A systematic review and meta-analysis of the associations between perceived teacher-based racial-ethnic discrimination and student well-being and academic outcomes

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Abstract

Although research has overwhelmingly demonstrated the negative consequences of perceived racial-ethnic discrimination on children's and youth's well-being and academic outcomes, context- and perpetrator-specific discrimination experiences are rarely disaggregated. Racial-ethnic discrimination in the school environment is common, and the perpetrators are often teachers who may treat racial-ethnic minority students unfairly. This work used a three-level multilevel approach to meta-analytically synthesize existing evidence with the aim to 1) document the links between perceived teacher-based racial-ethnic discrimination (TBRED) and students' psychological, behavioral, physical well-being, substance use, grade point average and school motivation, and 2) to examine whether these associations differ by sample and study characteristics. Based on 68 studies and 259 effect size estimates, we found that perceived TBRED is linked to lower well-being (r = -0.15, 95% [-0.18, -0.12]), higher substance use (r = 0.13, 95% [0.06, 0.20]), and lower academic performance (r = -0.16, 95% [-0.20, -0.13]) with substantial heterogeneity across effect sizes. Similarly, TBRED had small-to-medium negative associations within each domain of well-being and academics. The results were partially moderated by school racial-ethnic composition, suggestive of a protective function of a higher concentration of racial-ethnic minority students. In addition, more reliable scales and a greater number of items measuring TBRED were associated with stronger negative correlations with well-being. These findings highlight the importance of increasing awareness around issues of racism and discrimination in initial teacher training and professional development. We encourage further exploration of effect size heterogeneity and call for research on TBRED outside the United States.

Keywords: racial-ethnic discrimination; teachers; students; well-being; achievement; meta-analysis

Educational Impact and Implications Statement

This meta-analysis of 68 studies found that perceiving teacher-based racial-ethnic discrimination is detrimental to both students' well-being and academic outcomes to similar degrees. These findings demonstrate that teachers bear responsibility for the well-known discrimination-to-adjustment link and that the negative impact of teacher-based racial-ethnic discrimination is not limited to the academic domain but extends to well-being. The results imply that there is a dire need for changes in teacher training and professional development that not only educate teachers on what to teach their students (i.e., subject content) but also on how to teach in increasingly diverse schools in equitable and culturally responsive (i.e., nondiscriminatory) ways.

A systematic review and meta-analysis of the associations between perceived teacher-based racial-ethnic discrimination and student well-being and academic outcomes

Racial-ethnic discrimination is widespread in contemporary societies (Syed, 2021). Despite media attention often centering on blatant episodes of racism and discrimination (e.g., in encounters with the police), individuals also face unfair treatment due to their race and ethnicity in supposedly safe spaces such as schools (Seaton et al., 2018). Past studies have shown that first experiences of exclusion and rejection based on racial-ethnic group membership occur in the school context early on, namely, during preschool or elementary school (Marcelo & Yates, 2019; Szalacha et al., 2003), and become more frequent when students move to middle and high school (Hughes et al., 2016; Wang & Yip, 2020). However, with some notable exceptions (Benner et al., 2018, 2022), previous research syntheses have not focused specifically on either racial-ethnic discrimination in the school context or on discrimination by teachers. This underscores the importance of examining teacher based racial-ethnic discrimination (TBRED) in the school context.

According to Jones (1997), racism refers to an ideology of power that places certain racial-ethnic groups as inferior to others. Racial-ethnic discrimination can be defined as the differential and detrimental treatment on the basis of race or ethnicity[1] and helps to produce a group-based hierarchy (Sidanius & Pratto, 1999). There is an abundant literature that has documented the negative consequences of perceived racial-ethnic discrimination across numerous life domains among adults (e.g., psychological and physical health) (Paradies et al.,

[1] Borrowing from Cokley (2007, p. 225), race can be defined as 'a characterization of a group of people believed to share physical characteristics such as skin color, facial features, and other hereditary traits', while ethnicity refers to 'a characterization of a group of people who see themselves and are seen by others as having a common ancestry, shared history, shared traditions, and shared cultural traits such language, beliefs, values, music, dress, and food.' Importantly, we understand race and ethnicity as social constructions that lack any meaningful biological basis (Bhopal, 2004).

2015; Pascoe & Smart Richman, 2009; Schmitt et al., 2014), as well as among children and adolescents (Priest et al., 2013; Trent et al., 2019). Benner and colleagues' meta-synthesis (2018) of 214 studies was the first work that quantified in a meta-analytic framework the strength of the association of racial-ethnic discrimination with youth's well-being and academic performance. They found moderate to small links between discriminatory actions and socioemotional distress (r = 0.24), risky health behaviors (r = 0.20), and academic achievement (r = -0.10). In a more recent meta-analysis, Benner and colleagues (2022) differentiated between different perpetrators of discrimination (i.e., educator, peer, and school-based discrimination) and found overall weaker associations for educator vs. peer-based discrimination and for educator vs. school-based discrimination. However, both previous meta-analyses did not examine potential moderators of the association between discrimination from a particular source (e.g., teachers) or different indicators of well-being and academic outcomes. Moreover, while Benner et al. (2022) focused on educators as perpetrators (without specifying whether they were only teachers or other adults in the school), the specific contribution of this meta-analysis is to focus on the role of teachers rather than educators in general. Lastly, given the high overlap of studies that have used the same data, we deemed it imperative to use a methodological approach that takes these statistical dependencies (e.g., studies nested in datasets) into account.

In the school context, racial-ethnic minority students may face direct and indirect (vicarious) discrimination (Priest et al., 2017), and encounter overt and subtle forms of discrimination (Del Toro et al., 2021; Kohli & Solórzano, 2012; Steketee et al., 2021). Notably, there is evidence that perpetrators of racial-ethnic discrimination can be fellow students as well as adult figures such as teachers. Many studies, however, have aggregated across different sources of discrimination, making it difficult to gauge the specific impact of one source (e.g.,

teachers; Verkuyten et al., 2019). While it could be argued that discrimination is harmful irrespective of its source, there is research to suggest that not all youth experience discrimination from both peers and teachers. Studies using person-centered approaches identified several classes of students, one of which experienced high levels of discrimination from teachers but not from peers (Marraccini et al., 2022; McNeil Smith & Fincham, 2016), suggesting that it is important to differentiate between sources of discrimination. To this end, this meta-analysis summarized the evidence collected on perceived TBRED to address two main research questions: 1) What are the associations of perceived TBRED with school-aged children's and youth's well-being and academic outcomes? And 2) What are the factors that moderate these relationships?

What is Perceived Teacher-Based Racial-Ethnic Discrimination?

Teachers are of utmost importance for promoting intellectual development and school adjustment of young children and adolescents because they represent some of the most proximal influences (Farmer et al., 2011; Pianta et al., 2012; Wentzel, 2009). Student-teacher relations are inherently hierarchical, involving a power differential between teachers (high power) and students (low power). Teachers assign learning materials, provide instructions and feedback, give grades, and make recommendations for school track placement, shaping students' educational opportunities and future lives in important ways (Turetsky et al., 2021). Therefore, it is imperative to consider power imbalances between students and teachers and how they are reinforced by teachers' and students' respective group membership. While the percentage of racial-ethnic minority students has increased steadily in recent decades globally, the vast majority of teachers belong to the ethnic majority group (Civitillo & Juang, 2020; Taie & Goldring Westat, 2020). The resulting demographic and sociocultural mismatch between students and teachers may reinforce a power differential within schools (Gay, 1993). This does

not mean that teacher-student interactions are unequivocally discriminatory or racist. However, the power imbalance, which is inherent in the relationship between teachers and students, in combination with demographic and sociocultural mismatches, makes differential treatment across groups of students more likely to happen.

A range of behaviors could be perceived as discriminatory practices in school. For example, low academic expectations by teachers are a form of discrimination that racial-ethnic minority students often face and might internalize (Gershenson et al., 2016; Peterson et al., 2016; Tenenbaum & Ruck, 2007). In addition to differential expectations, there is also a variety of other school-based discriminatory experiences. One of the most frequently used scales to measure perceived racial-ethnic discrimination by teachers developed in the Maryland Adolescent Development in Context (MADIC) study (Wong et al., 2003) includes the following: students felt that their teachers called on them less often; graded them more harshly; disciplined them more harshly; discouraged them from taking a class; or thought they were less smart because of their race or ethnicity. Notably, qualitative studies (Abu El-Haj, 2007; Rosenbloom & Way, 2004) have highlighted that ethnic minority students did not necessarily perceive any kind of conflict with teachers as examples of ethnic-racial discrimination. Instead, they perceived to be discriminated against when teachers did not respect or care about them as individuals or enacted subtle forms of discrimination, such as microaggressions (e.g., praising third-generation immigrant youth for their skills in the language of instruction) (Colak et al., 2020).

In sum, we conceptualize TBRED as student-reported perceptions of differential treatment by teachers due to their race or ethnicity, which can manifest in a range of subtle, seemingly innocuous behaviors (e.g., microaggressions) to more blatant forms of discrimination (e.g., name-calling). We do so from the vantage point of a systemic-racism framework (Syed,

2021) that is informed by critical race theory (e.g., Ladson-Billings & Tate, 1995), which assumes that we live in a racist society and that individuals in such a society can act in ways that are either (a) actively racist, (b) actively antiracist or (c) passively racist. From this perspective, only being actively racist requires racist intent on the side of perpetrators (e.g., teachers) but this does not make a difference for targets (e.g., students) for whom both actively and passively racist behavior is going to be perceived as discrimination. This is notably different from an interpersonal-racism framework, which would assume that discriminatory intent is necessary for racial-ethnic discrimination to occur.

The consequences of experiencing perceived TBRED

Teachers and students interact on a daily basis. Teachers should provide the optimal level of structure for children's current maturity while providing a sufficiently challenging environment to move children along a developmental trajectory that promotes growth in cognitive and social competencies (Eccles et al., 1993). However, experiencing perceived TBRED is likely to affect not only academic domains but also students' well-being, including physical (e.g., somatization, health problems), psychological (e.g., depression, self-esteem) and behavioral domains (e.g., delinquency, risky sexual behavior). This is implicated by both integrative models of minority child development (Garcia-Coll et al., 1996) and more general risk and resilience frameworks (Suárez-Orozco et al., 2018). Schools, and in particular teachers, can provide supportive environments that may help ethnic minority youth cope with challenges they face both outside and inside school. For instance, Juang and colleagues (2018) suggest that teachers may represent secondary attachment figures for immigrant and refugee youth that may help them deal with migration-related stressors. However, teachers who discriminate against their students not only show a lack of support but also likely pose a risk factor for students' well-

being (Umaña-Taylor, 2016). General biosocial models of stress also imply that perceived TBRED is likely to affect mental and physical health through heightened stress responses (e.g., elevated blood pressure, sleep disturbances) and maladaptive coping strategies in the form of risky health behaviors such as substance abuse (Pascoe & Richman, 2009).

The consequences of experiencing perceived TBRED may be related to academic achievement and school belonging. From a social identity perspective, TBRED threatens the fulfillment of social identity needs of control, esteem, and belonging, thereby leading to academic disengagement (Verkuyten et al., 2019). In line with this perspective, perceived TBRED is associated with academic futility, the assumption that one has no control over educational success or failure. Consistent with stage-environment fit theory, youth whose social environments are responsive to their changing needs have the best developmental outcomes (Eccles et al., 1993). In contrast, experiencing TBRED is likely to lead to school disengagement, lower confidence in academic self-concept and ultimately lower academic achievement (Eccles & Roeser, 2009). Furthermore, Montoro et al. (2021) found that experiences of discrimination from adults at school were directly related to lower school belonging among Black, Latinx, and Asian American adolescents, whereas perceived discrimination from peers was not. The findings imply that for racial-ethnic minority students, experiences of academic discrimination from adults (including teachers) may diminish school belonging more than social exclusion and teasing from peers.

Despite the fact that research has consistently found negative associations between discrimination and both well-being and academic achievement, there is little work that has systematically compared the effects of TBRED across different outcome domains (e.g., well-being vs. academic). While some studies suggest that perceived TBRED is only associated with

poorer academic performance (Benner & Graham, 2013), other work has shown that it may be equally detrimental to socioemotional and behavioral indicators of adjustment, such as global self-esteem and anger (Wong et al., 2003). Thus, another open question is whether effect size estimates are comparable in size across domains.

Moderators

The risk and resilience perspective (e.g., Suarez-Orozco et al., 2018) assumes that there are protective factors at the level of individual characteristics and environmental conditions that may buffer the potential negative consequences of racial-ethnic discrimination. Similar assumptions about buffering effects due to internal characteristics and environmental resources are made by the integrative model of minority child development (García Coll et al., 1996) and the phenomenological variant of ecological systems theory (PVEST; Spencer et al., 1997). Previous meta-analyses have already shown variation in the links between racial-ethnic discrimination and mental health and academics by individual characteristics like age, and racial-ethnic group (Benner et al., 2018; Carter et al., 2019; Lee & Ahn, 2011, 2012) but did not focus specifically on TBRED and generally did not consider environmental factors at the school level such as racial-ethnic school composition.

In addition to individual characteristics and environmental conditions, there is evidence from school-based intervention research that study characteristics (e.g., quality of the instruments, reliability, number of items) explain as much variance in observed study effect sizes as features of the intervention itself (Wilson & Lipsey, 2001). Only one previous meta-analysis has specifically focused on the variation of associations of racial-ethnic discrimination among adolescents as a function of how discrimination was measured (Benner et al., 2022), pointing to larger effect sizes for instruments with more than two items. Given ongoing discussions about

the measurement of racial-ethnic discrimination (e.g., Neblett, 2019), it seemed important to examine variation in associations of perceived TBRED by features of the measurement.

Sample-Related Moderators

Age. The developmental model of children's perception of discrimination by Brown and Bigler (2005) outlines that children acquire the basic cultural and social-cognitive skills that allow them to perceive unfairness within many situations by age 6. During the elementary school years, pupils acquire more sophisticated skills to detect differential treatment based on social categories such as race or ethnicity, and to attribute these behaviors to a particular source, such as peers or teachers (Verkuyten et al., 1997). By age 10, and with the acquisition of advanced cognitive skills associated with formal operations and complex abstract thinking, adolescents are able to identify discrimination that is societal, institutional, and systematic. In addition, adolescence is a phase during which ethnic-racial identity (ERI) exploration and commitment processes become more important (Umaña-Taylor et al., 2014), and research suggests that ERI commitment (but not exploration) may buffer against the negative consequences of racial-ethnic discrimination (Yip et al., 2019).

When comparing different phases of adolescence (puberty, early, middle, and late adolescence), it can be argued that early adolescents are particularly vulnerable to the consequences of TBRED. Early adolescence coincides with the transition from elementary to secondary school, which is accompanied by significant changes in the school environment (e.g., less intimate and more anonymous). Students thus need to adapt to fewer close relationships with their teachers, and while peers become more important, they may not have fully replaced teachers as secondary attachment figures. In line with this thinking, the link between ethnic-racial discrimination (not differentiated by source) and *socioemotional stress* was stronger in

early compared to late adolescence (Benner et al., 2018). On the other hand, older adolescents have a clearer understanding of the public regard for their racial-ethnic group (Umaña-Taylor et al., 2014). Partially supporting this alternative assumption, the negative association between racial-ethnic discrimination and academic outcomes was stronger in mid-adolescence than in early adolescence (Benner et al., 2018). Thus, it remains an open question how developmental periods may moderate the link between perceived TBRED and well-being and academic outcomes.

Racial-Ethnic Group. While race and ethnicity may determine who gets targeted for racial-ethnic discrimination (Carter et al., 2017), research also suggests that the consequences of racial-ethnic discrimination may vary across groups. In the educational context, studies have found that African American students are disproportionately singled out for relatively harsh disciplinary actions (e.g., detentions) by teachers (e.g., Wegman & Smith, 2019). There may be qualitative differences in what it means to be discriminated against by teachers, depending on racial-ethnic group membership. Benner et al. (2018) identified a stronger link between general racial-ethnic discrimination and social-emotional distress for Asian vs. Black adolescents and academic outcomes for Latinx vs. Black youth. Cooper et al. (2019) similarly reported higher correlations between racial-ethnic discrimination and poor physical health for Asian~~s~~ adults compared to other racial groups. However, studies that examined discrimination by peers and adults separately did not always find moderation by ethnicity for discrimination by adults in schools (Greene et al., 2006; Montoro et al., 2021). Thus, it is presently unclear whether the downstream consequences of perceived TBRED may differ across racial-ethnic groups.

Racial-Ethnic School Composition. Racial-ethnic school composition helps to better understand the relationship between discrimination and student adjustment. On the one hand,

racial-ethnic discrimination may be especially harmful in less diverse schools because there is less potential support from co-ethnic peers (Bellmore et al., 2012; Thijs & Verkuyten, 2014). On the other hand, when racial-ethnic minority students numerically represent the majority in a school or classroom, but only certain students are discriminated against by teachers, this may have harsher consequences because they think they are the only ones that are being targeted (Brown & Chu, 2012). Taken together, these findings indicate that racial-ethnic school composition is a relevant contextual characteristic when examining discrimination experiences and their implications for well-being and school achievement.

Study-Related Moderators

Measurement Quality. In a previous systematic review of studies examining the relationship between reported racial-ethnic discrimination and health and well-being of children and young adults, Priest and colleagues (2013) warned that studies adopted measurements with poor psychometric properties. In addition to reporting internal consistency checks, they found that only few studies performed more robust analyses of scale dimensionality or cognitive pretesting. Lack of rigor in measurement may jeopardize the validity of the conclusions of scientific research, including research in the field of educational psychology (Flake, 2021). Thus, we examined the measurement quality of the instrument used to assess perceived TBRED as a moderator, adapting criteria for the rigorousness of the measurements from previous meta-analyses (Cheng et al., 2014; Holmbeck et al., 2008).

Reliability of Measures and Number of Items. Reliability represents an important psychometric property of a measure in particular samples (Appelbaum et al., 2018). Given that reliability attenuates effect size, the size of observed associations may change as a function of reliability of the measure (Wilkinson, 1999). Generally, measures of discrimination include

multiple perpetrators in which one source (e.g., teacher) is assessed by a separate subscale or by one or two survey items (Priest et al., 2013). Importantly, previous syntheses found that an increased number of items used to measure discrimination (regardless of the sources) was a significant moderator, such that the association between discrimination and mental health was stronger for measures with a higher (vs. lower) number of items (Benner et al., 2022; Kathawalla & Syed, 2021). Thus, we tested whether the size of associations varies as a function of reliability of the measure and its number of items.

Publication Bias. Recent meta-analyses on the consequences of discrimination conducted with adult (Paradies et al., 2015) and adolescent samples (Benner et al., 2018) showed evidence for a publication bias (i.e., studies with significant findings are more likely to be published). More specifically, published studies had larger effect sizes than unpublished studies (e.g., dissertations). Thus, publication status (published vs. unpublished) is an important characteristic of the study to account for.

The Present Study

During the last decade, there have been systematic reviews and meta-analyses of the negative consequences of racial-ethnic discrimination among children and adolescents (Benner et al., 2018, 2022; Priest et al., 2013; Trent et al., 2019). These reports have reached similar conclusions: racial-ethnic discrimination is detrimental to well-being and academic outcomes. However, missing from most of these syntheses is attention to teachers as sources of discrimination, which is probably due to the fact that most studies used only general and not source-specific measures of discrimination (Benner et al., 2018), although the number of studies using source-specific measures has increased in recent years (Benner et al., 2022). We focus on the role of teachers, and not educators in general (see Benner et al., 2022), to provide a more

nuanced understanding of the unique dynamics and consequences of teacher-based discrimination. By honing in on the role of teachers, we offer a deeper exploration of the mechanisms through which discriminatory experiences manifest and relate to students' well-being and academic outcomes. Moreover, by examining the different dimensions of the academic domain, such as grade point average, school motivation, and school belonging, our study goes beyond previous research by offering a more comprehensive understanding of the diverse outcomes associated with teacher-based discrimination. This nuanced analysis provides insight into the specific areas of students' academic lives that are most affected by such discrimination. By elucidating the detrimental consequences on well-being and academic achievement, we contribute to the development of theories surrounding the mechanisms through which discrimination operates within educational settings.

Our current work capitalizes on the strength of robust statistical techniques (i.e., multilevel meta-analysis), accounting for dependency in effect sizes and including multiple effect sizes in each study. In addition, moderator analyses were conducted to explain which factors may account for heterogeneity in effect sizes. This set of moderators includes characteristics of the samples (e.g., age, racial-ethnic membership, school racial-ethnic composition) and characteristics of the studies with special attention to the features of perceived TBRED measurement (e.g., measurement quality, reliability, and number of the items of TBRED incidents). Lastly, the inclusion of a substantial number of previously unexamined empirical works (31 non-overlapping studies) in our study (20 new studies published between 2020 and 2022 that were not included in Benner et al. 2022) adds value to the literature on this topic. Given the rapidly evolving nature of research around school-based discrimination, the inclusion of these newer studies allows for a more comprehensive and up-to-date review.

Method

Information Sources and Search Strategy

The PRISMA (Preferred Reporting Items for Systemic Reviews and Meta-Analysis) flow diagram (Moher et al., 2009) illustrates our procedure for literature search, screening, and inclusion (Figure 1). To ensure that the search strategy was comprehensive, we generated a list of 34 search terms. The list of search terms was as follows:

Discrimination: (“discrim*” OR “racism” OR “prejudice” OR “harassment” OR “race” OR "ethnic*" OR “cultur*” OR “religio*” OR “immigrant” OR “migrant”) AND

Participants: (“teacher” OR “educator” OR “student” OR “child”" OR “pupil” OR “youth” OR “adolesc*”) AND

Outcomes: (“wellbeing” OR “depression” OR “anxiety” OR “distress” OR “stress” OR “disease” OR “health” OR “self-esteem” OR “loneliness” OR “adjustment” OR “academic” OR “achievement" OR “grades” OR “test scores” OR “motivation” OR “engagement” OR “belonging”).

This set of terms was entered into five databases, balancing between multidisciplinary (Scopus, Web of Science Core Collection) and research domain (PsycINFO, ERIC) search systems. To search for dissertations, we used ProQuest Dissertations and theses. We conducted searches on March 2, 2020, and updated our searches on March 18, 2022. To complement our database search, we manually checked the reference lists of reviewed studies in previous systematic reviews and meta-analyses on racial-ethnic discrimination targeting children and adolescents (Benner et al., 2018; Priest et al., 2013). To identify gray literature, we used Google Scholar and scanned publications that cited the final pool of studies that met the inclusion criteria

(i.e., backward citation search). Finally, we solicited unpublished data from researchers on five international and German academic listservs for education and psychology researchers.

Eligibility Criteria

We selected studies on the basis of seven inclusion criteria. First, given our focus on children and adolescents attending schools, the study had to include students enrolled in school grades (from kindergarten to the end of high school). As a result, we excluded studies focusing on undergraduate or graduate students attending institutions of higher education (e.g., college or university). Second, studies were eligible for inclusion if they measured teacher-based discrimination on the basis of race, ethnicity, religion, culture or immigrant status[2]. Other forms of perceived discrimination (e.g., sexism, heterosexism, disablism) were excluded[3]. Third, studies had to report at least one item or a scale that included teachers as source-specific measures. We excluded studies that used items referring to 'adults in schools' because this category may refer to many other roles, including school psychologists, school counselors, janitors, or security personnel. If correlation coefficients were not disaggregated from other sources of discrimination (e.g., peers, institutional), we emailed corresponding authors (with two reminders in the absence of a response and including contacting coauthors or thesis/doctoral supervisors) with a formal request. In total, we sent 72 requests with two reminders, of which 27

[2] We acknowledge that these social categories are distinct but empirically conflated in the literature. Culture can be defined as 'an integrated constellation of practices, symbols, values, and ideals that are constructed and shared by a community, transmitted from one generation to the next, constantly renegotiated and subject to change, and operating at the individual and societal level' (Causadias et al., 2018, p. 244). While the terms 'race' and 'ethnicity' are commonly used in US-American research, their use is problematic in other societies, for example in continental Europe (Jugert et al., 2022) and Australia (Priest et al., 2013). Therefore, 'culturally diverse students' and 'students of immigrant descent' are often used to indicate racial-ethnic minorities (OECD, 2019).

[3] One exception is the Everyday Discrimination Scale (EDS) by Williams et al. (1997), which was used in the NSL-A dataset (Jackson et al., 2004) without using follow-up questions asking why students felt discriminated. We included studies using the EDS because is still widely used for assessing self-reported experiences of racial-ethnic discrimination.

were met. Studies where the authors did not respond or could not provide the requested correlations were excluded (n = 45). Fourth, student well-being includes a holistic operationalization covering physical (e.g., physical activity, sports participation, somatization, health problems), psychological (e.g., depression, internalizing symptoms, anxiety, self-esteem, loneliness), and behavioral domains (e.g., delinquency, externalizing behaviors, risky sexual behavior, deviant peer affiliations). Fifth, the first search was limited to the past two decades (1999–March 2020) to ensure a more contemporary review of studies. The search was updated in March 2022. Sixth, we did not restrict our search to specific racial-ethnic groups or places of residence. Seventh, we included cross-sectional, longitudinal, and experimental designs. When a study included correlations at multiple waves, we selected correlations at Wave 1 data to ensure that the larger sample size was represented. Finally, studies were included if they were published (i.e., peer-reviewed journal articles and book chapters) or unpublished (i.e., theses, dissertations) and were written in English or German. We also included studies in German to increase the likelihood of synthetizing studies conducted outside the US. Where possible (i.e., Scopus, ERIC), we specified the language of publication (English or German).

Study Selection

The results of the literature searches are displayed in the PRISMA diagram (Figure 1). We identified a total of 5,260 references, and we removed duplicates in Zotero (2016) (n = 2,280). Two student research assistants screened all the remaining records independently (n = 2,980) by checking the titles and abstracts as possibly relevant. After each research assistant screened approximately 300 titles and abstracts each time, the first author met with the two research assistants and retrieved full texts, seemingly meeting our inclusion criteria (n = 153). To assess against inclusion criteria, full-text manuscripts were then independently assessed by the

two research assistants. After assessing all texts, the first author and research assistants met and discussed the final studies to be included. Conflicts were resolved through discussion or consultation with the second and third authors. A total of 85 studies were excluded with reason (see Figure 1 for detailed explanations). In total, 68 studies were included in the analyses.

Coding of Studies

In line with guideline recommendations proposed by Lipsey and Wilson (2001) and Cooper (2015), we developed a coding scheme to record study and sample characteristics (see Supplementary Material for the coding manual). The first author coded all studies included in the meta-analysis and a research assistant coded a subset of studies (k = 14). For study characteristics, intercoder reliability was calculated for sample size (ICC = 0.99), sample mean age (ICC = 0.47[4]), percentage of females (ICC = 1.00), and racial-ethnic group (k = 0.89). For the correlation coefficients, intercoder reliability was computed for well-being (ICC = 0.99) and academic outcomes (ICC = 0.81). Discrepancies in the coding extraction were discussed with the research team (research assistant, first and second author) and resolved through consensus before the analyses were conducted. The first and second authors then rechecked all the extracted data from all 68 studies. Any disagreement was resolved through discussion, or the coding manual was updated where necessary, with the third author.

Sample Characteristics

[4] We acknowledge the low interrater agreement for the variable age. One possible reason for the disagreements in the coding of the age variable may be attributed to the availability of two types of age-related information, which were often provided in the studies we reviewed. First, the age of the sample was reported for the whole study sample. Second, age was reported for different subgroups within the samples (e.g., African American vs Caribbean American). In such cases, we prioritized and coded the age information for the specific subgroups. These variations in reporting may have contributed to discrepancies in coding and subsequently affected the interrater agreement for the variable age.

We coded sample size, number and percentage of females in the sample, mean age, age groups (9–12, 13–15, older than 15 years old), school grade, type of school (kindergarten, primary, and secondary school), racial-ethnic school composition (equals the percentage of racial-ethnic minority students within schools; low: < 33%, medium: ≥ 33% & < 66%, high: ≥ 66%), and racial-ethnic group membership (African American, Latinx, and Native American~~s~~ students, and ethnic minorities in Europe). While we planned to code the socioeconomic status of participants under investigation, it was not possible to come up with comparable categories because operationalizations differed widely across studies (e.g., median household income, highest education level of one parent, percentage of students receiving reduced lunch price) or information was simply missing.

Study-Related Characteristics

We extracted information regarding author(s), year of publication, title, publication status (published vs. unpublished), study design (cross-sectional, longitudinal, and experimental), and data used (i.e., independent data collection or secondary analysis of preexisting data), and country in which the study was conducted (the US vs. other world regions).

Measurement Quality

We coded the quality of teacher-based racial-ethnic discrimination instruments, adapting the criteria that were used in previous meta-analyses for the rigorousness of assessment (Cheng et al., 2014; Holmbeck et al., 2008). Each study received a score from 1 (low quality) to 4 (high quality). A score of 4 was assigned to studies that used an instrument published by the same or different research team, provided information on reliability, and reported the full list of items. A score of 3 was assigned to studies that used an instrument published by the same or different research team and provided information on reliability but did not report the full list of items. A

score of 2 was assigned to studies that used a self-devised scale and provided information on reliability and validity, as well as reported the full list of items. A score of 1 was assigned to studies that used a self-devised scale and provided information on reliability (e.g., Cronbach's alphas) but did not report strong validation evidence (e.g., factor analysis) or the full list of items.

Reliability of Measures and Number of Items

We coded the name of the scale, the reliability of the instrument (> .80 or < .80), and the number of items (1 = up to two items, and 2 = more than two items). Previous research has shown (Benner et al., 2022) that fewer items (one or two items) might not capture the underlying construct of racial-ethnic discrimination as effectively as more comprehensive instruments. We, therefore, chose, in line with Benner et al. (2022), up to 2 items vs. more than two items as categories. For reliability, we chose .80 as a cut-off value as it is discussed to indicate good reliability for most basic research (Nunally, 1978).

Dependent Variables

We subdivided well-being components into three domains, following prior meta-analyses (Benner et al., 2018; Schmitt et al., 2014) and checking the operationalization and measurements of a construct: psychological (e.g., self-esteem, depressive symptoms), behavioral (e.g., delinquent behavior), and physical (e.g., somatic symptoms). For substance use, we coded the use of drugs and alcohol (e.g., smoking marijuana, alcohol use). We subdivided academic outcomes into three domains: GPA and test scores (e.g., grades both self-reported or standardized), school motivation (e.g., academic self-efficacy, academic self-concept), and school belonging, commonly defined as emotional connection with peers and teachers, or feelings toward their school (Allen et al., 2018). By comparing the magnitude of these different academic domains, it can be investigated which type of construct is most harmed when

perceiving TBRED. Both school motivation and a sense of school belonging have been found to contribute to academic success among primary and secondary school students. A recent meta-analysis (Lavrijsen et al., 2022) found small to moderate positive correlations between school belonging and academic achievement and favorable motivational outcomes such as school engagement and self-efficacy. Thus, although these are fairly distinct constructs, there is sufficient empirical evidence to include GPA and test scores, school motivation, and school belonging into one single broad category, and to investigate how they are uniquely related to perceiving TBRED.

Transparency and Openness

All data, analysis code, and research materials are available at https://osf.io/pez76/?view_only=367444d8ecdf44a69b496e4356e667b6. All statistical analyses were performed in R, version 4.1.2 (R Core Team, 2021) using the *metafor* package (version 3.8-1; Viechtbauer, 2010). To enhance the transparency and reproducibility of our work (Pigott & Polanin, 2020), we preregistered the protocol of this meta-analysis through PROSPERO in February 2020 (CRD42020140064).

Deviations from the Preregistered Protocol

The main deviation from the preregistration protocol refers to the analysis. We initially aimed to conduct random effects models (Borenstein et al., 2010) and a shifting-units-of-analysis approach to deal with multiple effect sizes within studies (Patall et al., 2008). However, due to the multilevel structure of the current data (effect sizes nested in datasets), we used a three-level random effects model with cluster-robust variance estimation (Assink & Wibbelink, 2016; Van den Noortgate et al., 2015), using the metafor::rma.mv() function (Viechtbauer, 2010). This approach is described in full in the statistical analysis plan.

Initially, we intended to include substance use in well-being. However, we kept it separate to reduce heterogeneity across the included studies. Finally, we aimed to include a range of moderators exploring the nature of discrimination (e.g., open vs. subtle discriminatory behaviors, exposure timeframe). However, the included studies that differentiated between open vs. subtle forms of TBRED or reported a timeframe of discrimination experiences were either too few (i.e., none assessed subtle forms of discrimination specifically) or formulated the questions with the same exposure (i.e., last 12 months). As a result, only some of the moderators defined a priori could be tested.

Data Analysis

Pearson's product-moment correlation coefficient *r*-index was chosen as the effect size. The *r*-index is the most appropriate metric for expressing an effect size when the focus of interest is describing the relationship between two continuous variables (H. Cooper, 2015). Pearson's correlation coefficients underwent a Fisher's *z*-transformation and were back-transformed to Pearson's *r*-index when reporting the overall effect sizes for each indicator (Lipsey & Wilson, 2001). To interpret the magnitude of the effect sizes, we followed empirical distributions derived from previous meta-analyses on prejudice and interpersonal relations (Lovakov & Agadullina, 2021, i.e., small effect size: $r = 0.12$; medium effect size: $r = 0.24$; large effect size: $r = 0.41$).

In a number of studies ($n = 25$; see results section), the consequences of teacher-based discrimination were examined using the same dataset but with different outcomes (e.g., multiple studies reported results from the dataset created as part of the Maryland Adolescent Development in Context Study (MADICS)). Furthermore, several studies contributed multiple effect sizes for the associations of TBRED with well-being, and the associations between TBRED and academic outcomes (e.g., when a study provided separate effect sizes for loneliness

and GPA). Thus, to account for the statistical dependency of effect sizes in the data and preserve all relevant information from each study, we conducted three-level random effects models (Assink & Wibbelink, 2016; Van den Noortgate et al., 2015). The use of a three-level random effects model provides three variance levels, i.e., within sampling variance of the extracted effect sizes (I^2_1); variance between effect sizes extracted from the same dataset (I^2_2); and variance between datasets (I^2_3). We used restricted maximum likelihood estimation (REML) to estimate the heterogeneity variance in the models (Langan et al., 2019).

For well-being, substance use, and academic outcomes, we first calculated their overall correlational association with TBRED. Second, we estimated within-dataset (level 2) and between-dataset (level 3) heterogeneity by conducting a log-likelihood-ratio test (Q_E). Third, we estimated and compared the model fit indices (Akaike information criteria [AIC] and Bayesian information criterion [BIC]) of the original model with a two-level model without the within-dataset level and a two-level model without the between-dataset level, and calculated the log-likelihood-ratio tests. If the model fit indices of the original model were superior to those of the two-level models and the log-likelihood-ratio tests were significant, we performed moderator analyses.

We first conducted univariate meta-regression models to assess the associations of each moderator. When possible, moderators were tested both as continuous and categorical variables. This procedure allows checking the robustness of moderators because cut-offs for categorical variable (e.g., age groups or the number of items) are often arbitrary. Thus, showing that moderation effects are present for both categorical and continuous versions of the same variable gives more confidence in the results. Dummy variables were created for categorical moderators (see Tables 3, 4, and 5). Follow-up contrasts were examined to assess differences in correlations

between categories. We also tested in a multivariate model all moderators that were previously identified as significant moderators in the univariate analyses to determine the robustness of multiple interrelated moderators and ruled out multicollinearity issues (Hox, 2010).

Publication Bias and Sensitivity Analyses

In addition to comparing separate effect size estimates for published and unpublished studies, we performed Egger's regression test with inverse sample size as a predictor to quantify funnel plot asymmetry, which may be an indication of publication bias (Egger et al., 1997). To detect outliers and influential effect sizes, we examined hat values and Cook's distances, and defined outliers with the following characteristics: hat values twice as large as the hat value mean; and Cook's distance larger than the 50th percentile of a chi-square distribution with one degree of freedom, i.e., 0.45 (Viechtbauer & Cheung, 2010). If outliers or overly influential effect sizes were identified, we refitted the overall models after deleting these cases.

Results

Sample Characteristics

Table 1 shows an overview of the characteristics of the studies included in the meta-analysis. From our $k = 68$ included studies, 56 were peer-reviewed journal articles, 1 was a book chapter, 9 were dissertations, and 2 were master theses. The majority of the studies were conducted in the United States ($k = 50$), but samples from Australia ($k = 2$), Austria ($k = 1$), Belgium ($k = 3$), Canada ($k = 2$), China ($k = 1$), Finland ($k = 1$), Germany ($k = 3$), the Netherlands ($k = 2$), Israel ($k = 2$) and a multinational sample ($k = 1$) were also included. Of these 68 studies, 43 included unique, nonoverlapping samples. The remaining 25 studies used data collected from the Maryland Adolescent Development in Context Study (MADICS; Eccles, 1997) ($n = 12$), the National Survey of American Life Adolescents Supplement (NSAL-A;

Jackson et al., 2004) (n = 5), or other data collected by the same research teams (Brown & Chu, 2012; Brown & Tam, 2019; D'Hondt et al., 2016; D'Hondt et al., 2017; McDermott et al., 2019; Zeiders et al., 2012; Walsh et al., 2018a; Walsh et al., 2018b). With regard to the study design, the majority were cross-sectional (k = 48), and followed by longitudinal studies (k = 20). None of the included studies reported an experimental study.

Our total sample includes between 23,885 and 29,696[5] students (ranging from 74 to 2041 students, 55% girls, M_{age} = 13.7, SD = 2.0,) from 11 different racial-ethnic groups, with African American students being the most studied (48.0%). School grades ranged from the 4th to the 12th school year. The majority of studies (62.7%) did not report racial-ethnic school composition. From those that did, four studies were conducted within schools with low racial-ethnic school composition (< 33% ethnic minority students), eleven within schools with medium racial-ethnic school composition and ten schools had a high racial-ethnic school composition (> 66% ethnic minority students).

The studies included in this meta-analysis used a variety of instruments to assess TBRED, with some reporting well-established scales (k = 61, 89.7%) and others using self-devised instruments with weak or no validation data (k = 7, 10.3%). Among the studies that used well-established scales, an adaptation or the original five-item scale by Eccles and colleagues (1997) was the most common (38.2%), followed by the Educational Discrimination Distress Subscale contained in the Adolescent Discrimination Distress Index (ADDI; Fischer et al., 2000) (11.8%), and the Everyday Discrimination Scale (Williams et al.,1997) (7.4%). The number of items ranged from 1 to 8 items (M = 3.8, SD = 1.7). In five studies, only one item was used to

[5] As samples partially overlap, the range goes from a conservative estimation, including only the biggest sample size per dataset per race or ethnicity, to a liberal estimation, including all different sample sizes per dataset.

measure TBRED. The scales' reliability (all calculated with Cronbach's alpha) ranged from 0.67 to 0.95 (M = 0.82, SD = 0.08).

Overall Associations

An overview of the overall effect size estimates is presented in Table 2. Figures SM1 to SM3 in the supplementary material on OSF contain forest plots that display the magnitude of the effect size contained in each dataset for well-being, substance use, and academic outcomes.

Overall Associations between Teacher-Based Racial-Ethnic Discrimination and Well-being

Concerning well-being, we found a small negative correlation across all three domains (r = -0.15), and the overall effect size was significant, $N_{dataset}$ = 29, k = 103, SE = 0.02, t = - 9.84, 95% [CI: -0.18, -0.12] p <.001. The test of heterogeneity among effects was also significant, $Q_E(106)$ = 672.11, p <.001. The model fit of the three-level model was superior to that of the two-level model either without the within-dataset level ($AIC_{three\text{-}level}$ = -148.34 vs. $AIC_{two\text{-}level}$ = 1.29; $BIC_{three\text{-}level}$ = -140.47 vs. $BIC_{two\text{-}level}$ = 6.54; likelihood ratio test [LRT = 151.64], p <.001) or without the between-dataset level ($AIC_{three\text{-}level}$ = -148.34 vs. $AIC_{two\text{-}level}$ = -144.37; $BIC_{three\text{-}level}$ = -140.47 vs. $BIC_{two\text{-}level}$ = -139.12; likelihood ratio test [LRT = 5.97], p = .014). This implies that there is more variability in effect sizes than may be expected based on sampling variance alone, justifying moderator analyses. The distribution of variance across the three levels was: 17.8% (sampling variance), 60.0% (within-dataset variance), and 22.2% (between dataset-variance).

Within all dimensions of well-being, we found significant negative overall associations with psychological (r = -0.16, 95% [CI: -0.20, -0.13], p <.001), behavioral (r = -0.15, 95% [CI: -0.27, -0.03], p <.05), and physical well-being (r = -0.26, 95% [-0.38, -0.15], p <.05). The results

for both behavioral and physical well-being should be treated with caution, as the number of effect sizes was limited, k = 13 and k = 3, respectively.

Overall Associations between Teacher-Based Racial-Ethnic Discrimination and Substance Use

There was a positive and significant small association between TBRED and substance use, r = 0.13, $N_{dataset}$ = 6, k = 18, SE = 0.03, t = 3.81, 95% [CI: 0.06, 0.20] p <.01, with variation at the different levels, $Q_E(17)$ = 30.38, p =.024. The model fit of the three-level model was not superior to the two-level model either without the within-dataset level ($AIC_{three\text{-}level}$ = -37.76 vs. $AIC_{two\text{-}level}$ = -39.70; $BIC_{three\text{-}level}$ = -35.25 vs. $BIC_{two\text{-}level}$ = -38.04; likelihood ratio test [LRT = 0.05], p = ns), but constraining the variance between datasets to zero resulted in worse model fits ($AIC_{three\text{-}level}$ = -37.76 vs. $AIC_{two\text{-}level}$ = -35.14; $BIC_{three\text{-}level}$ = -35.25 vs. $BIC_{two\text{-}level}$ = -33.48; likelihood ratio test [LRT = 4.61], p <.05), suggesting the need for moderator analysis. The distribution of variance across the three levels was 32 % (sampling variance), 2.3% (within-dataset variance), and 65.7% (between dataset-variance).

Overall Associations between Teacher-Based Racial-Ethnic Discrimination and Academic Outcomes

We found a small negative association (r = -0.16) between TBRED and academic outcomes. The overall effect size was significant, $N_{dataset}$ = 35, k = 138, SE = 0.02, t = -8.73, 95% [CI: -0.20, -0.13] p <.001, with substantial heterogeneity, $Q_E(137)$ = 953.98, p <.001. Constraining the within-dataset variance ($AIC_{three\text{-}level}$ = -157.79 vs. $AIC_{two\text{-}level}$ = -130.29; $BIC_{three\text{-}level}$ = -149.03 vs. $BIC_{two\text{-}level}$ = 136.13; likelihood ratio test [LRT = 290.08], p <.001) as well as the between-dataset variance to zero ($AIC_{three\text{-}level}$ = -157.79 vs. $AIC_{two\text{-}level}$ = -141.10; $BIC_{three\text{-}level}$ = -149.03 vs. $BIC_{two\text{-}level}$ = -135.26; likelihood ratio test [LRT = 18.69], p <. 001) resulted in deteriorated model fits, suggesting that moderation analysis is warranted. The

distribution of variance across the three levels was 11.8% (sampling variance), 55.3% (within-dataset variance), and 32.9% (between-dataset variance).

With regard to the separate dimensions of academic outcomes, small negative correlations were found between TBRED and GPA and test scores (r = -0.11, 95% [CI: -0.16, -0.07], p <.001), and between TBRED and school motivation (r = -0.17, 95% [CI: -0.22, -0.12], p <.001). Finally, a moderate negative correlation between TBRED and school belonging was found (r = -0.26, 95% [CI: -0.32, -0.20], p <.001).

Moderator Analyses

Tables 3, 4 and 5 show the results regarding whether sample (age, racial-ethnic group, racial-ethnic school-composition) and study-related characteristics (number of items of the TBRED scale, instrument reliability, quality of the instrument, and publication status) explained the variability in the associations between TBRED and well-being, substance use, and academic outcomes. Tables SM2 to SM6 in the online supplementary materials summarize the results for psychological and behavioral well-being, and the separate dimensions of academic outcomes (GPA and test scores, school motivation, and school belonging). Moderation analyses were not performed with meta-regressions correlating TBRED with physical well-being, given the small number of datasets ($N_{dataset}$ = 3) contributing to these effect sizes.

For well-being using univariate moderator analysis, the results of the omnibus test suggest that racial-ethnic group was a significant moderator $F(3, 62) = 3.39$, $p < .05$, indicating that African American students were more negatively affected by TBRED compared to Latinx, Native American students, and ethnic minority students in Europe. With respect to study characteristics, the number of items used to assess TBRED was a significant moderator $F(1, 101) = 10.90$, p =.001. The strength of the overall association increases when studies have used more

than two items to examine perceived TBRED. Similarly, when we tested number of items as a continuous moderator, the results of the omnibus test was significant $F(1, 101) = 15.45$, $p < .001$) and the regression coefficient negative (-0.03), implying that the greater the number of items was used, the higher the reported associations. Significant moderators were included in multivariate moderator analysis to assess unique effects on the overall association between TBRED and well-being. No significant moderating effects were detected in the multivariate analyses. When testing moderation effects for the separate dimensions of well-being, racial-ethnic group and number of items (categorical and continuous) exhibited similar moderation effects for psychological well-being and behavioral well-being.

For substance use using univariate moderator analysis, we found that age group had a significant moderating effect $F(2, 13) = 4.31$, $p < .05$, such that 13-15 old students showed stronger positive associations than 9-12 years old but not significant association among students aged above 15. When mean age was entered as a continuous variable, we also found a moderation effect, $F(1, 14) = 7.64$, $p < .05$, suggesting a linear negative age trend, such that with increasing age the association of perceived TBRED with substance use is reduced. By trend, racial-ethnic group had a moderation effect $F(2, 9) = 4.19$, $p = .052$, such that substance use and TBRED were associated more strongly for African American students than for Latinx and Native American students. Significant moderators were included in multiple moderator analyses to assess unique effects on the association between TBRED and substance use. No significant multivariate moderating effects were observed.

For academic outcomes using univariate moderator analysis, the results were only moderated by racial-ethnic school composition $F(2, 60) = 3.425$, $p = .039$. Follow-up contrasts indicated a stronger correlation between TBRED and academic outcomes in schools with a lower

(vs. higher) percentage of racial-ethnic minority students. None of the study characteristics we tested in the moderator analysis were significant. When testing moderating effects for the separate dimensions of academic outcomes, the association between perceived TBRED and GPA and test scores was stronger with more reliable measures (> .80). The association between perceived TBRED and school belonging was stronger for ethnic minorities in Europe than for African American and Latinx students. No significant moderating effects for school motivation were observed.

Publication Bias and Sensitivity Analyses

The Egger's regression test with inverse sample size as a predictor was not significant for well-being (z = 0.118, p = .906), or for academic outcomes (z = -0.324, p = .746), suggesting that there was no evidence of publication bias. However, Egger's regression test for substance use was significant (z = -3.419, p <.001), indicating that the datasets do exhibit evidence of bias, which may be due to publication bias (see Figures SM7 to SM9 in the online supplementary materials). Cook's distances and hat values revealed outliers or overly influential studies that exceeded the standard thresholds in the literature (one effect size for well-being and five for academic outcomes; see Figures SM7 to SM12 in the online supplementary materials). Refitting the multilevel random effects models after removal of these influential effect sizes did not change the results to a substantial degree, that is, that TBRED is negatively correlated with well-being (r = -0.15, 95% [CI: -0.18, -0.12], p <.001), and academic outcomes (r = -0.17, 95% [CI: -0.21, -0.13], p < .001).

We conducted two additional sensitivity analyses. First, to examine whether studies that used the Everyday Discrimination Scale by Williams et al. (1997) produced different results, we performed our analyses, excluding those five studies. Neither the direction nor the significance

of our results changed after excluding those studies (well-being, r = -0.15, 95% [CI: -0.18, -0.12], p <.001; substance use, r = 0.13, 95% [CI: 0.06, 0.20], p <.01; and academic outcomes (r = -0.16, 95% [CI: -0.20, -0.12], p < .001). Second, we coded 14 additional studies that assessed racial-ethnic discrimination by adults in school and compared the effect sizes for well-being and academic outcomes with TBRED (Bennett et al., 2020; Cavanaugh et al., 2018; Espinoza et al., 2021; Felkey & Graham, 2022; Ghavami et al., 2020; Gonzales et al., 2014; Kiang et al., 2020; Lee et al., 2018; Martinez-Fuentes et al., 2021; Montoro et al., 2021; Sangalang & Gee, 2015; Stein et al., 2016; Tummala-Narra & Claudius, 2013; Umaña-Taylor et al., 2015). The moderation analysis showed that the effect of perceived school-adult discrimination resulted was stronger for well-being (r = -0.23, 95% [CI: -0.29, -0.17], p <.001) and psychological well-being (r = -0.22, 95% [CI: -0.28, -0.16], p <.001) compared to perceived TBRED. No moderation effects were found for substance use, academic outcomes and related subdimensions.

Discussion

This systematic review and meta-analysis, including 68 studies and 259 effect sizes, examined the relationships between both perceived TBRED and well-being, substance use, and academic outcomes. Given that racial-ethnic minority students may experience unfair treatment in safe spaces such as schools (Seaton et al., 2018), we approached a pressing topic of how these negative encounters may be associated with a variety of negative outcomes. Our results indicate small to moderate associations between perceived TBRED and well-being, substance use, and academic outcomes. Differing from prior work (Benner et al., 2018, 2022), effect sizes were similar for well-being, substance use, and academic outcomes, although associations for well-being and academic outcomes differed across subdimensions.

For well-being, associations were moderate for physical well-being, whereas they were small for psychological and behavioral well-being. Whether this represents a true difference in effect size is difficult to judge because confidence intervals were larger for behavioral and physical well-being compared to psychological well-being due to a limited number of effect sizes for the first two dimensions. Nevertheless, while findings for behavioral and physical well-being need to be treated with caution, the results do not support previous findings that perceived TBRED only affects the academic domain (Benner & Graham, 2013) and instead show that perceived TBRED is detrimental for nonacademic outcomes such as psychological well-being and substance use, even though associations were mostly small. While peer-based discrimination may have stronger associations with well-being than teacher-based discrimination (Benner et al., 2022), we consider it an important finding that discrimination by teachers is harmful to students' well-being. This finding is consistent with the integrative model of minority child development (Garcia-Coll et al., 1996) and more general risk-and-resilience models (Suárez-Orozco et al., 2018) as well as biosocial models of stress (Pascoe & Richman, 2009). All of these models suggest that supportive relationships with teachers are important for mastering universal developmental tasks around psychological adjustment. Discriminating against students is quite the opposite of being supportive and may explain why perceived TBRED also affects well-being and risky health behaviors such as substance use, and not solely academic outcomes.

For academic outcomes, relationships differed across subdimensions with small associations for GPA and school motivation and moderate associations for school belonging. Findings are largely in line with stage-environment-fit theory (Eccles et al., 1993) and self-determination theory (Ryan & Deci, 2000), as well as more specific models on the relationship between racial-ethnic discrimination and academic engagement from a social identity perspective

(Verkuyten et al., 2019). The latter model suggests that racial-ethnic discrimination leads to school disengagement and, thereby, to lower academic achievement by threatening social identity needs of control, esteem, and belonging. The moderate associations for school belonging may suggest that it is a more proximate outcome than school motivation and GPA, which is in line with the social identity threat perspective.

Moderators

The second aim of this systematic review and meta-analysis was to identify potential moderators related to sample and study characteristics. Overall, there was substantial heterogeneity in effect size estimates for well-being, substance use, and academic outcomes. Moderation analyses showed variation in the relations between perceived TBRED and outcomes across age, racial-ethnic group, racial-ethnic school composition, the number of items used to assess perceived TBRED, and reliability of these scales. The associations between perceived TBRED and substance use were strongest among 13-15 years old (vs. younger) students and for African American vs. Latinx or Native American students. Importantly, the high level of heterogeneity between datasets and the distribution of effect sizes among uneven subgroups could have led to low power of moderator analyses and increased the probability of Type II error.

The protective function of racial-ethnic school composition occurred for academic outcomes. This finding is in line with other evidence on the protective role of the presence of racial-ethnic minority peers for the social-emotional outcomes of minority students. One potential explanation is that in racially and ethnically more diverse schools, there is a greater balance of power between racial-ethnic groups (Graham, 2018), and more support from racial-ethnic minority peers is available. While perceiving TBRED may still occur in more diverse

schools, it may be less detrimental than in schools where ethnic minority students are a numerical minority, especially in a constellation where the teacher and most fellow classmates are from the racial-ethnic majority. When interpreting this finding, it is critical to consider that the racial-ethnic school composition was only available for a limited subset of studies.

Age and racial-ethnic groups moderated the association between perceived TBRED and substance use, while racial-ethnic groups also moderated the association with well-being. These findings must be treated with caution because they are based on a limited number of effect sizes and unique datasets. Substantially, these moderator findings may be driven by age differences in substance use and relative group size. Adolescents start experimenting with substance use around the age of 13 to 14 while more widespread use is seen among late adolescents (e.g., Johnston et al., 2013). While it could be that perceived TBRED increases the odds that middle adolescents start with substance use an alternative and perhaps more likely explanation is that the majority of adolescents in the included studies were around 14 years of age. The findings that the association between perceived TBRED and substance use and well-being were stronger among African American compared to Latinx and Native American students may be explained by the fact that African Americans were by far the largest group of students, representing more than one-third of students included in this meta-analysis.

The number of items also moderated effect sizes, such that a higher number of items used to assess perceived TBRED was associated with larger effect sizes. It is known that a higher number of items is associated with the reliability of the instrument and thus affects the precision of estimates (Appelbaum et al., 2018). This suggests that instruments with a greater number of items reflect the associations of TBRED more accurately and that the common use of a relatively low number of items in the literature is problematic because it may lead to reduced estimates of

the association of perceived TBRED with other outcome variables. Our findings are in line with other meta-analyses focusing on the consequences of perceived discrimination (Kathawalla & Syed, 2021; Paradies et al., 2015). For instance, Benner et al. (2022) found that measures with more items were associated with stronger effect sizes for other indicators of well-being but not for academic outcomes. However, their meta-analysis did not examine moderator effects of perceived TBRED specifically.

In the sensitivity analyses, we found that the association with well-being and psychological well-being was greater for discrimination by school adults than for perceived TBRED. One explanation could be that by lumping together all adults that students might encounter at school, the range of potential discriminatory situations increases (i.e., students could be discriminated against not only by teachers but also by other school staff, such as counselors, administrative and security personnel). However, a major criticism of previous research on perceived discrimination is that many measures include a host of different potential perpetrators of discrimination (Benner et al., 2018, 2022; Verkuyten et al, 2019), making it difficult to discern the impact of any particular source. Future research should aim to disentangle the unique contributions of different perpetrators more explicitly, which could involve developing more refined measures that specifically target different sources of discrimination. Doing so would contribute to a broader understanding of the complexity of discrimination experiences and inform targeted interventions and policies aimed at reducing discrimination and promoting inclusive school environments.

Implications for Teacher Professional Development and Intervention in School

These results point to the importance of teacher training and professional development in preparing future teachers to avoid acting in discriminatory ways toward their students. Numerous

pedagogical approaches from the last decades (e.g., culturally responsive teaching, Gay, 2000; culturally responsive pedagogy, Ladson-Billings, 1995; culturally sustaining pedagogy, Paris, 2012) have offered foundations for encouraging teachers to acquire more knowledge about issues fundamental to social justice in society and educational equity, to become more conscious of themselves as racial, ethnic, and cultural beings and actors in the process of teaching, and to engage in conversations around racism, prejudice, and discrimination. It should not be assumed that moving toward culturally responsive teaching will emerge naturally from the professional ethics of teachers (Gay, 2000). Currently, educational policymakers and teacher educators do too little to prepare their students to deal with culturally and ethnically diverse classrooms (Civitillo & Juang, 2020).

One additional implication of our findings is to train a more diverse educator workforce. One potential effect of co-racial or co-ethnic teachers is to lessen the power differential within schools and increase responsiveness to racism and discrimination (Haddix, 2017). In fact, research from the USA indicates that students who had same-race teachers reported feeling more cared for, had better student-teacher communication, had better teacher guidance, and also scored higher in reading and math (Redding, 2019). Fewer suspensions and more Latinx and Black students enrolled in gifted programs in school districts with higher percentages of racial-ethnic minority teachers (Nicholson-Crotty et al., 2016). Finally, when the proportion of the racial-ethnic teacher workforce is similar to the student body there are fewer dropouts and more high school graduates (Pitts, 2007).

Besides devoting efforts to promote greater representation and retention of teachers from different racial-ethnic backgrounds in school, identity-value approaches involving both teachers and students are also needed. For example, the Identity Project intervention developed by

Umaña-Taylor and Douglass (2017) and implemented in schools in six countries with a history of racial-ethnic tensions (Germany, Greece, Norway, Sweden, Italy, and the United States; Juang et al., 2022) provides one such promising avenue. This intervention aims to promote adolescents' ERI exploration and commitment and tries to raise critical consciousness among youth. ERI exploration and commitment are associated with a host of positive outcomes for racial-ethnic minority adolescents (Umaña-Taylor et al., 2014) and may be a protective factor against the detrimental impact of racial-ethnic discrimination (Yip et al., 2019).

Limitations and Future Directions

First, although the number of studies and effect sizes included in our work is substantial, the associations meta-analyzed in this study were correlational, and thus, no causal inference can be drawn. Future analyses should examine longitudinal associations, restricting the investigation to studies in which data were collected across multiple measurements and controlled for baseline levels of perceived TBRED. In addition, it is important to highlight that it was not possible to include a larger number of studies and effect sizes because separate correlations (i.e., distinguishing between different perpetrators) were often not provided. Thus, we encourage researchers, when possible, to report correlations separately for different perpetrators of discrimination. Doing so would allow future meta-analyses to quantify associations with a larger number of associations.

Second, ideally, we would have liked to compare the associations of discrimination across different sources (peers vs. teachers). However, this was not feasible because it would have led to a substantial reduction in the number of primary studies that we could have considered and would have resulted in a reduction of power. While there were studies that

included both estimates of peer and teacher discrimination, we also located a number of studies that focused exclusively on perceived TBRED.

Third, the generalizability of the results is limited. Although we aimed to include studies on K-12 students, in our final set of reviewed studies the age group ranged from 9 to 17.5 years old, and thus our meta-analysis focused mainly on students in different stages of adolescence. While we included studies from 9 countries and four continents and extended the search to different languages (i.e., German), the vast majority of the empirical evidence being reviewed was derived from studies conducted in the USA. This is worrisome because racial-ethnic discrimination is not solely a U.S. issue. In times of rising international migration and globalization, we call for investigating the potential negative consequences of perceived TBRED in other racially and ethnically diverse continents and countries.

Fourth, similar to previous meta-syntheses on the negative consequences of discrimination (e.g., Benner et al., 2018), all measures included in our work were based almost exclusively on self-report for both TBRED and the different outcomes. This points to shared variance, a common method bias in behavioral research (Podsakoff et al., 2003), which is not solely an issue in the discrimination literature. One possibility for partially overcoming this limitation could be to include markers of psychobiological functioning, such as sleep quality (Yip et al., 2020), and physiological stress responses, such as cortisol (Adam et al., 2015). However, including indicators of physiological markers of health is complex due to very different indicators being used and the limited number of studies that have used such indicators.

Fifth, while our study sheds light on the consequences of TBRED on student well-being and academic outcomes, we acknowledge that our analysis is limited to the inclusion of only one school-based moderator, namely, racial-ethnic composition. Although this characteristic has also

been shown to play an important role in shaping student experiences in our analyses, we recognize that other school and teacher characteristics (e.g., school size, distribution of low-income or receiving free/reduced-price lunch students, grade levels served, central city/suburban/rural location, percentage racial-ethnic minority teachers) could play a role. Due to the limited information available in the reviewed studies, we were unable to include these additional moderators. Therefore, we suggest that future research should examine the role of these other school and teacher characteristics to better understand the complex interplay between school context, TBRED, and student outcomes.

Finally, a more general problem of the racial-ethnic discrimination literature is its overwhelming use of retrospective measures that ask about experiences of racial-ethnic discrimination in the past 12 months. It is well known that retrospective measures suffer from recall bias and that responses on these measures are severely left-skewed, possibly reflecting underreporting of experiences of discrimination (Goosby et al., 2018). However, despite calls for more research that examines racial-ethnic discrimination as it occurs in the lives of children and adolescents in their daily lives (Ong & Burrow, 2017), the number of studies that have ventured beyond classic surveys and employed experience sampling methods is still quite limited (Civitillo & Jugert, 2023).

Conclusion

In sum, this systematic review and meta-analysis focused on perceived TBRED and extends previous findings on the detrimental consequences of racial-ethnic discrimination for children's and adolescents' well-being and academic outcomes. Differing from prior work, effect sizes were comparable in size for well-being and for academic outcomes and substance use, although relationships differed for well-being and academic outcomes depending on

subdimensions. There was evidence of variation of associations by sample characteristics (i.e., racial-ethnic school composition) and by study characteristics (i.e., number of items used to assess discrimination). We hope that this work can help generate anti-racist knowledge to improve the school experiences of a substantial portion of our students.

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*References marked with an asterisk indicate studies included in the meta-analysis.

†References marked with a dagger indicate studies included in the sensitivity analyses.

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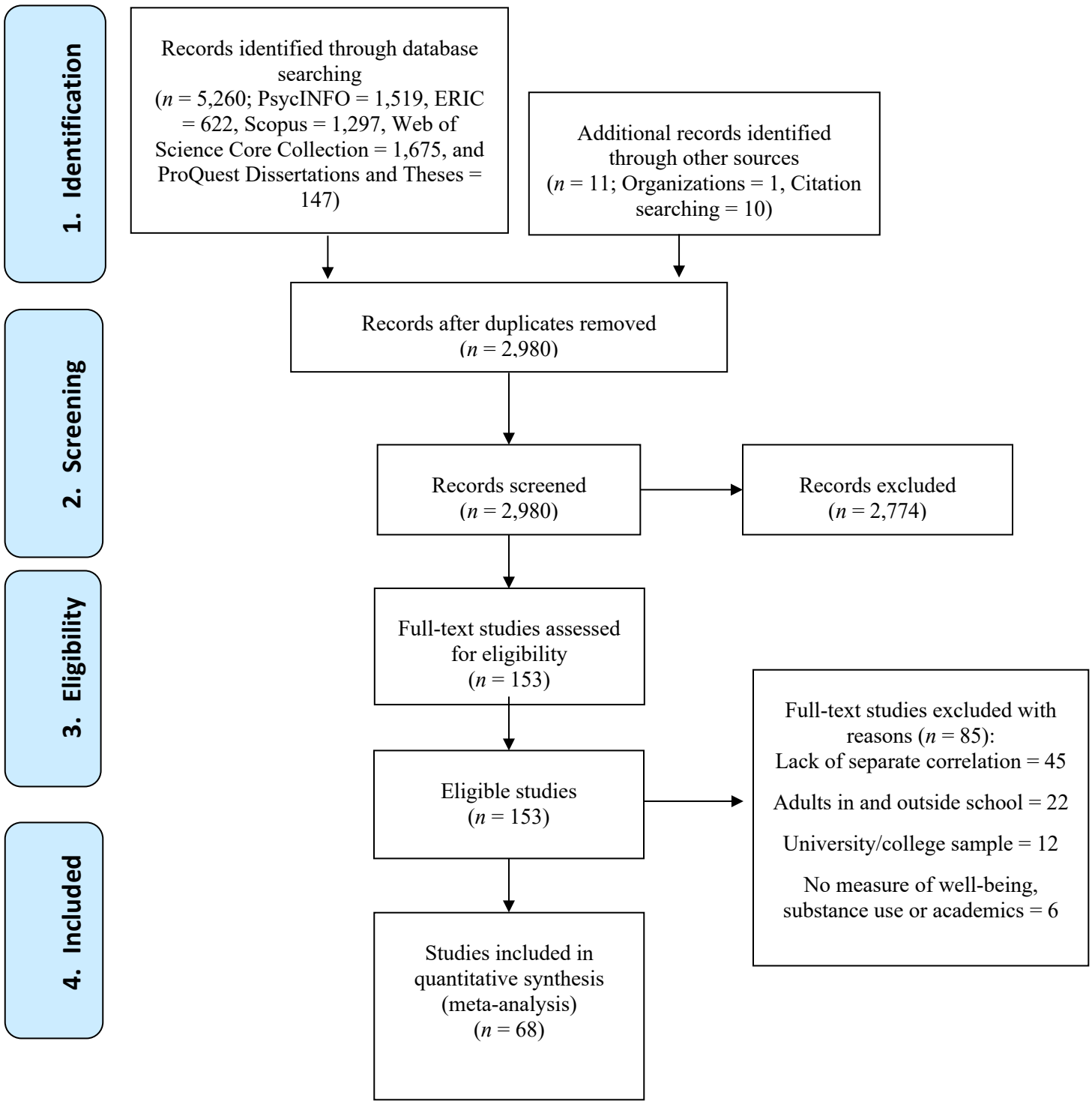

Figure 1. PRISMA flow diagram.

Table 1

Characteristics of Studies included

Author(s) and year of publication	Country	Study design	Dataset	*N* participants	% girls	School grade	*M* Age (years)	Racial-ethnic group	*N* items	Outcomes
Abel (2013)	USA	Cross-sectional	Independent	79	n/a	12th	17.5	African American	4	GPA & Test Scores
Allen et al. (2022)	USA	Longitudinal	MADICS (Eccles, 1997)	525	48.8	11th	16.4	African American	4	School Motivation
Bakhtiari et al. (2020)	USA	Longitudinal	Independent	121	54	9th	15.6	Latinx	3	Psychological Well-being, School Belonging, Substance Use
Banerjee et al. (2018)	USA	Cross-sectional	Independent	74	50	6th to 8th	12.5	African American	5	School Motivation
Behnke et al. (2011)	USA	Cross-sectional	Independent	383	53	9th	14.6	Latinx	2	Psychological Well-being
Benner & Wang (2017)	USA	Cross-sectional	Independent	252	50	8th	13.6	African American, Latinx	2	Psychological Well-being, School Belonging, School Motivation

Table 1 (continued)

Author(s) and year of publication	Country	Study design	Dataset	*N* participants	% girls	School grade	*M* Age (years)	Racial-ethnic group	*N* items	Outcomes
Benner et al. (2013)	USA	Longitudinal	Independent	531	n/a	11th	16.9	African American, Latinx, Asian American	3	GPA & Test Scores, Psychological Well-being, School Motivation
Brenick et al. (2018)	Germany	Cross-sectional	Independent	327	49	6th	11.6	Turkish-German	5	Behavioral Well-being, Psychological Well-being
Bodkin-Andrews et al. (2013)	Australia	Cross-sectional	Independent	290	n/a	7th to 10th	13.6	Indigenous Australian	5	GPA & Test Scores, School Motivation
Brown & Chu (2012)	USA	Cross-sectional	Brown & Cho (2012)	204	49	3rd to 4th	9	Latinx	5	GPA & Test Scores, School Belonging, School Motivation

Table 1 (continued)

Author(s) and year of publication	Country	Study design	Dataset	*N* participants	% girls	School grade	*M* Age (years)	Racial-ethnic group	*N* items	Outcomes
Brown & Tam (2019)	USA	Longitudinal	Brown & Cho (2012)	156	n/a	4rd to 5th	10	Latinx	5	School Belonging, School Motivation
Bryan et al. (2018)	USA	Cross-sectional	NSAL-A (Jackson et al., 2004)	1122	53.8	n/a	15	African American, Caribbean Black	3	GPA & Test Scores, School Belonging
Buckle (2017)	USA	Cross-sectional	Independent	987	51.6	9th to 10th	15.6	Latinx, Asian American, African American, Middle Eastern, Pacific Islander	4	Physical Well-being, Psychological Well-being, School Motivation
Butler-Barnes & Inniss-Thompson (2020)	USA	Cross-sectional	NSAL-A (Jackson et al., 2004)	603	100	n/a	15	African American, Caribbean Black	3	School Belonging, School Motivation
Butler-Barnes et al. (2018)	USA	Cross-sectional	NSAL-A (Jackson et al., 2004)	1170	51.5	n/a	15	African American, Caribbean Black	3	School Belonging

Table 1 (continued)

Author(s) and year of publication	Country	Study design	Dataset	*N* participants	% girls	School grade	*M* Age (years)	Racial-ethnic group	*N* items	Outcomes
Butler-Barnes et al. (2022)	USA	Cross-sectional	MADICS (Eccles, 1997)	232	100	n/a	16.9	African American	3	Psychological Well-being
Byrd & Chavous (2011)	USA	Cross-sectional	MADICS (Eccles, 1997)	359	47	11th	16.5	African American	5	GPA & Test Scores, School Motivation
Chavous et al. (2008)	USA	Longitudinal	MADICS (Eccles, 1997)	410	n/a	8th to 11th	15	African American	5	GPA & Test Scores, School Motivation
Chen (2003)	USA	Cross-sectional	Independent	212	45.8	5th to 8th	12.1	Natives American	2	Physical Well-being, Psychological Well-being, Substance Use
Cogburn (2010)	USA	Cross-sectional	MADICS (Eccles, 1997)	401	49	11th	16.5	African American	5	GPA & Test Scores, Psychological Well-being, School Motivation

Table 1 (continued)

Author(s) and year of publication	Country	Study design	Dataset	*N* participants	% girls	School grade	*M* Age (years)	Racial-ethnic group	*N* items	Outcomes
Cooper et al. (2022)	USA	Longitudinal	Independent	126	52	5th to 8th	11.9	African American	4	Psychological Well-being, GPA & Test Scores, School Motivation, School Belonging
Cruz (2016)	USA	Longitudinal	Independent	689	51.2	n/a	12.6	Latinx	2	School Motivation
D'Hondt et al. (2016)	Belgium	Cross-sectional	RaDiSS; (D'Hondt et al., 2015)	1181	50.6	9th	15.5	Moroccan-Belgium, Turkish-Belgium, Soviet Union roots, Others	6	School Motivation
D'Hondt et al. (2017)	Belgium	Cross-sectional	RaDISS (D'Hondt et al., 2015)	553	49.7	9th	16	Moroccan-Belgium, Turkish-Belgium, Soviet Union roots, Others	6	School Motivation

Table 1 (continued)

Author(s) and year of publication	Country	Study design	Dataset	*N* participants	% girls	School grade	*M* Age (years)	Racial-ethnic group	*N* items	Outcomes
Dogan & Strohmeier (2020)	Austria	Cross-sectional	Independent	284	50	n/a	12.6	Turkish-Austrian	5	Psychological Well-being
Dotterer & James (2018)	USA	Cross-sectional	Independent	129	58	6th	11.5	African American	4	Psychological Well-being
Dotterer et al. (2009)	USA	Cross-sectional	Independent	148	47	6th to 12th	13.9	African American	4	GPA & Test Scores, School Belonging, School Motivation
Edwards (2018)	USA	Longitudinal	MADICS (Eccles, 1997)	629	47.4	8th	13.5	African American	5	GPA & Test Scores, School Motivation
Fernandez & Benner (2022)	USA	Longitudinal	Preventing Inequalities in School Climate and Educational Success	750	54	9th to 10th	n/a	African American, Asian American, Latinx, Biracial, Other	3	GPA & Test Scores, Psychological Well-being, School Motivation

Table 1 (continued)

Author(s) and year of publication	Country	Study design	Dataset	*N* participants	% girls	School grade	*M* Age (years)	Racial-ethnic group	*N* items	Outcomes
Fuller-Rowell et al. (2012)	USA	Longitudinal	MADICS (Eccles, 1997)	417	51	9th to 11th	13	African American	5	Substance Use
Gale (2020)	USA	Cross-sectional	Independent	364	49	7th	12.5	African American	4	GPA & Test Scores, School Motivation
Galliher et al. (2011)	USA	Longitudinal	Independent	137	51	9th to 12th	15.2	Native American	2	Behavioral Well-being, Psychological Well-being, Substance Use
Griffin et al. (2017)	USA	Cross-sectional	Independent	139	57	9th to 11th	16.3	African American	5	GPA & Test Scores, School Motivation
Griffin et al. (2020)	USA	Cross-sectional	Independent	151	52	9th to 12th	16.4	African American	5	GPA & Test Scores, School Motivation

Table 1 (continued)

Author(s) and year of publication	Country	Study design	Dataset	*N* participants	% girls	School grade	*M* Age (years)	Racial-ethnic group	*N* items	Outcomes
Harven (2014)	USA	Cross-sectional	Independent	427	n/a	9th to 11th	15.7	African American, Latinx	8	GPA & Test Scores, Psychological Well-being, School Motivation
Helkamp et al. (2020)	Belgium	Cross-sectional	Independent	1050	47	7th to 9th	15.1	Turkish Belgium, Moroccan Belgium	6	School Belonging, School Motivation
Jaramillo et al. (2015)	USA	Cross-sectional	Independent	129	49.6	9th	16.4	Native American	2	GPA & Test Scores, Psychological Well-being, School Motivation
Jelsma & Varner (2020)	USA	Longitudinal	MADICS (Eccles, 1997)	610	49	8th to 11th	10.5	African American	5	Substance Use
Jelsma et al. (2022)	USA	Longitudinal	MADICS (Eccles, 1997)	630	49	8th to 11th	n/a	African American	5	Psychological Well-being, School Motivation

Table 1 (continued)

Author(s) and year of publication	Country	Study design	Dataset	N participants	% girls	School grade	*M* Age (years)	Racial-ethnic group	N items	Outcomes
Jiang et al. (2020)	China	Longitudinal	China Education Panel Survey (CEPS)	2041	46.2	7th to 8th	13.6	Chinese	2	Psychological Well-being, School Motivation
Kam & Cámaca-Colbert (2012)	USA	Cross-sectional	Independent	338	100	7th to 8th	12.3	Latinx	2	Psychological Well-being, School Motivation
Kassar (2019)	USA	Cross-sectional	New Immigrant Survey (Jasso et al., 2005)	341	47	n/a	10	Latinx, Asian American, African American, White	1	School Motivation
Kyere et al. (2019)	USA	Cross-sectional	NSAL-A (Jackson et al., 2004)	810	n/a	n/a	13	African American	3	GPA & Test Scores, School Belonging
McDermott et al. (2019)	USA	Longitudinal	Umaña-Taylor et al. (2009)	323	49.5	9th to 10th	15.3	Latinx	2	GPA & Test Scores, Psychological Well-being, School Motivation

Table 1 (continued)

Author(s) and year of publication	Country	Study design	Dataset	*N* participants	% girls	School grade	*M* Age (years)	Racial-ethnic group	*N* items	Outcomes
Miller (2012)	USA	Cross-sectional	Independent	239	51.9	8th	13.5	African American	5	GPA & Test Scores
Mulvey (2019)	USA	Cross-sectional	Independent	896	49.6	6th to 9th	11.7	Latinx, Asian American, African American, biracial, Other	5	School Motivation
Nichols (2017)	USA	Cross-sectional	MADICS (Eccles, 1997)	261	100	8th	13.5	African American	4	Psychological Well-being, School Motivation
Oxman-Martinez et al. (2012)	Canada	Cross-sectional	New Canadian Children and Youth Study	1053	49.5	n/a	12	Chinese Canadian, Hong-Kong-Chinese Canadian, Filipino Canadian	2	Psychological Well-being, GPA & Test Scores, School Motivation
Priest et al. (2014)	Australia	Cross-sectional	Independent	263	54.5	n/a	11.2	First- and second-generation immigrants	2	Psychological Well-being

Table 1 (continued)

Author(s) and year of publication	Country	Study design	dataset	*N* participants	% girls	School grade	*M* Age (years)	Racial-ethnic group	*N* items	Outcomes
Spaas et al. (2021)	Multi-national (Belgium, Denmark, Finland, Norway, Sweden)	Cross-sectional	Refugees Well Schools	1366	40.3	n/a	15.4	Refugee and non-refugee migrants	1	Psychological Well-being
St-Pierre et al. (2021)	Canada	Cross-sectional	Independent	696	57	7th to 8th	13	First- and second-generation immigrants	4	Psychological Well-being
Thomas & Caldwell (2009)	USA	Cross-sectional	NSAL-A (Jackson et al., 2004)	1170	49	n/a	15	African American	3	GPA & Test Scores
Thompson (2014)	USA	Cross-sectional	Independent	248	50.8	8th	12.3	African American	5	GPA & Test Scores, Psychological Well-being, School Belonging, School Motivation
Titzmann et al. (2021)	Germany	Cross-sectional	Independent	944	51.8	6th to 10th	13.3	First- and second-generation immigrants	4	GPA & Test Scores, Psychological Well-being

Table 1 (continued)

Author(s) and year of publication	Country	Study design	Dataset	*N* participants	% girls	School grade	*M* Age (years)	Racial-ethnic group	*N* items	Outcomes
Toomey et al. (2013)	USA	Longitudinal	Independent	204	100	n/a	16.8	Latinx	2	Behavioral Well-being. Psychological Well-being
Trask-Tate et al. (2014)	USA	Cross-sectional	Independent	153	62.3	8th	n/a	African American	7	School Motivation
Tynes et al. (2015)	USA	Longitudinal	Independent	257	n/a	6th to 12th	15	African American, Latinx	5	School Motivation
Ulubas-Varpula et al. (2021)	Finland	Cross-sectional	Independent	155	57.6	n/a	15.2	First- and Second-Generation Immigrants	7	School Belonging
Van Bergen et al. (2021)	the Netherlands	Cross-sectional	Independent	308	54.2	n/a	15.6	Turkish Dutch, Moroccan Dutch	1	Psychological Well-being
Verkuyten & Brug (2003)	the Netherlands	Cross-sectional	Independent	204	n/a	n/a	n/a	Moroccan Dutch, Surinamese Dutch, Turkish Dutch	2	GPA & Test Scores, School Motivation

Table 1 (continued)

Author(s) and year of publication	Country	Study design	Dataset	*N* participants	% girls	School grade	*M* Age (years)	Racial-ethnic group	N items	Outcomes
Walsh et al. (2018a)	Israel	Cross-sectional	HBSC-WHO (WHO, 2014)	1503	n/a	6th to 12th	15	Former Soviet Union Heritage, Ethiopian Heritage	1	Psychological Well-being,
Walsh et al. (2018b)	Israel	Cross-sectional	HBSC-WHO (WHO, 2014)	1503	n/a	6th to 12th	15	Former Soviet Union Heritage, Ethiopian Heritage	1	Substance Use
Wang & Huguley (2012)	USA	Longitudinal	MADICS (Eccles, 1997)	630	47	9th to 12th	14.5	African American	5	GPA & Test Scores, School Motivation, School Belonging
Wenzig et al. (2021)	Germany	Cross-sectional	Independent	104	62	n/a	17.7	Refugee and non-refugee migrants	4	Psychological Well-being

Table 1 (continued)

Author(s) and year of publication	Country	Study design	Dataset	N participants	% girls	School grade	*M* Age (years)	Racial-ethnic group	N items	Outcomes
Whitbeck et al. (2001)	USA	Cross-sectional	Independent	195	47	5th to 8th	12.2	Native American	2	Behavioral Well-being, Physical Well-being, Psychological Well-being, Substance Use
Wittrup et al. (2019)	USA	Cross-sectional	Independent	663	53	n/a	15	African American	7	School Motivation
Wong et al. (2003)	USA	Longitudinal	MADICS (Eccles, 1997)	629	46.6	8th	13.5	African American	5	GPA & Test Scores, Psychological Well-being, Behavioral Well-being, School Motivation
Zeiders et al. (2013)	USA	Longitudinal	Umaña-Taylor et al. (2009)	323	49.5	9th to 10th	15.3	Latinx	2	Psychological Well-being

Note. n/a = not available.

Table 2

Summary of Effect Sizes Linking Teacher-Based Racial-Ethnic Discrimination to Well-being, Substance Use and Academic Outcomes

	n(k)	*r*	95% CI	$Q_E(df)$	I^2
Overall Well-being	29(103)	-0.15***	[-0.18, -0.12]	(106) = 593.40***	Level 1 variance: 17.8% Level 2 variance: 60.0% Level 3 variance: 22.2%
Psychological Well-being	28(87)	-0.15***	[-0.19, -0.12]	(86) = 532.70***	Level 1 variance: 16.8% Level 2 variance: 69.4% Level 3 variance: 13.7%
Physical Well-being	3(3)	-0.26**	[-0.38, -0.15]	(2) = 0.81	Level 1 variance: 100% Level 2 variance: 0% Level 3 variance: 0%
Behavioral Well-being	6(13)	-0.15**	[-0.27, - 0.03]	(12) = 41.46***	Level 1 variance: 13.4% Level 2 variance: 0% Level 3 variance: 86.6%
Substance Use	6(18)	0.13**	[0.06, 0.20]	(17) = 30.38*	Level 1 variance: 32% Level 2 variance: 2.3% Level 3 variance: 65.7%
Academic Outcomes	35(138)	-0.16***	[-0.20, -0.13]	(137) = 953.98***	Level 1 variance: 11.8% Level 2 variance: 55.3% Level 3 variance: 32.9%
GPA & Test Scores	19(40)	-0.11***	[-0.16, -0.07]	(39) = 147.47***	Level 1 variance: 20.5% Level 2 variance: 63% Level 3 variance: 16.5%
School Motivation	31(82)	-0.17***	[-0.22, -0.12]	(81) = 661.28***	Level 1 variance: 10% Level 2 variance: 40.7% Level 3 variance: 49.3%
School Belonging	10(16)	-0.26***	[-0.31, -0.21]	(15) = 21.01	Level 1 variance: 46.5% Level 2 variance: 0% Level 3 variance: 53.5%

Note. n = number of datasets. k = number of effect sizes. r = meta-regression coefficients transformed to the correlation metric. CI = 95% confidence intervals for the meta-regression coefficients. Q_E = test for heterogeneity among effect sizes. I^2 = proportion of total variability due to between dataset heterogeneity. * $p < .05$ ** $p < .01$ *** $p < .001$

Table 3

Summary of Moderator Analyses by Sample and Study Characteristics in Correlated Associations for Well-Being

Moderator variables	*n(k)*	Omnibustest	*p*	*t(df)*	*β*	95% CI
Sample-Level Moderators						
Age (categorical)	28(97)	$F(2, 94) = 0.15$	.859			
9 to 12 (Ref)				-5.88(94)	-0.16	[-0.22; -0.11]
13 to 15				0.22(94)	0.01	[-0.07; 0.09]
above 15				0.54(94)	0.02	[-0.05; 0.09]
M_{age} (continuous)	28(97)	$F(1, 95) = 0.23$	.636	0.49(95)	0.00	[-0.00; -0.01]
Racial-Ethnic Group	18(66)	$F(3, 62) = 3.39$	.023*			
African American (Ref)				-8.50(62)	-0.23	[-0.29; -0.18]
Latinx				2.40(62)	0.09	[0.02; 0.17]
Native American				2.82(62)	0.13	[0.04; 0.21]
Ethnic Minorities in Europe				0.70(62)	0.04	[-0.06; 0.14]
Racial-Ethnic School Composition	12(35)	$F(1, 33) = 0.76$	.388			
Low (Ref)				-3.10(33)	-0.11	[-0.19; -0.03]
Medium				-0.87(33)	-0.06	[-0.19; 0.08]
High				n/a	n/a	n/a
Study-Level Moderators						
Number of Items (categorical)	29(103)	$F(1, 101)=10.90$	.001***			

1 to 2 (Ref)				-7.19(101)	-0.12	[-0.15; -0.09]
above 2				-3.30(101)	-0.08	[-0.14; -0.03]
Number of Items (continuous)	29(103)	$F(1, 101)=15.45$	<.001***	-3.93(101)	-0.03	[-0.04; -0.01]
Reliability (categorical)	19(68)	$F(1, 66) = 0.26$	.610			
> .80 (Ref)				-4.04(66)	-0.12	[-0.18; -0.06]
< .80				-0.51(66)	-0.02	[-0.10; 0.06]
Reliability (continuous)	19(68)	$F(1, 66) = 1.51$	.223	-1.23(66)	-0.00	[-0.01; 0.00]
Measurement Quality (continuous)	29(103)	$F(1, 101) = 3.95$	.050	1.94(101)	0.05	[0.00; 0.09]
Publication Bias	29(103)	$F(1, 101) = 2.99$	.087			
Published (Ref)				-4.82(101)	-0.22	[-0.32; -0.13]
Unpublished				1.73(101)	0.06	[-0.01; 0.13]

Note. *n* = number of datasets. *k* = number of effect sizes. Ref = reference category. Racial-ethnic school composition equals the percentage of racial-ethnic minority students within schools. *p <.05 **p <.01 ***p <.001

Table 4

Summary of Moderator Analyses by Sample and Study Characteristics in Correlated Associations for Substance Use

Moderator variables	*n(k)*	Omnibustest	*p*	*t(df)*	*β*	95% CI
Sample-Level Moderators						
Age (categorical)	6(16)	$F(2, 13) = 4.31$	.037*			
9 to 12 (Ref)				2.60(13)	0.12	[0.02; 0.22]
13 to 15				1.62(13)	0.10	[-0.03; 0.24]
above 15				-1.51(13)	-0.12	[-0.29; 0.05]
M_{age} (continuous)	6(16)	$F(1, 14) = 7.64$	.015*	-2.76(14)	0.00	[-0.00; -0.00]
Racial-Ethnic Group	5(12)	$F(2, 9) = 4.19$	.052			
African American (Ref)				5.51(9)	0.23	[0.13; 0.32]
Latinx				-2.12(9)	-0.23	[-0.47; 0.01]
Native American				-2.52(9)	-0.13	[-0.25; -0.01]
Ethnic Minorities in Europe				n/a	n/a	n/a
Racial-Ethnic School Composition	n/a	n/a	n/a			
Low (Ref)						
Medium						
High						
Study-Level Moderators						
Number of Items (categorical)	6(18)	$F(1, 16) = 0.33$	.573			

1 to 2 (Ref)				2.72(16)	0.11	[0.03; 0.20]
Above 2				0.58(16)	0.04	[-0.12; 0.21]
Number of Items (continuous)	6(18)	$F(1, 16) = 0.65$	.433	0.80(16)	0.02	[-0.03; 0.08]
Reliability (categorical)	5(17)	$F(1, 15) = 0.25$	.627			
> .80 (Ref)				2.15(15)	0.17	[0.00; 0.34]
< .80				-0.50(15)	-0.05	[-0.24; 0.15]
Reliability (continuous)	5(17)	$F(1, 15) = 0.01$	.906	-0.48(15)	-0.00	[-0.01; 0.00]
Measurement Quality	6(18)	$F(1, 16) = 4.09$	.060	2.02(16)	0.09	[-0.01; 0.19]
Publication Bias	6(18)	$F(1, 16) = 0.02$	.899			
Published (Ref)				0.86(16)	0.11	[-0.16; 0.38]
Unpublished				0.13(16)	0.01	[-0.07; 0.23]

Note. *n* = number of datasets. *k* = number of effect sizes. Ref = reference category. Racial-ethnic school composition equals the percentage of racial-ethnic minority students within schools. n/a = not applicable (because correlation coefficients were not available for calculating moderation effects). **p* <.05 ***p* <.01 ****p* <.001

Table 5

Summary of Moderator Analyses by Sample and Study Characteristics in Correlated Associations for Academic Outcomes

Moderator variables	*n(k)*	Omnibustest	*p*	*t(df)*	*β*	95% CI
Sample-Level Moderators						
Age (categorical)	32(130)	$F(2, 127) = 0.39$	.681			
9 to 12 (Ref)				-3.61(127)	-0.14	[-0.21; -0.06]
13 to 15				-0.78(127)	-0.04	[-0.14; 0.06]
above 15				-0.84(127)	-0.04	[-0.14; 0.06]
M_{age} (continuous)	32(130)	$F(1, 128) = 0.00$	.985	0.02(128)	0.00	[-0.00; 0.00]
Racial-Ethnic Group	20(97)	$F(3, 93) = 1.52$	.214			
African American (Ref)				-6.51(93)	-0.17	[-0.23; -0.12]
Latinx				0.86(93)	0.04	[-0.05; 0.13]
Native American				1.67(93)	0.21	[-0.04; 0.45]
Minorities in Europe				-0.97(93)	-0.11	[-0.32; 0.11]
Racial-Ethnic School Composition	18(63)	$F(2, 60) = 3.425$	.039*			
Low (Ref)				-3.29(60)	-0.20	[-0.31; -0.08]
Medium				-0.48(60)	-0.03	[-0.18; 0.11]
High				1.54(60)	0.11	[-0.03; 0.26]
Study-Level Moderators						
Number of Items (categorical)	34(135)	$F(1, 133) = 3.70$	.056			
1 to 2				-2.91(133)	-0.10	[-0.18; -0.03]

above 2				-1.92(133)	-0.08	[-0.16; 0.00]
Number of Items (continuous)	34(135)	$F(1, 133) = 1.33$	.251	-1.15(133)	-0.01	[-0.08; 0.14]
Reliability (categorical)	22(96)	$F(1, 94) = 1.28$	.261			
< .80 (Ref)				-3.99(94)	-0.15	[-0.23; -0.08]
> .80				-1.13(94)	-0.05	[-0.15; 0.04]
Reliability (continuous)	22(96)	$F(1, 94) = 0.98$	.324	-0.99(94)	-0.00	[-0.01; 0.00]
Measurement Quality	35(138)	$F(1, 136) = 1.25$	.266	0.49(136)	-0.02	[-0.07; 0.02]
Publication Bias (categorical)	35(138)	$F(1, 136) = 0.06$	.801			
Published (Ref)				-3.36(136)	-0.15	[-0.24; -0.06]
Unpublished				-0.25(136)	-0.01	[-0.08; 0.06]

Note. *n* = number of datasets. *k* = number of effect sizes. Ref = reference category. Racial-ethnic school composition equals the percentage of racial-ethnic minority students within schools. **p* <.05 ***p* <.01 ****p* <.001