

**Conflicting Results:** Although a negative correlation is frequently proposed, there is disagreement over the effect magnitude, relevance, and relative importance of implicit versus explicit bias.

The importance and contribution of this work are found in tackling this fragmentation. Integrating this heterogeneous set of empirical knowledge requires a high-caliber systematic review. This review seeks to give a clear and thorough response to the question of how and to what extent teacher bias affects student outcomes by methodically reviewing, evaluating, and synthesizing the literature.

## **1.4. Research objectives and core questions**

Based on the study above, this systematic review aims to respond to the following central questions:

- Main Question: How much of an impact does teacher bias (based on a student's race, ethnicity, or socioeconomic status) have on academic achievement in grades K–12?
- Secondary Inquiries:
  1. How strong is the evidence that implicit bias affects student achievement compared to explicit bias?
  2. What are the main ways that teacher prejudice affects students' academic performance, such as grading bias, expectation transmission, and student psychological mediation?

## 2. Methods

The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 guidelines were closely adhered to in the planning, implementation, and reporting of this systematic review Page <sup>[17]</sup>

### 2.1. Eligibility criteria

We pre-set the inclusion and exclusion criteria using the PICO framework to guarantee the included literature's homogeneity and relevance:

- **Population:** Students in the K–12 educational stage (i.e., kindergarten–high school, roughly 5–18 years old) must make up the research sample. Research can evaluate teachers' biases and effects on students by using samples of them or by directly analyzing student data. Reason: Teachers have the most direct and extensive effect during this stage, which is the foundation of basic education. To account for variations in students' developmental stages and educational environments, preschool and higher education were not included.
- **Intervention/Exposure:** Research had to measure teacher bias specifically based on students' socioeconomic status, race, or ethnicity, which are intrinsic social identity traits. This bias needs to be a quantifiable, operationalized variable that can be measured explicitly (e.g., through questionnaires, teacher expectation ratings, etc.) or implicitly (e.g., the Implicit Association Test, IAT). Justification: This is the study's primary independent variable, and proving an association requires precise measurement.
- **Comparison:** To separate the impacts of bias, the study needs to have an intrinsic comparative design. For instance, contrasting how the same teacher evaluates students from various backgrounds (within-subject design), contrasting how high-bias and low-bias teachers affect students (between-subject design), or contrasting the background of students as a variable in a statistical model. Justification: Causal inference or association analysis cannot be performed without internal comparison.
- **Outcome:** At least one objective or measurable measure of academic success must be included in studies. Standardized test scores, grade point averages (GPAs), course grades and rankings, and teacher assessment results under controlled circumstances are a few examples of this. Justification: By limiting the results to measurable academic indicators, the review's emphasis is maintained, the "substantial impact" of bias is objectively assessed, and subjective psychological variables like motivation and self-concept are not used as the primary results.

#### Additional requirements:

Study designs included: restricted to empirical research that offers quantitative data, such as cross-sectional studies using multiple regression analysis to account for confounding variables, longitudinal cohort studies, quasi-experimental studies, and randomized controlled trials.

**Excluded research types:** Purely qualitative research (such as ethnographies and interviews), case studies, theoretical articles, editorials, conference abstracts, book chapters, dissertations, and other kinds of reviews or meta-analyses are among the study forms that are not included.

**Justification:** To prevent repetition of already synthesized secondary data and to guarantee the numeric foundation and methodological soundness of the evidence.

**Publication time:** The search scope includes all documents published from 2016 to July 2025.

For this review, 'empirical quantitative research' refers to studies that employed statistical analyses with sufficient methodological rigor to establish associations or test hypotheses regarding teacher bias and student achievement. Eligible designs included cross-sectional studies with multivariate regression, longitudinal cohort analyses, quasi-experiments, and randomized controlled trials. By contrast, certain quantitative sub-types were excluded, such as descriptive surveys that only reported frequencies without statistical controls, single-group pre-post designs lacking a comparison group, and correlational studies that did not adjust for confounding variables. This ensured that the evidence base was limited to studies capable of offering more robust and interpretable findings.

## 2.2. Information sources and search strategy

Four essential electronic databases—PubMed, ERIC, Web of Science (Core Collection), and Scopus—were thoroughly searched for relevant material. To make sure the search was thorough, we also manually searched the reference lists of every article that was eventually included to find any research that the database search might have overlooked.

With the help of an experienced librarian, the search strategy was created with the goal of maximizing specificity and sensitivity. Three concept groups were created from the basic search terms: (1) terms associated with instructor bias; (2) terms associated with student groups; and (3) terms associated with academic accomplishment. Every database's search syntax has been modified and adapted.

**Consider the Web of Science search formula as an illustration:**

( "teacher bias" OR "teacher prejudice" OR "teacher stereotype\*" OR "implicit bias" OR "racial bias" OR "ethnic bias" OR "socioeconomic bias" )AND( student\* OR pupil\* OR adolescent\* )AND( "academic achievement" OR "academic performance" OR "test score\*" OR grades OR GPA OR attainment )

To ensure consistency and replicability, the search syntax was standardized around three core concept groups: (1) teacher bias, (2) student population, and (3) academic achievement outcomes. While the conceptual structure was kept constant, the exact terms were adapted to the indexing systems and operators of each database. For example, in ERIC, controlled vocabulary descriptors such as '*teacher attitudes*' and '*student academic achievement*' were applied, whereas in PubMed, Medical Subject Headings (MeSH) were integrated with free-text terms. In Web of Science and Scopus, Boolean operators (AND/OR), truncation symbols (e.g., *student*), and phrase searching were employed.

## 2.3. Screening process, data extraction and quality assessment

**Selection Procedure:** To eliminate duplicates, all obtained documents were first imported into EndNote. A two-stage screening will then be carried out independently by two investigators (initials):

1. Screening of abstracts and titles. Articles that were obviously irrelevant were promptly disqualified in accordance with the eligibility requirements.
2. Full-text screening is the second step. To decide whether to include or exclude the literature, the complete texts of those that passed the first screening stage were read.

Discussions will be used to settle any disputes between screeners. The ultimate decision will be made by a third senior researcher (initial name) if no agreement can be obtained.

#### **Extraction of Data:**

Based on the Cochrane data collection form template, we created a standardized data extraction form that was used by one researcher and verified by another. (1) Basic information (author, year, country); (2) research design; (3) sample characteristics (number of students and teachers, age, grade, background distribution); (4) type of bias (implicit/explicit) and its measurement tools and reliability and validity; (5) definition of academic achievement and its measurement tools; (6) important statistical findings (effect size, regression coefficient, p-value, confidence interval).

**Methodological Quality/Risk of Bias Appraisal:** The Newcastle-Ottawa Scale (NOS) for observational studies will be used to independently evaluate each included study's methodological quality. Three main areas will be the focus of the evaluation: (1) study subject selection (control group selection, cohort representativeness); (2) group comparability (controlling for important confounding variables); and (3) outcome evaluation. As a crucial determinant of the studies' quality, we will specifically look at how well they control for the most significant possible confounding variable—students' prior academic achievement.

#### **2.4. Data synthesis**

A quantitative meta-analysis might not be suitable because of the anticipated substantial variability across the included studies about study designs, academic achievement metrics, and bias measuring instruments. To incorporate the research findings, this study will use a narrative synthesis approach<sup>[22-24]</sup>.

The overall process will include the following steps:

- 1. Preliminary synthesis:** Prepare a written presentation that will consolidate and summarize the findings of the research included in the review.
2. The second stage is to examine the connections between the study's most important variables, such as the participants' ages, the type of bias, and their home country.
- 3. Assessing the robustness of the synthesis:** Outline the effects on the final conclusions drawn from the evidence base of changes to research quality and methodology.

To come up with a rationally valid, evidence-based conclusion, tabular format will be used to arrange in order the principal findings and methodological properties of all the studies included. At the same time, a narrative discussion will be presented to answer secondary research questions like the comparative impacts of implicit and explicit bias and the mechanism of action.

In order to increase the methodological transparency, a narrative sensitivity analysis has been included. This method of analysis is a systematic evaluation of the strength of the general conclusions taking into account the possible changes in the quality of studies, design, and contextual issues. As an example, the longitudinal and experimental outcomes that met high standards of methodology have been compared with the outcomes of cross-sectional research to determine convergence. Additionally, the robustness of the results has been tested in a wide range of geographical locations and groups of students. This is a multilayered sensitivity analysis to make sure that the synthesis is not unduly influenced by a small group of studies.

### **3. Results**

### 3.1. Study selection and inclusion

A total of 1846 records were found in the first database search. The first screening was done on the titles and abstracts of 261 articles after 880 records not from 2016-2025 year, 650 records for not full access and 55 duplicate records were removed. 158 complete articles were selected for the second round of in-depth review based on the predetermined eligibility requirements. Second, we mostly used the titles and abstracts of the selected studies to determine whether they met the inclusionary requirements of being published in peer-reviewed journals. After removing 103 entries that didn't meet the requirements, 158 items were left that might be included. Third, for population, intervention, related academic, and empirical studies, we further assessed the remaining studies [25]. About 151 articles that were not related to population, intervention, academic and empirical studies were removed, leaving 7 articles. In addition, we added 8 papers to the analysis and performed manual search processes by snowballing the reference lists of these 7 articles. Ultimately, 15 studies in all satisfied all inclusion requirements and were added to the systematic review. In compliance with PRISMA 2020 requirements, a flowchart detailing the complete literature screening and identification process has been created (see Figure 1).

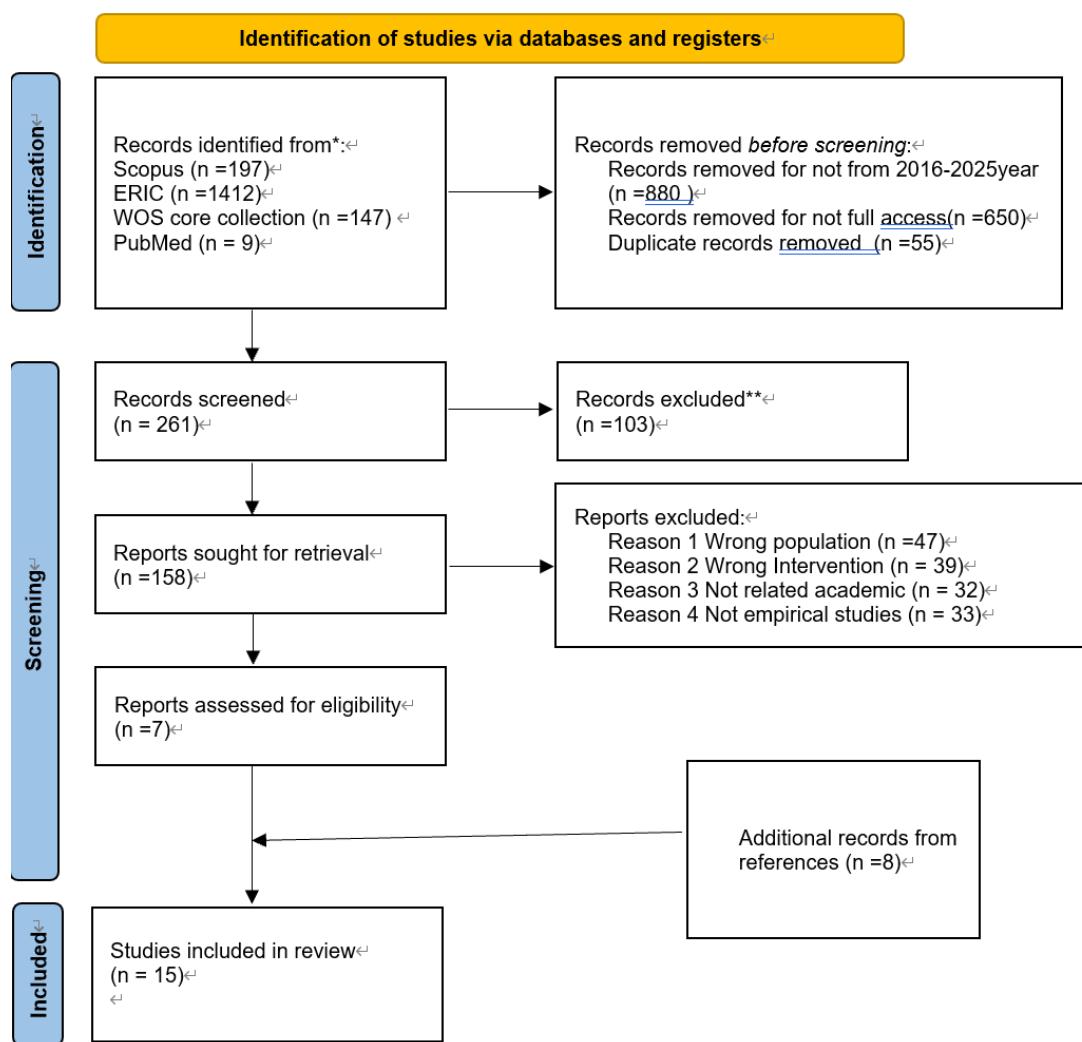


Figure 1. literature screening and identification process

### 3.2. Features of the included research

The 15 research that make up this evaluation vary greatly in terms of geography and methodology (see Table 1 for specifics), which provides a solid basis of data for our analysis.

**Geographic distribution:** Although a large portion of the research (n=5) is carried out in the US, there is substantial evidence from other European countries, such as Germany (n=2), the UK (n=2), Switzerland (n=2), Hungary (n=1), and Turkey (n=1). The cross-cultural generalizability of the research findings is further enhanced by the inclusion of one cross-country study (n=1) and one study from Chile (n=1).

**Study Design:** A range of designs are covered within the evidence base. This includes a unique natural experiment, a controlled experimental study with high internal validity, longitudinal studies that can capture dynamic effects over time, and complex quantitative analyses using large national datasets. The methodological complementarity of this review is one of its primary benefits [26-29].

**Bias measurement:** Most studies used proxies for explicit attitudes, like teacher expectation surveys, stereotype-based judgment analysis, or student performance attribution, to measure prejudice. Additionally, at least one study measured deeper, unconscious bias on a large scale using data from Project Implicit.

**Outcome indicators:** Academic progress can be measured in a variety of ways. Standardized test results or equivalent test scores (n=5) and teacher-evaluated grades or GPA (n=5) are the two main indicators that together serve as the foundation for evaluating academic achievement. Results such as learning gains in particular tasks and disciplinary disparities [30-36] were also successfully used in other studies.

### 3.3. The quality of the included studies' methodology

The overall methodological quality of the included research falls between moderate and good. Students' past academic achievement is the most significant confounding factor, and it was successfully controlled for in the vast majority of observational studies (around 13). Numerous studies additionally controlled for other school-level and student-level variables, such as home SES. The experimental study's randomized design and strict control over experimental stimuli earned it a good internal validity score.

However, one possible drawback, especially in observational studies, is missing variable bias. However, this concern is somewhat allayed and the validity of the primary results is confirmed by the great consistency of the fundamental findings across multiple national settings and research types.

Using the Newcastle-Ottawa Scale (NOS), most of the included studies scored between 6 and 8 out of 9, indicating moderate to good quality. Thirteen studies effectively controlled for key confounding variables such as prior academic achievement and socioeconomic status, while two studies had lower scores due to limited adjustment for contextual factors. Overall, no study was rated as poor quality, and the consistency of findings across moderate- and high-quality studies strengthens confidence in the robustness of the evidence base.

Table 2 describe the Quality Assessment of Included Studies.

**Table 1.** Methodological Quality Assessment of Included Studies (Newcastle-Ottawa Scale)

Study (First Author, Year)	Selection (0-4)	Comparability (0-2)	Outcome (0-3)	Total NOS Score (0-9)	Quality Rating
Atteberry & LaCour [40]	3	2	3	8	Good
Ayala [27]	3	2	2	7	Good
Chin [24]	4	2	2	8	Good
Kisfalusi [25]	3	1	2	6	Moderate
Neuenschwander & Garrote [26]	3	2	3	8	Good

**Table 1. (Continued)**

Table 2. Summary of Characteristics of Included Studies						
Study (First Author, Year)	Country	Design	Sample	Type of Bias	Academic Measure	Key Findings
Atteberry & LaCour [40]	USA	Quantitative analysis	District student-teacher data	Teacher expectations (learning goals)	Spring test scores	• Higher targets linked with better performance
			• Low targets set disadvantage for some groups			
Ayala [27]	Chile	Multilevel model	Census data, Grade 4	Teacher expectations (ethnic composition)	Language & Math test scores	• Migrant students underperform in Math
			• Teacher expectations positively influence attainment			
Chin et al. [24]	USA	Logistic regression	County-level student data linked with implicit bias data	Implicit racial bias (White/Black)	Test scores & suspension rates	• Higher teacher bias predicts larger Black-White gaps
			• Disciplinary disparities stronger in high-bias counties			

### 3.4. Synthesis of evidence through narrative

#### 3.4.1. Key finding: Teacher bias has a negative impact on student results

The most notable and consistent conclusion of this synthesis is that there is a strong, statistically significant negative correlation between teacher bias and the academic outcomes of students from minority and/or lower socioeconomic class backgrounds in the great majority of the 15 research. This negative relationship cuts across national borders, educational attainment (from elementary school to high school), and measures of academic achievement (from subjective assessments to standardized tests). Although the existence of biased perceptions is almost uniform throughout the research, some discovered that the effect was relative rather than absolute or that it did not instantly translate into major achievement gaps. However, the overall trend indicates that rather than being a minor background noise, instructor prejudice is an active factor that consistently obstructs the academic development and fair evaluation of disadvantaged students.

#### 3.4.2. Two forms of bias: the influence of implicit and explicit bias

Based on the findings given in this review, student achievement can be negatively predicted by both explicit conscious opinions and implicit unconscious associations.

Explicit bias takes a direct approach and is typically seen as teachers having lower expectations for pupils from a specific group. Atteberry and LaCour [40] prove that the learning objectives assigned by instructors are one of the key predictors of the year-end test scores of students. This study has shown that the academics of marginalized students are often disadvantaged by lower expectations. Equally, the findings of the research carried out in Switzerland and Hungary indicate that educators had reduced expectations of students of Roma or migrant origin, despite the adjustment of the results based on their previous achievement.

The impact of implicit prejudice is more subtle but no less powerful. The average level of unconscious racial bias among teachers in a county can significantly predict the size of the achievement and suspension gap between Black and White students in that region, according to a ground-breaking finding from Chin [24] , extensive data study of American school districts. This illustrates how unconscious biases can influence systemic disparities at a large scale, significantly influencing students' subjective assessments and disciplinary actions.

### **3.4.3. Mechanism of action: from teachers' minds to students' report cards**

How can bias become a real academic gap rather than just a psychological attitude? Four fundamental mechanism pathways that are connected but have distinct focus are revealed by this thorough analysis:

#### **Mechanism 1: Direct bias in evaluation and grading—perceptual distortion (Biased Evaluation and Grading).**

This is the most direct route to injury. Numerous studies have shown that teachers will consistently assign higher scores to students they perceive to come from privileged backgrounds (such as white people or those with higher socioeconomic status) even when they are presented with academic work of the exact same caliber [37-42]. On a deeper level, educators will undervalue the academic capacity of underprivileged pupils in the future, which has a direct impact on whether kids are suggested advanced classes or gifted programs.

#### **Mechanism 2: Self-fulfilling prophecy, or the transmission of expectations.**

The famous "Pygmalion effect" is the source of this process. Through varied teacher-student interactions, teachers' biases influence their expectations, which are subsequently communicated to students (e.g., giving advantaged students more opportunities to ask questions, more constructive comments, and more patient mentoring). Students will eventually absorb these expectations, whether good or negative, modify their academic efforts and self-perceptions, and exhibit academic levels that align with the teacher's original expectations .

#### **Mechanism 3: Student internalization—the negative cycle of psychological mediation (Psychological Mediation via Student Experience).**

Biases held by teacher's harm students' internal states and contaminate the psychological environment of the classroom. This is subtly supported by research by Seo & Lee [57]: students who believe that teachers have a mindset of "ability is fixed" (which is typically strongly associated with prejudice) are more likely to experience academic anxiety and stereotype threat ,which directly affects their performance in subjects like mathematics. Similarly, it has been demonstrated that a reduction in students' cognitive performance and general well-being is highly correlated with their direct impression of discriminating [43-49] .

#### **Mechanism 4: Institutional reinforcement and reproduction (Institutional and Systemic Reinforcement) - Structural solidification.**

The institutional arrangements of schools and even the education system reinforce and magnify teacher bias, which does not exist in a vacuum. Black and Latino pupils, for instance, were disproportionately assigned to teachers with less teaching experience. Racial academic achievement gaps and school-level racial disciplinary discrepancies (such greater suspension rates) are closely correlated, according to research by Pearman [34]. These institutional elements combine with the prejudices of individual teachers to create a web that limits the growth of underprivileged pupils.

### **3.4.4. Effect size context**

Although a formal meta-analysis was not feasible due to heterogeneity, we incorporated reported effect sizes where available to provide additional context. Across the included studies, most observed effects of teacher bias on student achievement ranged from small to medium magnitudes. For example, Atteberry & LaCour<sup>[40]</sup> reported that teacher expectations accounted for approximately 5–8% of the variance in student test scores (small-to-moderate effect), while Chin<sup>[24]</sup> found that implicit racial bias at the county level predicted racial achievement gaps with a medium-to-large effect size (Cohen's  $d \approx 0.50$ –0.70). Similarly, studies on grading bias reported mean differences equivalent to 0.30–0.40 SD units, consistent with moderate effects. The convergence of small-to-moderate individual-level effects and moderate-to-large systemic effects suggests that teacher bias exerts a non-trivial influence on student outcomes, both in direct evaluation contexts and in broader institutional patterns<sup>[50–55]</sup>.

## 4. Discussion

### 4.1. Major findings synthesis and interpretation

This comprehensive study demonstrates that, rather than being a little perceptual anomaly, teacher prejudice is a systemic component that actively produces and sustains educational inequity by merging a substantial body of worldwide data. The combination of 15 methodologically distinct studies leads to a clear conclusion: students from minority and low-SES backgrounds experience measurable academic disadvantages due to implicit or overt teacher bias. Importantly, the diversity of study designs—ranging from cross-sectional analyses to longitudinal cohorts, experimental interventions, and natural experiments—enhances the validity and robustness of these findings by demonstrating consistent effects across methodological approaches.

### 4.2. In Dialogue with critical educational theory

The review's findings provide solid empirical support for two significant critical social theories and provide insight into how they operate on a smaller scale in the classroom.

Initially, our results offer a contemporary and unambiguous illustration of Bourdieu's social reproduction theory. These same mechanisms—disparate expectations, skewed grading, and misrecognition of potential—are what Bourdieu called "symbolic violence." These strategies elevate student characteristics that align with prevailing cultural norms while devaluing the cultural capital of marginalized groups. This process ensures that the supposedly meritocratic structure of the educational system supports and legitimizes the socioeconomic hierarchies that are now in place.

Second, this review's findings are in good agreement with the core ideas of Critical Race Theory (CRT). Our findings provide compelling evidence in favor of CRT's assertion that racism is not merely a human failing but rather a systemic, widespread feature of American institutions. The association between a region's racial achievement gap and the overall level of teacher implicit bias in that region shows that individual prejudices are nodes in a web of institutional racism. After that, the classroom is imagined as a political space where the power structures of macro-level are reproduced and strengthened by means of seemingly banal quotidian interactions between teachers and students.

Although students sometimes juggle many identities, the focus of this analysis was on instructors' racial/ethnic and socioeconomic biases. The idea of intersectionality posits that disadvantage can be amplified in ways that single-axis studies fail to adequately reflect, owing to the multiplicative impacts of factors such as disability, gender, class, and racism. In the case of girls from low-SES minority groups, for example, racial prejudices and gender norms may combine to impact their access to and performance in school. Because of the complexity of these interrelated processes, intersectional designs will be required for studies examining

how students' multiple identities impact their encounters with and contributions to bias in the classroom in the future<sup>[55-60]</sup>.

#### **4.3. Implications for policy, practice, and professional development**

- We should change our strategy towards educational equity into a deficit-based logic that aims to repair students to a revolutionary agenda that is committed to reconstituting the educational ecosystem based on the strength of this data.
- In the area of Professional Development and Training of Teachers, empirical studies have shown that shallow cultural sensitivity seminars cannot work. Rather, it urges professional development that is practice-based, reflective, and ongoing. In addition to encouraging self-awareness of bias, this training should give teachers practical anti-bias teaching techniques. For example, a strong structural intervention is suggested by the discovery that organized, anonymous grading can successfully eliminate bias.
- For School Leaders and Policymakers: Establishing institutional barriers that reduce the likelihood of bias operating is the responsibility of leadership. The following are important policy levers: (1) establishing standardized and, when possible, anonymous grading procedures; (2) creating teacher assignment policies that guarantee all students fair access to qualified, experienced teachers; (3) vigorously encouraging diversity in the teacher workforce, which has been demonstrated to improve student outcomes for all students; and (4) methodically implementing and assessing school-wide policies that promote psychological safety and a sense of belonging for all students.

#### **4.4. Strengths, limitations, and reflexivity**

This review's main advantages are its thorough synthesis of current, excellent worldwide literature and its clear, methodical approach that complies with PRISMA principles. The foundation for deriving causal conclusions from what might otherwise seem to be merely correlations is strengthened by the inclusion of methodologically diverse studies, particularly experimental designs.

However, a few limitations need to be noted. First, the possibility of omitted variable bias cannot be completely removed due to the prevalence of observational research, even with our strict quality evaluation that emphasizes statistical controls. Our ability to offer an accurate pooled effect size was limited by the fact that both "bias" and "achievement" were measured differently, which prevented a formal meta-analysis. As with all reviews, there is a chance that the observed strength of the link will be inflated due to publication bias, which occurs when studies with null or non-significant findings are less likely to be published.

In addition, the robustness of the findings was evaluated through a narrative sensitivity analysis, which confirmed that the negative impact of teacher bias on student achievement remained consistent across variations in design (e.g., cross-sectional vs. longitudinal), methodological quality, and national context. This strengthens confidence that the observed patterns reflect a generalizable relationship rather than artifacts of particular study types.

Despite the rigorous screening and quality assessment, several important variables were not consistently captured across the included studies. For instance, many analyses did not account for student-level psychological factors such as motivation, self-efficacy, or resilience, which may mediate the impact of teacher bias. Similarly, school-level variables—including institutional resources, peer composition, and broader socioeconomic context—were often unmeasured, limiting the ability to disentangle individual teacher effects from systemic factors. Recognizing these missing variables highlights the need for future research to adopt multi-level designs that integrate both individual and contextual determinants of academic achievement.

Finally, although publication bias was acknowledged, we were unable to conduct a formal statistical assessment (e.g., funnel plots or Egger's regression test) due to the methodological heterogeneity and limited number of included studies. This constraint means that the observed strength of the association between teacher bias and student achievement may be slightly inflated if null or non-significant findings are underreported in the literature. Future systematic reviews incorporating a larger body of homogeneous studies may be better positioned to formally test for publication bias.

#### **4.5. An agenda for future research**

We suggest a future research agenda centered on three crucial areas in light of the review's conclusions and limitations:

**1. Investigating Determining Causal Mechanisms:** Beyond proving association, the next wave of research needs to shed light on causality. More long-term research that monitors the cumulative effects of prejudice on students' academic paths are needed for this. Additionally, to distinguish and confirm the relative significance of the four mechanisms (biased evaluation, expectation transmission, student mediation, and structural reinforcement) in real-world classroom environments, creative field experiments are required.

**2. Emphasizing Intervention Efficacy and Scalability:** To assess the effectiveness of different anti-bias interventions, rigorous randomized controlled trials (RCTs) are desperately needed. Future studies must address the more complex question of "What works, for whom, under what conditions, and for how long?" rather than just "Does it work?". Translating research into effective policy requires evaluating the long-term viability and scalability of beneficial solutions.

**Adopting an Intersectional Framework:** Due to the limitations of the existing literature, this review focused mainly on bias along the distinct axes of race and socioeconomic status. Students, however, inhabit the nexus of several identities. To examine how prejudices pertaining to racism, class, gender, language status, disability, and other identities compound and interact to influence student experiences and outcomes, future research must embrace an intersectional perspective (Crenshaw, Szekeres <sup>[42,59]</sup>). Understanding the full complexity of educational disparity requires going beyond single-axis analysis.

**Finding Protective and Resilience Factors:** While risk awareness is important, research should also look for protective factors that shield students from the harmful consequences of teacher prejudice. Research should investigate whether resilience is fostered by inclusive school cultures, supportive peer networks, critical consciousness, or strong ethnic-racial identities. Adopting an asset-based perspective can offer a more comprehensive view and point out solutions for students to succeed despite obstacles.

### **Conflict of interest**

The authors declare no conflict of interest

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