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Racial/ethnic discrimination and well-being during adolescence: A meta-analytic review

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Abstract

This meta-analytic study systematically investigates the relations between perceived racial/ethnic discrimination and socioemotional distress, academics, and risky health behaviors during adolescence and potential variation in these relations. The study included 214 peer-reviewed articles, theses, and dissertations with 489 unique effect sizes on 91,338 unique adolescents. Random-effects meta-analyses across 11 separate indicators of well-being identified significant detrimental effects. Greater perceptions of racial/ethnic discrimination were linked to more depressive and internalizing symptoms, greater psychological distress, poorer self-esteem, lower academic achievement and engagement, less academic motivation, greater engagement in externalizing behaviors, risky sexual behaviors, and substance use, and more associations with deviant peers. Meta-regression and subgroup analyses indicated differences by race/ethnicity, gender-by-race/ethnicity interactions, developmental stage, timing of retrospective measurement of discrimination, and country. Overall, this study highlights the pernicious effects of racial/ethnic discrimination for adolescents across developmental domains and suggests who is potentially at greater risk.

Keywords

racial/ethnic discrimination; adolescence; socioemotional well-being; academics; risky behaviors

The demographics of the U.S. are rapidly shifting. Although non-Hispanic Whites continue to make up the majority of the U.S. population (64%), representation of Latino (16%), African American (12%), and Asian American (5%) individuals is not insubstantial (U.S. Census Bureau, 2010). Disaggregating demographics by child and adolescent versus adult populations highlights the nuances of demographic changes in the U.S. Whereas racial/ethnic minorities comprised 33% of the adult population in 2010, they comprised 46% of the child and adolescent population (i.e., under age 18; O'Hare, 2011), and non-Hispanic White

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children and adolescents are projected to be the numeric minority by 2020 (U.S. Census, 2014).

These shifts in population demographics in the U.S. are complicated by both ongoing challenges with race relations and the clear disparities that exist between African Americans and Latinos versus Whites across numerous facets of daily living and well-being. In a recent survey by the Pew Research Center (2015), half of respondents indicated that racism is “a big problem” in the U.S., and almost 60% agreed that more needs to be done to achieve racial equality. Moreover, African Americans and Latinos were much less likely to endorse fair treatment in various public spaces (e.g., in dealings with police, in schools, in stores and restaurants) than their White counterparts (Pew Research Center, 2013). Recent media attention to the police shootings of young Black teens including Michael Brown in Ferguson, Missouri, Tamir Rice in Cleveland, Ohio, and Laquan McDonald in Chicago, Illinois place these disparities in perceived differential treatment into bold relief.

Racial/ethnic disparities also exist across numerous life course outcomes, including poorer educational performance and attainment, lower labor force participation, and higher rates of teenage pregnancy, arrests and incarceration, poverty, and morbidity and mortality for African Americans and Latinos as compared to Whites (Kena et al., 2014; Peterson & Krivo, 2005; Pew Research Center, 2013; Snyder & Dillow, 2013; Ventura, Mathews, Hamilton, Sutton, & Abma, 2011). Relatedly, evidence persists for differential treatment across racial/ethnic groups in healthcare, employment, the judicial system, financial and consumer markets, and the housing sector (Bales & Piquero, 2012; Krivo & Kaufman, 2004; Mouw & Kalleberg, 2010; Pager & Shepherd, 2008; Smedley, Stith, & Nelson, 2009). Although much of these disparities are documented for African American and Latino versus White populations, Asian Americans also face disadvantages that leave them vulnerable to stigmatization and mistreatment. For example, Asian American youth are often labeled as model minorities who are expected as a group to excel academically, yet larger perpetual foreigner stereotypes also label Asian Americans as a monolithic “other” who are viewed as foreigners despite nativity status or generational family ties to the US (Kim, 1999).

It is both within and because of this larger contextual backdrop that experiences of discrimination are critical to understand. Discrimination is “any behavior which denies individuals or groups of people equality of treatment which they may wish” (Stroebe & Insko, 1989, p. 50). Discrimination can be perpetrated based on a number of different social identities and characteristics that are vulnerable to stigmatization (e.g., gender, weight, sexual orientation; Schmitt, Branscombe, Postmes, & Garcia, 2014). In the current meta-analysis, we focus on race/ethnicity as a key social identity subject to stigmatization, as certain racial/ethnic groups are often devalued in the larger society and in the eyes of others (Crocker, Major, & Steele, 1998).

Linking Racial/ethnic Discrimination to Child and Adolescent Well-being

Much of what we know about the pernicious effects of racial/ethnic discrimination is based on adult populations—as an example, 77% of the studies in Schmitt and colleagues’ (2014) recent meta-analysis of discrimination (broadly defined) and psychological well-being

included only adult populations—yet children and adolescents of color are not immune to discriminatory mistreatment tied to race/ethnicity. Indeed, reports of being followed by store clerks or store guards, receiving poor service at a restaurant, getting a lower grade than deserved, or being called a racially insulting name are all too common occurrences for racial/ethnic minority youth (Fisher, Wallace, & Fenton, 2000; Rosenbloom & Way, 2004). The commonplace nature of racial/ethnic discrimination during the early life course has driven recent integrative models of minority child development (Garcia Coll et al., 1996; Mistry et al., 2014) to incorporate race/ethnicity and race/ethnicity-based mistreatment as central drivers of young people's growth and development.

Understanding of difference—particularly in regard to race/ethnicity—occurs quite early in the life course. Evidence suggests that infants as young as six months old recognize differences in race/ethnicity (Katz, 2003), and in-group preferences are observed as early as the preschool years (Aboud, 2003; Bigler, Brown, & Markell, 2001; Patterson & Bigler, 2006). Awareness of cultural stereotypes tied to skin color and out-group prejudices begin to emerge in middle childhood (Aboud & Amato, 2001; Augoustinos & Rosewarne, 2001), and by age 10, many children can recognize both overt and more covert discriminatory actions (McKown & Weinstein, 2003; Verkuyten, Kinket, & van der Wielen, 1997). Early adolescence is also when young people begin to understand and articulate the implications of race for one's daily life, and at this stage of development, they begin to consider their own ethnic identity and how others view their racial/ethnic group (Quintana & McKown, 2008; Umaña-Taylor, 2016). By late adolescence, youth have a more nuanced grasp of abstract notions of racism and privilege and the implications of these for individuals' experiences in society (Karcher & Fischer, 2004; Quintana & McKown, 2008). Moreover, racial/ethnic disparities in health and well-being are thought to take root in adolescence, with reverberating repercussions across the life course (Sanders-Phillips, Settles-Reaves, Walker, & Brownlow, 2009). As such, adolescence is a critical time to investigate the repercussions of racial/ethnic discrimination, as the social cognitive and identity developmental processes that young people experience and work through at this time in the life course are the foundations for perceiving racial/ethnic discrimination and its consequences (Brown & Bigler, 2005).

In our meta-analysis, we examine whether adolescents' perceptions of racial/ethnic discrimination are linked to their socioemotional distress, academic success, and risky health behaviors, with particular attention to specific aspects of functioning within each domain. These represent the central developmental competencies highlighted by Garcia Coll and colleagues' integrative model (1996). Although several existing meta-analyses have investigated the link between discrimination and broader domains of mental or physical health, few have statistically examined differences in the strength of the association between discrimination and specific facets of socioemotional distress or well-being (either via direct relations or moderation analyses; see Lee & Ahn, 2011, 2012; Pieterse et al., 2012; Schmitt et al., 2014). Yet the various facets of socioemotional distress and well-being have been differentially linked to one another and to life course outcomes. For example, self-esteem has been found to influence later depression, health, and job satisfaction in a causal manner, but the reverse causal direction was not found for these relations (Orth, Robins, & Widaman, 2012). As such, greater attention to the links between racial/ethnic discrimination and the

individual facets of socioemotional distress and well-being is needed. Moreover, no existing meta-analyses have investigated the links between racial/ethnic discrimination and either academics or risky health behaviors, two foci of the current study.

Potential Moderators of the Effects of Racial/Ethnic Discrimination during Adolescence

In addition to examining the extent to which perceived racial/ethnic discrimination is a key driver of well-being, our meta-analytic study also places attention on whether these links are conditioned by characteristics of the adolescent, the study, and the discrimination measure.

Race/ethnicity and gender

To fully understand the impact of discrimination on adolescents from diverse backgrounds, we employ an intersectionality framework (Andersen & Collins, 2015; Cole, 2009) to investigate variations in the developmental implications of discrimination by race/ethnicity and gender and their interactions. This framework acknowledges the multiple social identities that adolescents possess and the pernicious effects of possessing multiple stigmatized identities, while also asserting that the salience and potential stigma associated with identities is context dependent (Purdie-Vaughns & Eibach, 2008). Race/ethnicity is a primary source of social stratification that delineates Whites from their racial/ethnic minority counterparts (Fuligni, Hughes, & Way, 2009). Qualitative work suggests that experiences of racial/ethnic discrimination may vary across groups, and quantitative research indicates that the effects of racial/ethnic discrimination may look quite different based on the race/ethnicity of the reporter/target (Greene et al., 2006; Rosenbloom & Way, 2004; Seaton, Caldwell, Sellers, Jackson, 2008). In particular, cultural stereotypes in the U.S. associate being Black or Latino and male with dangerousness, violence, and threat (Jones, Peddie, Gilrane, King & Gray, 2013). These stereotypes likely fuel differences in discriminatory treatment, such that males tend to report greater experiences of discrimination than their female counterparts and tend to attribute discriminatory treatment substantially more often to race/ethnicity (Kessler, Mickelson, & Williams, 1999; Noguera, 2003; Pérez, Fortuna, & Alegría, 2008). In addition to these mean differences, there is some empirical evidence that the link between discrimination and well-being varies by gender, at least within African American and Latino samples (Brody et al., 2006; Chavous, Rivas-Drake, Smalls, Griffin, & Cogburn, 2008; Wiehe, Aalsma, Liu, & Fortenberry, 2010). The intersectionality framework (Andersen & Collins, 2015; Cole, 2009) suggests that investigating differential effects by race/ethnicity or gender alone provides an incomplete picture given the multiple identities adolescents possess. As such, we integrate race-by-gender interactions into moderation analyses.

Developmental period

Adolescence is a developmental period rife with physical, social, and cognitive changes, but how the links between discrimination and well-being shift with advances in thinking and identity development is unclear. Advances in formal operational thought, deductive and inductive reasoning skills, the ability to understand abstract concepts (e.g., egalitarianism, civil liberties and rights), and the engagement in social perspective taking all facilitate young

people's thinking about race/ethnicity (Inhelder & Piaget, 1958; Kuhn, 2009; Smetana & Villalobos, 2009). It may be that as cognitive development unfolds, it leaves early adolescents especially vulnerable to the long-term effects of social marginalization, as they are only gradually acquiring the more sophisticated cognitions (i.e., formal operational thinking) and adaptive coping skills, such as social support seeking and primary control coping, that help them better manage their experiences of racial/ethnic discrimination (Brittian, Toomey, Gonzales, & Dumka, 2013; Edwards & Romero, 2008; Seaton, 2010). In contrast, as young people age they have more well-formed notions of their own ethnic identity and how others view their racial/ethnic group (Seaton, Yip, & Sellers, 2009; Umaña-Taylor et al., 2014), and they are more likely to encounter discriminatory treatment (Benner & Graham, 2011; Brody et al., 2006), all of which may make late adolescents more vulnerable to discrimination's negative effects.

Timing of retrospective measurement

Discrimination experiences vary according to the timeframe participants are asked to use. Although reports of discrimination within one's lifetime are rather common for racial/ethnic minority adolescents, rates of discrimination reported on any given day are quite low (Huynh & Fuligni, 2010). Parallel to this, the effects of perceived discrimination also may vary based on the referenced time. Some measures of perceived racial/ethnic discrimination either specify lifetime experiences or are nonspecific in their designation of time, whereas other studies ask adolescents to reflect on their experiences in a more time-limited way (i.e., last two weeks, last six months). To the extent that the effects of discrimination on adolescents' well-being are cumulative in nature, then perceived racial/ethnic discrimination reported over one's lifetime would likely be more potent for adolescent well-being than more recent experiences of discrimination (e.g., discriminatory treatment over the past three months). This is consistent with cumulative risk theories of child development (Rutter, 1979; Sameroff, Seifer, Zax, & Barocas, 1987), which suggest that risks accumulate and compound across time, compromising children and adolescents' growth and development.

Specific versus general perpetrator of discrimination

The majority of studies examining racial/ethnic discrimination during adolescence use general measures, but limited evidence suggests that the effects of racial/ethnic discrimination may vary depending on both the perpetrator and the outcome under study. For example, the relations between academic outcomes and racial/ethnic discrimination are often stronger when considering teachers versus peers as the perpetrators (Benner & Graham, 2013; Chavous et al., 2008). Similarly, differential relations across perpetrators have also been observed for associations between racial/ethnic discrimination and both self-esteem and depressive symptoms (Fisher et al., 2000; Greene et al., 2006), all of which suggest needed attention to variation by perpetrator. Consistent with this empirical work, bioecological theory (Bronfenbrenner, 1979) asserts that proximal contexts of adolescent development exert stronger influences on developmental domains most closely tied to the context. As such, discrimination perpetrated by educators, for example, would be expected to be most closely tied to the academic domain, whereas peer-perpetrated discrimination would be most closely tied to socioemotional distress and risky behaviors.

Country of residence

Race/ethnicity is a particularly salient identity component for adolescents, and there is extensive evidence that American adolescents' experiences of racial/ethnic discrimination are quite common (Umaña-Taylor, 2016). Although the historical treatment of minorities through slavery and conquest and more recently in the treatment of Latinos and Asian Americans who predominate the shifting immigration trends of the last half century make the U.S. a unique context for understanding the consequences of racial/ethnic discrimination (Feagin, Vera, & Batur, 2001; Sigelman & Welch, 1991; Yetman, 1999; Young & Takeuchi, 1998), other countries have also struggled with race relations historically (Leach, 2005). As such, we investigate potential variation in the links between discrimination and adolescents' outcomes between the US and other countries as a means of examining the generalizability of our findings given the literature is heavily weighted to US samples.

Prior Reviews of the Consequences of Discrimination for Well-being

Since 2000, eleven qualitative reviews and meta-analyses have been conducted on the consequences of discrimination for individual well-being. These reviews fall into two primary categories—those focused on discrimination broadly defined (including racial/ethnic discrimination along with discrimination tied to other potentially stigmatized identities, such as gender and sexual orientation; Jones et al., 2013; Pascoe & Richman, 2009; Schmitt et al., 2014) and those focused solely on racial/ethnic discrimination (Dolezsar, McGrath, Herzig, & Miller, 2014; Paradies, 2006; Priest et al., 2013; Williams & Mohammed, 2009; Williams, Neighbors, & Jackson, 2003), with three of these including studies on a single racial/ethnic group (African Americans in Pieterse, Todd, Neville, & Carter, 2012; Asian Americans in Lee & Ahn, 2011; Latinos in Lee & Ahn, 2012). Although these meta-analyses and qualitative reviews have made substantial progress in synthesizing what we know about the links between discrimination and well-being, our current meta-analysis fills substantive gaps in these existing summaries.

First, key developmental dynamics of adolescence (e.g., individuation, disjunctures in brain development, advances in formal operational thought, neurobiological plasticity, engagement in social perspective taking; Chambers, Taylor, & Potenza, 2003; Côté, 2009; Dahl, 2004; Inhelder & Piaget, 1958; Killen & Stangor, 2001) suggest that adolescence is a particularly sensitive period of development. The integrative model of child and adolescent development (Garcia Coll et al., 1996), which serves as the foundation for our meta-analysis, was built on the recognition of the developmental sensitivity during this time in the life course. Yet to date only one qualitative review has focused exclusively on the implications of racial/ethnic discrimination for children and young people under age 18 (Priest et al., 2013), and only two meta-analyses attended to developmental period as a moderator (Schmitt et al., 2014; Lee & Ahn, 2012). Findings on potential age effects were equivocal, likely due to inconsistencies in age cut-offs; Schmitt and colleagues (2014) compared children (under age 13), adolescents (age 13–18 years), and adults (over age 18), whereas Lee and Ahn (2012) compared Latinos under versus over age 16. Thus, a comprehensive investigation of the strength of the effects of racial/ethnic discrimination on well-being during adolescence and across developmental stages within adolescence is greatly needed. Moreover, more careful

attention to age effects will suggest whether intervention efforts should be targeted at specific times during adolescence.

In addition, we focus on multiple facets of development that extend beyond the oft examined mental health consequences of discrimination. Only one qualitative review has examined the link between racial/ethnic discrimination and risky behaviors, and no meta-analyses or qualitative reviews have examined the association between racial/ethnic discrimination and academics. Given the critical nature that academic success and risky health behaviors play for subsequent development across the life course (IOM & NRC, 2014), synthesis of the effects of racial/ethnic discrimination on these competencies fills a clear hole in the extant knowledge base. We further build on this by examining key moderators at the individual, study, and measurement level to comprehensively understand who is at particular risk and how we can best understand these risks. Although prior meta-analyses on discrimination have tested ethnicity moderators within larger pan-ethnic groups (e.g., Chinese vs Indian vs Korean within Asian American samples, Lee & Ahn, 2011; Latino ethnic groups, Lee & Ahn, 2012), no meta-analyses have investigated differential effects in the links between racial/ethnic discrimination and outcomes across pan-ethnic groups nor have any investigated gender or race-by-gender interactions. Similarly, attention to potential moderation effects by the characteristics of the discrimination measure (i.e., perpetrator, retrospective measurement timing) has not been previously considered in published meta-analyses on this topic.

Finally, it is also important to stress that the focus of our meta-analytic studies is squarely on the consequences of perceptions of discrimination tied to race/ethnicity. This is in contrast to prior meta-analyses and qualitative reviews that have a) examined discrimination quite broadly, often including mistreatment tied to race/ethnicity along with other potentially stigmatized identities (Jones et al., 2013; Pascoe & Richman, 2009; Priest et al., 2013; Schmitt et al., 2014), b) conflated personal experiences of racial/ethnic discrimination with perceptions of how other group members are treated and valued by society (Paradies, 2006; Schmitt et al., 2014), or c) integrated studies that manipulated experiences of discrimination experimentally (Paradies, 2006; Pascoe & Richman, 2009; Priest et al., 2013; Williams & Mohammed, 2009). As such, our inclusion strategy provides a cleaner estimate of the relations between personally experienced racial/ethnic discrimination and well-being across developmental domains.

Method

Literature Search

We conducted literature searches in PsycINFO, ERIC, Social Sciences Citation Index, Sociological Abstracts, and ProQuest using the term *adoles** combined with each of the three terms related to discrimination, including *discrim**, *racism*, and *prejudice* (i.e., three separate searches per database). The search included studies published only in English through the end of 2016. This search resulted in 15,359 articles in peer-reviewed journals, 338 book chapters, and 819 theses/dissertations. The research team then reviewed the 16,516 abstracts (as available) to identify those meeting the following criteria: a) measured perceptions of personally-experienced racial/ethnic discrimination, b) included adolescents

(mean ages ranged between 10 to 20), and c) included quantitative data. In total, 757 studies either met the inclusion criteria, could not be excluded based on the content of the abstract, or did not include an abstract. The 757 studies were then read and double-coded. The interrater reliability was $r = .83$ to 1.00 for continuous variables, and $\kappa = .77$ to 1.00 for the categorical or string variables. Discrepancies in coding were resolved via consensus after consulting the original study during coding review meetings.

We excluded 466 of the 757 coded studies based on the following criteria: (a) no measure of personally-experienced racial/ethnic discrimination, (b) no relevant outcomes, (c) no quantitative data or re-print of prior work, or (d) outside the targeted age range (i.e., adolescence). Of the remaining 308 studies, 82 were missing test statistics necessary to calculate effect sizes. We emailed authors, and 44 provided bivariate data. Of the resulting 270 studies with necessary data, 122 studies used unique data, whereas 148 studies had overlap in the datasets analyzed. Due to analysis requirements around data independence (Lipsey & Wilson, 2001), for each outcome under analysis, we included only one study from each larger dataset. We selected the study with the larger sample size for inclusion; when sample sizes were comparable, selections were made based on publication type, study design, and developmental period. We selected peer-reviewed studies over unpublished ones. We also selected cross-sectional correlations over longitudinal ones. When a study included correlations at multiple waves or multiple developmental periods, we selected correlations with a relatively larger sample size (usually Wave 1 data); if correlations across multiple waves had similar sample sizes, we selected data in the developmental period that was less represented in our analytic data. This resulted in the exclusion of 56 studies, for a total of 214 studies (171 peer-reviewed articles, 43 theses/dissertations) included in the final meta-analysis for the 11 well-being indicators. For the meta-analysis of the three larger developmental domains (i.e., socioemotional, academic, behavioral), we used 190 of the 214 studies (149 peer-reviewed articles, 41 theses/dissertations) that provided independent effect sizes within domain.

Measuring Racial/ethnic Discrimination

The vast majority of measures used to assess perceived racial/ethnic discrimination were retrospective, asking adolescents to reflect either over their lives or over a specified amount of time (e.g., last two weeks) and rate the frequency with which they experienced discriminatory treatment. The exception was the quite limited number of studies that used daily diary techniques (e.g., Huynh & Fuligni, 2010; Potochnick, Perreira, & Fuligni, 2012). In total, studies in our meta-analysis used 44 different discrimination measures; additionally, 20 studies combined multiple measures into a single discrimination scale, 4 created a new measure for the study, and 22 studies used a single item or did not provide information for the measure source. Most discrimination measures were general assessments that did not identify a particular perpetrator of the mistreatment; thus, what we learned about the repercussions of racial/ethnic discrimination in adolescence in our meta-analysis is heavily weighted to effects of general (rather than perpetrator-specific) experiences.

Analyses

Our analyses examined effect sizes for the relations between perceived discrimination and three developmental domains (i.e., socioemotional distress, academics, risky health behaviors). The analyses included 314 unique effect sizes on 91,297 unique adolescents. We also examined the relations between racial/ethnic discrimination and 11 adolescent well-being indicators across socioemotional distress and well-being (i.e., depression, other internalizing symptoms, positive well-being, self-esteem), academics (i.e., performance and achievement, school engagement, academic motivation), and risky health behaviors (i.e., externalizing behaviors, risky sex behaviors, substance use, association with deviant peers). This set of analyses included 489 unique effect sizes on 91,338 unique adolescents.

We used random-effects models to estimate mean effect sizes. Random-effects models assume that studies differ beyond sampling errors and that true effect sizes vary across studies (Raudenbush, 2009). In determining effect sizes, we transformed all correlation coefficients to the Fisher's Z scale using the following equation:

$$Z = \frac{1}{2} \ln\left(\frac{1+r}{1-r}\right)$$

We used the following calculation for the transformation of unadjusted ORs to correlation coefficients and then to Fisher's Z:

$$r = \frac{d}{\sqrt{d^2 + a}}, \quad d = \log OR \times \frac{\sqrt{3}}{\pi}$$

All summary effect sizes were then transformed back to weighted correlations (that take into account both sample size and heterogeneity) for interpretation. When violations to independence assumptions occurred, we used the shifting unit-of-analysis approach, creating an average effect size so that each article could only contribute one effect to any given analysis (Borenstein, Hedges, Higgins, & Rothstein, 2009; Cooper, 1998); this average effect size was then used in the random effects model. We assessed homogeneity of effect sizes using Cochran's Q tests and I^2 statistics (Higgins, Thompson, Deeks, & Altman, 2003), and we created forest plots displaying the effect size and weight for each study. We explored evidence of publication bias using three approaches: funnel plots with Egger's tests (e.g., Begg's tests; Sterne, Egger, & Moher, 2008), trim-and-fill analyses (Duval & Tweedie, 2000) to estimate effect sizes adjusted for publication bias, and meta-regression analyses to examine whether effect sizes differed by published versus unpublished works. We examined the moderating effects of gender, race/ethnicity, gender-by-race/ethnicity, developmental period, measurement retrospective timing, perpetrator of discriminatory treatment, study design, and country using meta-regression and subgroup analyses (Borenstein et al., 2009). All analyses were conducted in STATA 13.1 (StataCorp, 2013).

Results

The Relation between Perceived Race/ethnic Discrimination and Adolescent Well-being

Summaries of study information—including sample size, study type, discrimination measurement, mean age, gender and race/ethnic breakdown, and targeted outcomes—for all studies contained in the meta-analysis are shown in Table S1 in the online supplementary materials. A summary of effect size information (i.e., weighted mean effect size, 95% confidence interval, heterogeneity) for all relations is presented in Table 1. Supplementary Tables S2 (socioemotional distress), S3 (academics), and S4 (health and behavior) present individual study correlations between discrimination and adolescent well-being as well as forest plots displaying correlation coefficients and sample size weights for each study.

Socioemotional distress—We first examined the relation between perceived racial/ethnic discrimination and the broad well-being domain of socioemotional distress. In total, 126 studies included data on this link (144 unique effect sizes as some studies reported separate estimates for different racial/ethnic groups or gender groups). We observed a small to moderate effect size between discrimination and socioemotional distress ($r = .24$; this and all subsequent coefficients transformed from weighted mean effect size) based on Cohen's (1992) criteria ($r = .10$ as a small effect size, $r = .30$ as a moderate effect size, and $r = .50$ as a large effect size). Here the correlations between discrimination and positive psychological outcomes (i.e., positive well-being, self-esteem) were reverse coded so that all relations were in the same direction. We then examined the relation between perceived race/ethnic discrimination and the four specific aspects of adolescents' socioemotional distress and well-being. In total, 76 studies included data on the relation between perceived racial/ethnic discrimination and depression (e.g., depressive symptoms, depressed affect; 87 unique effect sizes), 58 for other internalizing symptoms (e.g., anxiety, loneliness, stress, somatic symptoms; 64 unique effect sizes), 30 for positive well-being (e.g., life satisfaction, prosocial behaviors, self-control; 33 unique effect sizes), and 47 for general self-esteem/self-worth (55 unique effect sizes). The strongest correlations observed were between discrimination and depression ($r = .26$) and between discrimination and internalizing symptoms ($r = .26$), which were both small to moderate in size. Correlations of a smaller effect size were observed for the relation between perceived race/ethnic discrimination and positive well-being ($r = -.14$) and self-esteem ($r = -.17$).

Academics—In total, 73 studies included data on the relation between perceived racial/ethnic discrimination and the broad well-being domain of academic outcomes (89 unique effect sizes). We observed a small effect size between discrimination and academics ($r = -.10$). We then examined the relation between perceived race/ethnic discrimination and four distinct aspects of adolescents' academic performance. In total, 47 studies included data on the relation between discrimination and achievement (e.g., GPA, achievement test scores; 56 unique effect sizes), 21 for school engagement (e.g., attendance, engagement; 25 unique effect sizes), and 42 for academic motivation (e.g., academic efficacy, utility value of education; 51 unique effect sizes). Significant correlations were observed for the relations between perceived race/ethnic discrimination and GPA ($r = -.09$), school engagement ($r = -.14$), and motivation ($r = -.11$), with all correlations small to moderate in size.

Risky health behaviors—Finally, we examined the relation between perceived racial/ethnic discrimination and the broad well-being domain of risky health behaviors. In total, 71 studies included data on this relation (81 unique effect sizes). We observed a small to moderate effect size between discrimination and risky health behaviors ($r = .20$). We also examined the relation between perceived racial/ethnic discrimination and four specific aspects of adolescents' risky health behaviors. In total, 53 studies (63 unique effect sizes) included data on the relation between discrimination and externalizing behaviors (e.g., delinquency, anger), 29 for substance use (e.g., alcohol use, smoking; 33 unique effect sizes), 12 for affiliation with deviant peers (e.g., peer deviance, peer substance use; 14 unique effect sizes), and 7 for risky sexual behaviors (e.g., unprotected sex, number of sexual partners; 8 unique effect sizes). The strongest correlation observed was between perceived racial/ethnic discrimination and externalizing behaviors ($r = .24$), which was small to moderate in size. Small correlations were observed for the relation between discrimination and substance use ($r = .13$), affiliations with deviant peers ($r = .15$), and risky sexual behaviors ($r = .16$).

Tests of heterogeneity and publication bias—We observed significant heterogeneity in effect sizes for all broad well-being domains and more specific indicators based on Cochran's Q tests. I^2 statistics showed that there were moderate to high proportions of variance in effect sizes attributed to heterogeneity for all well-being domains and all indicators within each domain (e.g., depression, achievement), meaning that there were substantial variations in effect sizes across studies rather than sampling error (see Table 1). This suggested that investigating moderators of the relation between discrimination and well-being was needed.

Estimates for publication bias are displayed in Table 2. We observed some evidence of publication bias based on funnel plot results (see Figures S1a to S1c in online supplementary materials). Funnel plots display effect sizes by study precision (i.e., standard errors of the effect sizes), and data without publication bias are expected to form a symmetrical pattern around the estimated mean effect size. However, we observed some asymmetries for the funnel plots in the present study. Moreover, the asymmetry of funnel plots was significant for two of the three well-being domains (i.e., socioemotional, behavioral) and 7 of the 11 well-being indicators (i.e., depression, other internalizing symptoms, self-esteem, achievement, externalizing behaviors, risky sexual behaviors, substance use). However, subsequent trim-and-fill analyses showed that the relations between racial/ethnic discrimination and all well-being domains/indicators (including those identified as problematic by the funnel plots, with the exception of risky sexual behaviors) remained significant after adjusting for publication bias. Additionally, as shown in Table 2, although unpublished studies tended to report weaker relations between perceived racial/ethnic discrimination and adolescent well-being indicators, only a few effects for publication type (i.e., published vs. unpublished study) emerged as significant.

The Moderating Role of Adolescent, Measurement, and Study Characteristics

Our final set of analyses examined the extent to which correlations between perceived racial/ethnic discrimination and adolescent well-being varied by the gender or racial/ethnic

distribution of the samples, developmental period (i.e., early, middle, or late adolescence), retrospective measurement timing (i.e., how far in the past adolescents were asked to reflect on when providing estimates of perceived racial/ethnic discrimination), perpetrator of discriminatory treatment (i.e., peers, educators, institution, general/unspecified), study design (i.e., cross-sectional, longitudinal), or country (i.e., U.S., international; we also compared U.S., Europe, and Australia, the sources of the majority of the studies in the meta-analysis). For significant moderators, relevant tables are included in the manuscript; when no evidence of moderation was observed, relevant tables are included in the supplementary materials.

Gender—Among the 190 studies that provided independent effect sizes for the three developmental domains (i.e., socioemotional, academic, behavioral), the vast majority provided gender distributions for their samples (181 or 95%), which were used for meta-regression analyses. In total, 39 studies provided independent test statistics (i.e., correlations, unadjusted odds ratios) separately for males and/or females, which were used for the subgroup analyses. We did not observe significant effects for the moderating role of gender from meta-regression or subgroup analyses, suggesting that the overall observed effects from each meta-analysis are consistent across boys and girls. Estimates for gender effects are displayed in Table S5.

Race/ethnicity—All but one study provided the racial/ethnic composition of their samples, which was used in meta-regression analyses. In total, 149 studies (78%) included separate, independent test statistics for individual racial/ethnic groups because either the sample consisted of only a single racial/ethnic group or the study disaggregated test statistics by race/ethnicity; these studies were used to compare racial/ethnic differences in subgroup analyses. We observed five significant sets of differences in racial/ethnic effects (see Table 3). The negative association between perceived racial/ethnic discrimination and socioemotional distress was stronger when the sample was composed of more adolescents of Asian or Latino descent (versus more adolescents of African descent) based on meta-regression. Similarly, subgroup analyses also demonstrated a stronger link between discrimination and socioemotional distress for adolescents of Asian descent than adolescents of African descent. Additionally, we also observed a stronger link between perceived discrimination and academics for adolescents of Latino descent versus African descent in meta-regression and subgroup analyses.

Gender-by-Race/ethnicity—In total, 24 studies (13%) provided separate, independent test statistics for both gender and racial/ethnic groups. We were able to compare four gender-by-racial/ethnic groups (i.e., African-descent males and females, Latinos, Latinas), as only these groups had adequate representation for each developmental domain. As shown in Table 4, for the meta-regression, the negative effect of racial/ethnic discrimination on academics was stronger for samples consisting of more males of Latino descent compared to those of African descent. For subgroup differences, we observed a stronger effect of discrimination on academics for Latino males compared with African-descent males and Latino females.

Developmental period—In total, 36 studies included early adolescents (age 10–13), 60 of middle adolescents (age 14–16), and 32 of late adolescents (age 17 and older). We excluded 58 studies that either had missing or large (i.e., standard deviation larger than 1.5) age spans. Estimates for the effects of developmental period are shown in Table 5. Based on both meta-regression and subgroup analyses, the positive association between perceived racial/ethnic discrimination and socioemotional distress was stronger in early adolescence than in late adolescence. Moreover, the negative association between perceived racial/ethnic discrimination and academics was stronger in mid adolescence than in early adolescence.

Retrospective measurement timing—In total, 12 studies (6%) queried lifetime experiences of racial/ethnic discrimination, 126 studies (66%) did not specify the timing of the discriminatory experiences, and the remaining 52 studies (27%) specifically asked about discrimination experienced over the past year or less. Estimates for the effects of retrospective measurement timing are shown in Table 6. The positive association between perceived racial/ethnic discrimination and socioemotional distress was weaker for studies that queried lifetime experiences of racial/ethnic discrimination compared to studies that did not specify the timing of the discriminatory experiences (based on both meta-regression and subgroup analyses) and studies that asked about discrimination within the past year or less (based on subgroup analyses). Additionally, the negative association between perceived discrimination and academics was stronger for studies that did not have a specific timing than studies that asked for lifetime experiences of discrimination and discrimination within the past year or less (based on subgroup analyses). The negative effect of discrimination on academics was also stronger for studies that asked for discrimination within the past year or less compared to studies that asked for lifetime discrimination experiences (based on meta-regression analyses).

Perpetrator of discrimination—The majority of studies (78%) included in our meta-analysis used only general measures of discrimination. In contrast, 32 studies included source-specific measures of racial/ethnic discrimination, and an additional 10 used both general and source-specific measures. Due to limitations in the available studies using perpetrator-specific measures, our moderation analyses were limited to comparisons of general versus each of the peer-, institution-, and educator-perpetrated discrimination (see online supplementary Table S6). We did not observe significant differences between general discrimination with any of the perpetrator-specific discrimination for any of the three developmental domains.

Country of residence—In total, 173 studies were U.S. based. Among the 17 studies from other countries, 9 were from Europe, 4 from Australia, and 4 from other countries (e.g., i.e., Argentina, Brazil, Israel, Canada). Estimates for the effects of countries are shown in Table 7. We first compared effect sizes between U.S. and all international studies. Three significant findings emerged. The positive association between perceived racial/ethnic discrimination and socioemotional distress was stronger in U.S. than other countries. This was observed in both meta-regression and subgroup analyses. In contrast, the negative association between perceived racial/ethnic discrimination and academics was stronger in other countries than in the U.S. based on subgroup analyses. We then compared effect sizes

among U.S., European, and Australian studies. The negative association between perceived racial/ethnic discrimination and academics was stronger in Australia than the U.S. based on both meta-regression and subgroup analyses.

Discussion

We investigated the link between perceived racial/ethnic discrimination and adolescents' health and well-being using meta-analytic techniques. Prior meta-analyses and qualitative reviews on discrimination have generally focused on adults' experiences, yet a multitude of research suggests adolescence is a sensitive period of development characterized by rapid cognitive/neurological and social changes that may put youth of color at particular risk (Chambers et al., 2003; Côté, 2009; Dahl, 2004). The results of our analyses highlight the current state of knowledge of racial/ethnic discrimination in adolescence, and our findings have broad implications for both how we study racial/ethnic discrimination during adolescence and the areas where future inquiry is particularly needed.

We observed that perceived racial/ethnic discrimination was consistently linked to poorer youth adjustment across socioemotional (depression, other internalizing symptoms, self-esteem, and positive well-being), academic (achievement, engagement, motivation), and behavioral domains (externalizing behaviors, substance use, deviant peer associations, risky sex behaviors). The effect sizes for socioemotional distress and well-being we observed for the adolescent samples included in our meta-analysis were generally similar to or larger than those found in meta-analyses focused on racial/ethnic discrimination in adult populations (Pascoe & Richman, 2009; Schmitt et al., 2014) and in meta-analyses on effects of general experiences of victimization in childhood and adolescence (Hawker & Boulton, 2000; Nakamoto & Schwartz, 2010; Reijntjes, Kamphuis, Prinzie, & Telch, 2010). In contrast, our work represents the first efforts to quantify in a meta-analytic frame the strength of effects of racial/ethnic discrimination on adolescents' academics and risky health behaviors. The consistent relations we identified are of particular concern given the long-term linkages between depression, anxiety, substance use, aggression, hostility, and poor academic performance and engagement with individual's subsequent morbidity and mortality rates in the later life course (Kiecolt-Glaser, McGuire, Robles, & Glaser, 2002; Lopez, Mathers, Ezzati, Jamison, & Murray, 2006; Rugulies, 2002; Rehm, Gmel, Sempes, & Trevisan, 2003). Our findings also provide consistent evidence for integrated models of minority child development that posit the direct role that discrimination and prejudice play in the development of youth of color.

Evidence of Heterogeneity in Effect Sizes

Racial/ethnic discrimination tended to pose a greater risk for Asian-descent and Latino youth's socioemotional well-being compared to African-descent but Latino youth's academics compared to those of African descent. These differential effects are consistent with other scholarship on mean racial/ethnic differences. For example, prior studies have documented greater depressive symptoms and lower self-esteem among Asian Americans compared to Latinos, African Americans, and Whites (Brown, Meadows, & Elder, 2007; Twenge & Crocker, 2002). Latinos also tend to exhibit higher levels of depression than their

White and African American peers (Harris, Gordon-Larsen, Chantala, & Udry, 2006; Twenge & Nolen-Hoeksema, 2002) and are more likely to drop out of secondary school and less likely to attain a Bachelor's degree or higher versus their White, Asian American, and African American peers (Kena et al., 2015). Our study findings suggest that these mean differences in socioemotional adjustment (particularly challenging for youth of Asian and Latino descent) and academics (particularly challenging for Latino youth) may be driven, at least in part, by experiences of discrimination. Future research, however, is needed to determine whether Latino and Asian American youth are experiencing similar or greater levels of discrimination than their African American peers to support this conclusion. The weaker findings for adolescents of African descent may also reflect parents' socialization efforts, as African American families are more likely to employ socialization strategies that prepare their children for the bias they may face in multiple contexts of their daily lives (Else-Quest & Morse, 2015). It is also possible that stronger effects for African American youth may be observed for other developmental domains not assessed in the current meta-analysis, such as effects of physical health. Prior meta-analyses have documented stronger effects in the link between discrimination and hypertension for African American adults (Dolezsar et al., 2014), and it is possible that cardiovascular risk factors in adolescence (e.g., overweight status, blood pressure) may be similarly more susceptible to discrimination in African American adolescent populations.

There is also some evidence that gender further conditions variations by race, such that racial/ethnic discrimination was more detrimental to Latino males' academics (versus Latinas and African-descent males). The particular disadvantages for Latino males are consistent with cumulative risk, perpetual foreigner, and intersectional theories (Cheryan & Monin, 2005; Cole, 2009; Sameroff et al., 1987), which suggest that young people simultaneously hold multiple social identities that can leave them vulnerable to mistreatment, and the accumulation of risks tied to these identities can be particularly detrimental for well-being. As such, both perceived nativity (i.e., perpetual foreigner stereotypes) and gender (with males more at risk academically than females; Crosnoe & Benner, 2015) would place Latino adolescents at heightened risks for the ill effects of discrimination. However, given that African American males typically report experiences of institutional and educational discrimination that are more severe and persistent than those from other racial/ethnic groups, some scholars have posited that these early and ongoing experiences of discrimination may have particular detrimental repercussions for African American boys (Chavous et al., 2008; Smith, Allen, & Danley, 2007). As such, greater attention to potential race-by-gender variation by the perpetrator, chronicity, and severity of experiences of discrimination is warranted. Clearly, there is still much empirical work needed examining how the links between discrimination and well-being vary by race/ethnicity and gender.

Our moderation analyses also dug deeper into the issue of developmental timing effects by investigating whether the relations between racial/ethnic discrimination and well-being varied across different stages of adolescence. We observed some evidence that racial/ethnic discrimination had higher stakes for younger (versus older) adolescents' socioemotional distress. This lends some credence to our hypothesis that as they age, adolescents have a larger array of social-cognitive resources from which they can draw, which serve to protect

older adolescents against some of the challenges they face socioemotionally when encountering discriminatory treatment. Such findings are consistent with a review on the coping literature that documents developmentally-graded differences in effective coping skills across childhood and adolescence (Skinner & Zimmer-Gembeck, 2007). The developmental timing effects looked different in the academic domain, where we observed a larger effect size of racial/ethnic discrimination in middle versus early adolescence. Middle adolescence generally overlaps with the transition to high school when students often struggle with the new educational environment and a more challenging and high stakes academic curricula (Benner, 2011). Managing this transition may disrupt adolescents' ability to manage racial/ethnic discrimination, thus resulting in greater challenges to academic adjustment at this stage of the life course. Moreover, there is evidence that discrimination perpetrated by educators is increasing from early to mid adolescence (Hughes, Del Toro, Harding, Way, & Rarick, 2016), which may also contribute to the heightened effects of discrimination during this time period. Greater attention to changes in experiences of discrimination and concomitant changes in well-being across adolescence is necessary to more comprehensively unpack developmental differences in these associations.

In terms of retrospective timing of racial/ethnic discrimination measures, although we expected a larger effect size for discrimination reported over one's lifetime compared to more recent experiences of discrimination based on theories of cumulative risk, our findings showed an opposite pattern. In both socioemotional and academic domains, lifetime discrimination showed a smaller effect size than more recent discriminatory experiences, and discrimination with no specific reference of timing had the largest effect size. We suspect that discrimination with no timing reference is likely tapping into the experiences that are most salient, followed by recent discrimination experiences within a year, and thus they may be more strongly linked to well-being as compared to lifetime experiences of discrimination. Moreover, the problem of memory bias in self-reports of discrimination may be particularly an issue for recall over a longer period of time (Williams & Mohammed, 2009). Our findings in combination with this extant research suggest that in future work, scholars may want to consider alternative methods to assessing discriminatory experiences with lifetime measures. These could include more daily diary studies to gain greater information on day-to-day experiences and how these might accumulate across short time frames as well as more long-term longitudinal studies in which discrimination data could be aggregated across multiple time points that span several years.

Based on prior theoretical and empirical work, we hypothesized that the perpetrator of discrimination would moderate the effects of discrimination on outcomes. For example, when the proximal contexts of adolescents' lives—their schools, neighborhoods, and communities (Bronfenbrenner & Morris, 1998; Garcia Coll et al., 1996)—are characterized by experiences of racial/ethnic discrimination, they are more likely to be inhibiting environments detrimental to healthy development, particularly when others within the environment fail to respond to the discriminatory treatment in adequately supportive ways (DuBois, Burk-Braxton, Swenson, Tevendale, & Hardesty, 2002; Garcia Coll et al., 1996). Moreover, adolescents who recognize their proximal contexts as hostile or unwelcoming are more likely to disengage with that environment (Benner, Crosnoe, & Eccles, 2015; Farkas, 2003). Unfortunately, we lacked sufficient studies to comprehensively test these hypotheses,

as measurement of discrimination by perpetrator is rarely disaggregated. As such, no firm conclusions can be drawn until more empirical work using perpetrator-specific discrimination measures is conducted.

Future Directions for Research on Adolescents' Experiences of Discrimination

The past three decades have seen a major increase in attention to issues of racial/ethnic discrimination in adolescence, but in reviewing the current body of literature on the topic, we have identified substantial gaps in our knowledge base that could be addressed in future research. These include thinking more critically about how the field measures racial/ethnic discrimination with adolescent populations, investigating and clearly reporting processes and contextual characteristics that might moderate the link between racial/ethnic discrimination and adolescent well-being, and placing a greater focus on the intersection of discrimination tied to race/ethnicity and mistreatment linked to other social identities vulnerable to stigmatization.

Measuring racial/ethnic discrimination in adolescent populations—In total, more than 40 different measures of racial/ethnic discrimination were used by the studies included in our meta-analysis. All varied in the defined timing window and in the identified perpetrator of the discriminatory treatment. Although certainly there is broad overlap among many of these measures, each includes unique aspects that likely introduce random error variation into our current study. More measurement work is needed to analyze specific aspects of racial/ethnic discrimination (e.g., timing reference, perpetrator, overt discrimination vs. microaggressions, personally experienced vs. witnessed, in-person versus online). Moreover, although qualitative studies consistently identify racial/ethnic discrimination as an all too common experience in the lives of racial/ethnic minority youth (Romero, Gonzalez, & Smith, 2014; Rosenbloom & Way, 2004), survey and daily diary methods tend to document lower levels of mistreatment (Huynh & Fuligni, 2010; Rivas-Drake, Hughes, & Way, 2009). Whether these differences reflect issues with the quantitative measures employed, most of which are modified versions of instruments used with adult populations, or some other measurement artifact remains to be seen. Greater attention to the measurement of racial/ethnic discrimination, however, was a primary concern of the National Research Council's Panel on Methods for Assessing Discrimination (Blank, Dabady, & Citro, 2004), which concluded that, "Data collection sponsors should support research on question wording and survey design that can lead to improvements in survey-based measures relating to perceived experiences of racial discrimination" (Blank et al., 2004, p. 10).

More careful measurement work that examines the content and overlap of the vast number of discrimination measures is greatly needed. Similarly, qualitative investigations of the discriminatory experiences adolescents currently face is also critically important, as most of the discrimination measures currently used to assess discrimination during this point in the life course are somewhat dated (typically 15 to 20 years old). Given the larger political climate, the current context of reception for immigrants in the US, and the heightened role of social media in the lives of youth, it is possible that the types of discriminatory experiences adolescents encounter in their daily lives is evolving.

Interpersonal processes and contextual characteristics as potential

moderators—The integrated model of minority child and adolescent development (Garcia Coll et al., 1996) is typically utilized to identify the potential mechanisms by which discrimination might exert indirect effects on adolescent well-being; however, in their conceptualization of the pervasive role that discrimination and prejudice play in the lives of young people, Garcia Coll and colleagues (1996) also acknowledge that interpersonal interactions, cultural processes, and social structures have the potential to modify the effects of discrimination on youth in positive or negative ways. To this end, several existing studies of racial/ethnic discrimination in adolescence have identified the protective role that warm and supportive parents (Brody et al., 2006; Juang & Alvarez, 2010), nurturing and positive friendships (Brody et al., 2006; Grossman & Liang, 2008), and positive interracial climates (Benner & Graham, 2013) play in buffering the pernicious effects of discrimination as well as the role of school and neighborhood racial/ethnic composition play in exacerbating the challenges of experiencing discrimination (Benner & Graham, 2011; Seaton & Yip, 2009). Scholars investigating racial/ethnic discrimination in adolescence, however, do not commonly attend to the potential moderating role of the proximal contexts of adolescents' daily lives, and many studies that do focus on contexts either lack the data necessary for meta-analytic tests of moderation (i.e., beta coefficients of the interaction effects, r-squared values of the outcomes, total number of model parameters) or have null moderation effects and report no statistical estimates. How contextual and individual assets and resources can attenuate the effects of racial discrimination and promote resilience during adolescence is critical for designing intervention and prevention efforts that support the healthy growth and development of adolescents, and thus more attention (and more detailed reporting) is needed on this important line of inquiry.

Attention to other social identities vulnerable to stigmatization—Social stratification and the resulting differential treatment tend to occur on multiple levels and pertain to multiple social markers. In addition to race/ethnicity, other social identities possessed by youth, such as being poor, obese, or a sexual minority, can also elicit marginalization and mistreatment (Eisenberg, Neumark-Sztainer, & Story, 2003; Haines, Neumark-Sztainer, Wall, & Story, 2007; Puhl & Latner, 2007; Toomey, Ryan, Diaz, Card, & Russell, 2010), and these social identities also show substantial overlap in many cases (Adler & Rehkopf, 2008; Braveman, Egerter, & Williams, 2011; Isaacs & Schroeder, 2004; Singh, Kogan, & van Dyck, 2010; Wang & Beydoun, 2007). The developmental and social psychological research base, however, has historically insufficiently recognized the fact that many youth possess multiple, intersecting social identities that make them vulnerable to stigmatization and that these identities may privilege youth in one setting while subjugating them in another (Hancock, 2007; McCall, 2005). Whether the effects of intersecting identities are cumulative or more nuanced is an open question.

Limitations

The current meta-analytic study comprehensively synthesizes the literature on the consequences of racial/ethnic discrimination for adolescents' well-being, but some limitations and caveats should be noted. First, publication bias is a common concern with meta-analyses, as the reliance on published studies systematically skews the magnitude of

effects sizes (Sutton, 2009). We conducted a number of analyses to examine potential publication bias, and the evidence for publication bias was weak, suggesting that publication bias is not a substantial threat to our conclusions. Second, although we identified significant effect sizes capturing the negative relations between racial/ethnic discrimination and a host of developmental outcomes, such findings are based on meta-analyses of observational rather than experimental studies. As such, no definitive conclusions about causality can be made. The potential for third (omitted) variable bias is less likely given the consistent significance of effect sizes across three domains of adjustment (i.e., socioemotional distress, academics, risky health behaviors) and all individuals indicators within these domains. Moreover, studies experimentally manipulating discriminatory treatment typically document similar effect sizes to those observed in observational research (Schmitt et al., 2014). Ethical issues in experimentally manipulating discriminatory experiences with child and adolescent populations will necessarily limit the use of experimental designs with younger populations; however, longitudinal studies with adolescents that integrate a host of potential confounds and the use advanced statistical methods such as autoregressive cross-lagged techniques can purge much of the intra-individual, or omitted error, bias and better document the directionality of effects (Little, Preacher, Selig, & Card, 2007; Mayer & Carroll, 1988; Singer & Willett, 2003).

Third, for our meta-regression and sub-group analyses testing moderation, some analyses were underpowered. To test as many potential moderators as possible, we focused on broad developmental domains rather than individual well-being indicators. While this resulted in larger numbers of effect sizes for moderation analyses (greater than five in general), a few statistics were still underpowered. In part, our challenges with moderator analyses relate to a larger issue of disaggregating test statistics. Although it is currently standard practice to provide bivariate relations in peer-reviewed publications, very rarely do authors disaggregate such statistics by subgroup. This substantially limits the types of moderation that can be examined. For example, only 25 studies included in this meta-analysis provided disaggregated gender-by-ethnicity test statistics, limiting both the groups we could examine and our power to detect group differences. Similarly, we could not test for other potential moderators of interest, such as nativity or socioeconomic status, because this information is rarely consistently reported in studies, and test statistics are generally not disaggregated by these characteristics. As such, there is much left to learn about how the links between racial/ethnic discrimination and adolescents' well-being might vary across individuals and contexts.

Summary and Conclusions

The findings reported in our meta-analysis clearly illustrate the pernicious effects of racial/ethnic discrimination across multiple domains of adolescents' health and well-being, including their mental health, their engagement in risky health behaviors, and their educational success. The psychological, behavioral, and academic burdens posed by racial/ethnic discrimination during adolescence, coupled with evidence that experiences of discrimination persist across the life course for persons of color, point to discrimination as a clear contributor to the racial/ethnic health disparities observed for African American, Latino, and Native American populations compared to their White counterparts (Mays et al.,

2007; Williams & Sternthal, 2010). There is some evidence for variation of effects by individual and study characteristics (i.e., race/ethnicity, race/ethnicity-by-gender, developmental period, retrospective timing, country), but much more work is needed to clearly elucidate who is most at risk for racial/ethnic discrimination and what contexts buffer or exacerbate such risks.

There is, however, comprehensive evidence of the far-reaching effects of racial/ethnic discrimination for youth, and as such, future scholarship must also begin investigating intervention and prevention efforts. To date, the intervention science is quite limited but suggests benefits of self-affirmation activities that reduce stereotype threat responses (Bowen, Wegmann, & Webber, 2013; Cohen, Garcia, Apfel, & Master, 2006) and family-centered interventions that give children and adolescents tools for dealing with experiences of discrimination (Brody et al., 2012). Yet in addition to ameliorating the effects of racial/ethnic discrimination at the individual level, we must also work toward preventing the occurrence of discriminatory treatment on a larger scale. How to combat the prejudicial and stereotype views held by adult authority figures and peers is an open question. In their review of prejudice reduction programs, Paluck and Green (2009) identify potential in prevention efforts that facilitate more inter-group contact and cooperation. Although the costs of such programs are likely high, the economic and social costs of continuing to ignore adolescents' experiences of racial/ethnic discrimination is even higher.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Table 1
 Summary of Effect Sizes for Racial/ethnic Discrimination and Adolescent Well-being

	<i>k</i>	<i>N</i>	Mean ES	95% CI	<i>Z</i>	Mean Correlation	Homogeneity (<i>Q</i>)	<i>I</i> ²
<i>Socioemotional</i>	144	69,966	.24	*** [.22, .26]	23.05	.24	828.87	*** 83%
Depression	87	46,143	.27	*** [.24, .29]	18.43	.26	659.47	*** 87%
Internalizing symptoms	64	22,098	.27	*** [.24, .30]	16.99	.26	297.76	*** 79%
Positive well-being	33	19,795	-.14	*** [-.18, -.09]	-6.13	-.14	213.11	*** 85%
Self-esteem	55	22,665	-.17	*** [-.19, -.14]	-13.16	-.17	136.33	** 60%
<i>Academic</i>	89	35,873	-.10	*** [-.12, -.07]	-7.66	-.10	379.38	*** 77%
Achievement	56	26,566	-.09	*** [-.13, -.05]	-4.37	-.09	458.77	*** 88%
School engagement	25	19,243	-.14	*** [-.19, -.09]	-5.66	-.14	205.44	*** 88%
Motivation	51	26,566	-.11	*** [-.14, -.08]	-6.89	-.11	149.99	*** 67%
<i>Behavioral</i>	81	52,502	.20	*** [.17, .22]	15.62	.20	510.82	*** 84%
Externalizing behaviors	63	37,495	.24	*** [.21, .27]	16.28	.24	369.99	*** 83%
Risky sex behaviors	8	6,511	.16	* [.04, .29]	2.55	.16	96.96	*** 93%
Substance use	33	33,470	.13	*** [.10, .16]	9.49	.13	139.19	*** 77%
Deviant peer affiliations	14	6,514	.15	*** [.08, .22]	3.98	.15	97.34	*** 87%

Note. ES = effect size. CI = confidence interval. *k* = number of studies. *N* = number of participants in all studies. While effect sizes were used in the actual met-analysis, we transformed effect sizes back to correlation for interpretation.

* *p* < .05.

** *p* < .01.

*** *p* < .001.

Table 2
 Publication Bias in Effect Sizes for Racial/ethnic Discrimination and Adolescent Well-being

	Funnel Plot Symmetry Test											
	Egger's Test					Trim and Fill Analysis					Publication Type	
	B	(SE)	T	N of trimmed studies	Filled ES	95% CI	Z	B	(SE)	Published	Not Published	
<i>Socioemotional</i>	1.37	.33	4.15 ***	44	.18 ***	[-.16, .20]	16.62	-.06	.03 *	115	29	
Depression	1.60	.50	3.21 **	29	.19 ***	[-.16, .22]	12.82	-.08	.03 *	69	18	
Internalizing symptoms	1.43	.57	2.50 *	19	.22 ***	[-.18, .25]	12.96	-.01	.05	55	9	
Positive well-being	-.57	.71	-.80	6	-.10 ***	[-.15, -.06]	-4.38	-.10	.06	25	8	
Self esteem	-1.35	.33	-4.03 *	19	-.12 ***	[-.09, -.15]	-8.59	-.01	.03	45	10	
<i>Academic</i>	-.59	.41	-1.44	0	-.10 ***	[-.12, -.07]	-7.66	.05	.03 *	53	26	
Achievement	-1.69	.62	-2.72 **	0	-.09 ***	[-.13, -.05]	-4.37	.07	.04	29	27	
School engagement	-.88	.99	-.89	0	-.14 ***	[-.19, -.09]	-5.66	-.06	.09	20	5	
Motivation	-.14	.79	-.18	6	-.13 ***	[-.16, -.10]	-7.65	.06	.03	27	24	
<i>Behavioral</i>	1.98	.43	4.64 ***	27	.13 ***	[-.10, .15]	9.48	-.07	.03 *	61	20	
Externalizing behaviors	2.01	.45	4.44 ***	22	.17 ***	[-.14, .20]	11.03	-.08	.04 *	47	16	
Risky sex behaviors	4.75	1.26	3.78 **	5	-.02	[-.13, .10]	-.29	-	-	8	0	
Substance use	1.66	.56	2.97 **	12	.08 ***	[-.05, .11]	5.35	-.02	.05	30	3	
Deviant peer affiliations	-.48	1.77	-.27	0	.15 ***	[-.08, .22]	3.98	-.16	.10	11	3	

Note. ES = effect size. CI = confidence interval. *k* = number of studies. We did not conduct meta-regression analyses for publication type when there were less than three unpublished studies. While effect sizes were used in the meta-analyses, we transformed effect sizes back to correlations for interpretation purposes.

* *p* < .05.

** *p* < .01.

*** *p* < .001.

Table 3 Effects of Race/ethnicity on Correlations between Racial/ethnic Discrimination and Adolescent Well-being and Subgroup Analyses by Race/ethnicity

Predictor	Race/ethnicity Effect from Meta-regression		Group Differences		Subgroup Analyses														
	B (SE)	Q (df)	ES	95% CI	African			Latino			Asian			Natives					
					r	k	ES	95% CI	r	k	ES	95% CI	r	k	ES	95% CI	r	k	
Socio-emotional	LA vs. AF	.06 (.03)*	3.09 (1)	.20***	[-.16, .25]	.20	43	.26***	[.21, .30]	.25	40	.28***	[.22, .33]	.27	21	.23***	[-.14, .32]	.23	8
	AS vs. AF	.07 (.03)*	4.40 (1)*																
	NA vs. AF	.02 (.05)	.22 (1)																
	AS vs. LA	.01 (.03)	.21 (1)																
	NA vs. LA	-.03 (.05)	.18 (1)																
	NA vs. AS	-.03 (.05)	.57 (1)																
Academic	LA vs. AF	-.07 (.03)*	7.44 (1)**	-.04*	[-.09, -.00]	-.04	35	-.14***	[-.19, -.09]	-.14	23	-.12**	[-.20, -.04]	-.12	10	-.14*	[-.25, -.02]	-.14	6
	AS vs. AF	-.06 (.04)	2.85 (1)																
	NA vs. AF	-.09 (.06)	2.23 (1)																
	AS vs. LA	.01 (.05)	.08 (1)																
	NA vs. LA	-.02 (.06)	.01 (1)																
	NA vs. AS	-.02 (.06)	.04 (1)																
Behavioral	LA vs. AF	-.00 (.03)	.08 (1)	.19***	[-.14, .24]	.19	25	.20***	[.16, .25]	.20	26	.19***	[.09, .29]	.19	7	.19*	[-.07, .30]	.19	5
	AS vs. AF	-.02 (.05)	.00 (1)																
	NA vs. AF	-.01 (.07)	.01 (1)																
	AS vs. LA	-.02 (.05)	.05 (1)																
	NA vs. LA	-.01 (.07)	.06 (1)																
	NA vs. AS	.01 (.08)	.00 (1)																

Note. AF = African, LA = Latino, AS = Asian, NA = Native. ES = effect size. CI = confidence interval. Meta-regression tested the effect for the proportion of a given racial/ethnic group in the sample compared to the proportion of the reference group in the sample. Predictors with the same reference group were tested simultaneously in the same meta-regression model. Subgroup analyses compared mean effect sizes between two given groups.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

Table 4

Effects of Gender by Race/ethnicity on Correlations between Racial/ethnic Discrimination and Adolescent Well-being and Subgroup Analyses by Gender and Race/ethnicity

Predictor	B (SE)	Q (df)	Subgroup Analyses											
			African Male		African Female		Latino Male		Latino Female					
			ES	95% CI	r	k	ES	95% CI	r	k	ES	95% CI	r	k
Socio-emotional														
AF vs. AM	.09 (.06)	.33 (1)	.18 **	[.09, .32]	.18	9	.24 ***	[.07, .41]	.24	5	.32 ***	[.15, .48]	.31	3
LM vs. AM	.11 (.06)	1.82 (1)												
LF vs. AM	.10 (.05)	1.47 (1)												
LM vs. AF	.03 (.06)	.26 (1)												
LF vs. AF	.03 (.06)	.08 (1)												
LF vs. LM	.04 (.07)	1.14 (1)												
Academic														
AF vs. AM	-.07 (.06)	.82 (1)	.07	[-.05, .19]	.07	7	-.02	[-.16, .12]	-.02	5	-.17 *	[-.32, -.03]	-.17	4
LM vs. AM	-.17 (.07) *	6.76 (1) **												
LF vs. AM	-.05 (.06)	3.58 (1)												
LM vs. AF	-.08 (.06)	2.04 (1)												
LF vs. AF	.04 (.06)	.32 (1)												
LF vs. LM	.10 (.07)	3.93 (1) *												
Behavioral														
AF vs. AM	-.02 (.10)	.16 (1)	.19 **	[.06, .31]	.19	5	.23 *	[.06, .40]	.23	3	.30 ***	[.13, .47]	.29	2
LM vs. AM	-.03 (.09)	1.27 (1)												
LF vs. AM	.00 (.07)	2.63 (1)												
LM vs. AF	-.01 (.08)	.10 (1)												
LF vs. AF	.02 (.08)	.44 (1)												
LF vs. LM	.03 (.11)	.07 (1)												

Note. AM = African American male, AF = African American female, LM = Latino male, LF = Latino female. ES = effect size. CI = confidence interval. Meta-regression tested the effect for the proportion of a given gender-by-race group in the sample compared to the proportion of the reference group in the sample. Predictors with the same reference group were tested simultaneously in the same meta-regression model. Subgroup analyses compared mean effect sizes between two given groups.

* $p < .05$.

** $p < .01$.

$p < .001$

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Table 5

Effects of Developmental Stage on Correlations between Racial/ethnic Discrimination and Adolescent Well-being and Subgroup Analyses by Developmental Stage

Predictor	Developmental Stage Effect from Meta-regression			Group Differences			Subgroup Analyses								
	B (SE)	Q (df)	ES	ES	95% CI	r	k	ES	95% CI	r	k	ES	95% CI	r	k
Socio-emotional	Mid vs. Early	-.04 (.03)	1.79 (1)	.28 ***	[.23, .33]	.27	24	.24 ***	[.21, .27]	.24	49	.21 ***	[.17, .25]	.21	26
	Late vs. Early	-.06 (.03)*	5.56 (1)*												
	Late vs. Mid	-.03 (.03)	.89 (1)												
Academic	Mid vs. Early	-.08 (.04)*	4.33 (1)*	-.05	[-.10, .01]	-.05	16	-.12 ***	[-.17, -.08]	-.12	31	-.06 *	[-.12, -.00]	-.06	14
	Late vs. Early	-.02 (.04)	.19 (1)												
	Late vs. Mid	.06 (.04)	2.67 (1)												
Behavioral	Mid vs. Early	-.02 (.03)	.56 (1)	.21 ***	[.18, .25]	.21	21	.19 ***	[.16, .23]	.19	24	.17 ***	[.12, .23]	.17	13
	Late vs. Early	-.04 (.04)	1.43 (1)												
	Late vs. Mid	-.02 (.04)	.35 (1)												

Note: ES = effect size. CI = confidence interval. Meta-regression tested the effect of a given developmental stage compared to the reference developmental stage. Predictors with the same reference group were tested simultaneously in the same meta-regression model. Subgroup analyses compared mean effect sizes between two given groups.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

Table 6

Effects for Timing of Retrospective Measurement on Correlations between Racial/ethnic Discrimination and Adolescent Well-being and Subgroup Analyses by Timing

Predictor	Retrospective Timing Effect from Meta-regression			Group Differences			Subgroup Analyses										
	B (SE)	Q (df)	ES	95% CI	r	k	ES	95% CI	r	k	ES	95% CI	r	k			
Socio-emotional	Ever vs. General	-.14 (.03)***	17.81 (1)	.26***	[.23, .29]	.25	92	.12	***	[.06, .18]	.12	15	.22	***	[-.18, .25]	.22	37
	1 Year or less vs. General	-.04 (.02)	3.81 (1)														
	1 Year or less vs. Ever	.05 (.03)	8.28 (1)**														
Academic	Ever vs. General	-.06 (.04)	7.33 (1)**	-.12***	[-.15, -.10]	-.12	63	-.02		[-.09, .05]	-.02	7	-.06	**	[-.11, -.02]	-.06	19
	1 Year or less vs. General	-.03 (.03)	4.17 (1)*														
	1 Year or less vs. Ever	.10 (.03)**	.65 (1)														
Behavioral	Ever vs. General	-.10 (.05)	2.47 (1)	.21***	[.18, .25]	.21	46	.15	***	[.07, .22]	.15	10	.18	***	[-.13, .22]	.18	25
	1 Year or less vs. General	-.04 (.05)	1.46 (1)														
	1 Year or less vs. Ever	.03 (.04)	.51 (1)														

Note. ES = weighted effect size. CI = confidence interval.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

