What If Coleman Had Known About Stereotype Threat? How Social-Psychological Theory Can Help Mitigate Educational Inequality

GEOFFREY D. BORMAN AND JAYMES PYNE

The Coleman Report has inspired various lines of inquiry offering new understandings of inequality of educational opportunity and the persistent achievement gaps in American schools. Of the various models and theories, stereotype threat, *which focuses on social-psychological dimensions of inequality, has received considerable attention over the past twenty years. But what if stereotype threat theory, and associated interventions to combat it, had existed fifty years ago? Using data from the original Equality of Educational Opportunity Study, we find, consistent with the stereotype threat literature, that African American students confronted with more threatening educational contexts are burdened by a less favorable self-image; this finding partially explains how students' internalization of racial stereotypes depresses their test scores. Based on these findings and on results from numerous laboratory and field experiments documenting the impact of stereotype threat and how to mitigate it, we explore its usefulness for studying educational inequality in the years to come.*

Keywords: stereotype threat, black-white achievement gap, educational inequality

Over the past fifty years, the Coleman Report and its findings have inspired continued scholarship on inequality of educational opportunity and the achievement gaps separating racial-ethnic minority students from their white counterparts. In some cases, new lines of inquiry and new analytical methods have offered different perspectives on the report's core finding that "schools bring little influence to bear on a child's achievement that is independent of his background and general social context" (Coleman et al. 1966, 325). For instance, research on seasonal learning differences, which decomposes students' achievement gains over the school year relative to their gains over the summer months, suggests that schools are important "equalizers" as gaps tend to grow much faster during the summer than during the school year (Alexander, Entwisle, and Olson 2001, 2007; Downey, von Hippel, and Broh 2004; Heyns 1978). In addition, by applying more recent and appropriate multilevel modeling methods to the analysis of the original Equality of Educational Opportunity Study (EEOS) data, Geoffrey Borman and Maritza Dowling (2010) have found that as much

Geoffrey D. Borman is Vilas Distinguished Achievement Professor of Education Policy and Sociology and director of the Interdisciplinary Training Program (ITP) at the University of Wisconsin–Madison. **Jaymes Pyne** is an advanced doctoral student in the Sociology Department and fellow of the ITP at the University of Wisconsin–Madison.

as 40 percent of the variation in students' test scores is attributable to between-school differences, while within-school social inequalities are explained in part by teachers' biases favoring middle-class students and by schools' greater reliance on curriculum differentiation through the use of academic and non-academic tracking. These recent theories and analyses have offered important new perspectives on the Coleman Report and the conventional wisdom of our time. However, often missing from this discussion is how social stereotypes and harmful expectations about minority students' underperformance in school can undermine their social-psychological well-being and their ability to achieve their true potential in school.

As Clark McKown and Rhona Weinstein (2003) suggest, a critical component of ethnic and racial minority children's development is their growing awareness of their status as a member of a stigmatized group. The vast majority of ethnic and racial minority children report knowing that others—family or peers—have been the target of discrimination (Brown 2008; Quintana 1999). In addition to witnessing overt forms of discrimination, more subtle stereotypes within the academic domain may depress the performance of women in mathematics and related fields and African Americans and other non-Asian racial-ethnic groups in all academic areas. Claude Steele and Joshua Aronson, who coined the term in 1995, have referred to *stereotype threat* as the apprehension that individuals experience when confronted with a personally relevant stereotype that threatens their social identity or self-esteem. Steele and Aronson propose that the phenomenon could help explain group differences in performance on standardized tests and other academic outcomes. According to the theory, when individuals are aware that they belong to a group that is thought to perform poorly on a particular task, they often fear that they might perform in a way that confirms stereotypes about that group and thus be labeled as implicitly inferior to individuals for whom the stereotype does not apply. This largely unconscious fear elicits anxiety, lowered self-esteem, and other psychological responses that interfere with performance on evaluative activities in the classroom. In this way, individuals' psy-

chological processes in response to socially constructed stereotypes and prejudices may contribute to persistent social inequalities (Steele and Aronson 2004).

Though stereotype threat can undermine the academic performance of minority students, a number of recent research programs suggest that interventions aimed at *reducing* stereotype threat can attenuate its effects in school-based contexts (for example, Borman, Grigg, and Hanselman 2015; Cohen et al. 2006; Cohen et al. 2009; Good, Aronson, and Inzlicht 2003; Walton and Cohen 2007), yielding significant gains on test scores and other academic outcomes (for reviews, see Aronson and McGlone 2009; Yeager and Walton 2011). A growing number of experimental studies have shown that relatively simple, brief, but well-conceptualized social-psychological interventions that focus on individual and socially constructed beliefs that affect school outcomes can have important impacts on secondary and postsecondary students' short- and longer-term educational outcomes (Cohen et al. 2006; Cohen et al. 2009; Sherman 2013; Yeager and Walton 2011). Typically, the interventions target student beliefs that may depress academic performance—such as stereotype threat, which overwhelmingly affects minority students.

These social-psychological theories and interventions, which did not exist during the development of the Coleman Report, emphasize the power that differing attitudes, mind-sets, and perceptions have on how people view themselves and how they succeed in education and beyond. But what if these theories and interventions *had* existed in 1966? At the time, the EEOS provided some correlational evidence suggesting that black students have higher achievement scores in majority-white schools relative to scores for their counterparts in schools comprising predominantly nonwhite students. This contextual feature was the most important malleable school characteristic that Coleman and his colleagues noted as a possible remedy to address inequality, and the policies that ensued, such as busing, were targeted at improving the racial integration of schools across the country.

Nevertheless, a vast literature on compositional, contextual, or peer effects (for example,

Erbring and Young 1979; Firebaugh 1978; Mayer and Jencks 1989) has led to varying interpretations for their causes. Stephen Raudenbush and Anthony Bryk (2002) suggest that such effects—which occur when the group-level aggregate of the person-level characteristic (for example, percentage minority, school mean socioeconomic status, or school-level average achievement) is related to the achievement outcome even after controlling for the effect of the student-level characteristic—may be due to normative effects associated with a school, other unmeasured school resources or characteristics for which the aggregate school-level characteristic acts as a proxy, or statistical artifacts whereby the school-level mean explains part of the effect of a poorly measured student-level characteristic.

Research on the composition of schools and groups is often atheoretical, offering only "black box" correlational data showing relationships between school compositional features and student achievement. However, some notable theories have been implicated, including the *contact hypothesis,* which is generally attributed to Gordon Allport (1954). Allport suggested that interpersonal contact can be a highly effective means to reduce prejudice between majority- and minority-group members, in that prejudice may be reduced as one learns more about a category of people. However, for optimal intergroup contact to occur, it must take place under appropriate conditions, which include: equal group status within the context, common goals, intergroup cooperation, and authority support. Robert Slavin (1985) has shown how *cooperative learning* methods can enact Allport's contact theory in a supportive context characterized by ethnically mixed learning groups of students who study material presented by the teacher and are rewarded based on the learning of the group as a whole. In most schools, however, minority students do not experience such a supportive environment. Black students—who tend to be tracked and effectively resegregated within lower-level courses (Mickelson 2001; Oakes 1995) and who often receive disproportionate (Losen 2011) and unusually harsh discipline from authority figures (Fisher, Wallace,

and Fenton 2000)—are more often marginalized than considered of equal status with their white peers, and they often perceive limited authority support within their school.

Though the Coleman Report suggested that attending majority-white schools benefits the academic outcomes of black students—presumably through their access to potentially better resources, more challenging curricula, or higher-achieving white peers—these benefits may be offset by de facto segregation through academic tracking and by various social and psychological challenges that black students face in less-supportive school contexts. Indeed, some evidence suggests that black and Latino adolescents report more perceived discrimination as school racial-ethnic diversity increases and the relative size of their own ethnic group declines (Benner and Graham 2011; Hagan, Shedd, and Payne 2005; Seaton and Yip 2009). Aprile Benner and Sandra Graham (2009) further report that when the representation of black and Latino students' racial-ethnic groups decreases significantly across the transition from middle school to high school, these students experience declines in both feelings of belonging and academic achievement. If racial-ethnic minority students are poorly represented, evidence suggests, their small numbers may give rise to feelings of isolation or marginalization. In response, Robert Linn and Kevin Welner (2007), among others, have recently suggested that any racial-ethnic group should be at least 15 percent of the school population to mitigate both isolation and vulnerability to out-group hostility.

In this paper, we suggest that stereotype threat and other social-psychological factors can contribute to the achievement gap in significant ways and that the representation of black students in schools and classrooms appears to moderate social identity threats. We begin by describing the theories and evidence supporting the existence of stereotype threat and present evidence from several randomized field experiments attempting to alleviate stereotype threat among minority students. We then summarize how brief social-psychological interventions can work to reduce achievement

gaps at low cost and with minimal time commitment. After these considerations, we highlight our findings from the Madison Writing and Achievement Project (MWAP). Being the first districtwide randomized field trial of stereotype threat interventions to date, MWAP provides empirical evidence of the particular school contexts in which stereotype threat is most likely to occur and in which the interventions are most likely to close academic performance gaps.

In the second part of the paper, drawing on stereotype threat theory and prior empirical evidence, we explore the following question: given our current knowledge of stereotype threat, the expansive data available from the original 1966 EEOS, and modern statistical techniques and computational power, would Coleman and his colleagues have been able to find evidence of stereotype threat in their data? We use the original EEOS data and apply stereotype threat theory to determine how the concept helps us better understand black-white achievement differences between students. In doing so, we find evidence that ninth-grade African American students of the 1960s probably experienced stereotype threat, particularly in learning environments where the majority of their classmates were white. It is likely that subtle psychological and social forces undermined the academic performance of these African American students. While much of the effect of race on academic performance can be explained by structural and institutional constraints on African American students, social-psychological forces also play a role through lowered positive self-image, partially explaining the effects of majority-white environments on black students' test scores. Ultimately, we argue that when considering integration as a solution to racial inequalities, an important piece of the puzzle is addressing the ways in which minority students internalize and process the subtle and overt forms of prejudice they experience at school. Following these findings, we close with some final thoughts on the connections between the legacy of EEOS and the expanding work on social-psychological "mind-set" interventions in schools.

STEREOTYPE THREAT AND EDUCATIONAL INEQUALITY

Though national data reveal achievement gaps at every age and grade level (Vanneman et al. 2009), considerable evidence suggests growing gaps in performance during the critical secondary school years. Grade point average, motivation, academic engagement, and achievement goals appear to decline during middle and high school for all students, but African American and Latino students suffer steeper declines in school performance than their Asian and white peers (Anderman 2003; Cook et al. 2012; Sherman 2013; Shim, Ryan, and Anderson 2008). Student achievement mirrors this trend. Although there are exceptions (see Reardon and Galindo 2009), most empirical evidence suggests that achievement gaps between white and nonwhite students persist and even grow as they progress through school (Benson and Borman 2010; Downey, von Hippel, and Broh 2004; Fryer and Levitt 2004; Jencks and Phillips 1998, 2011). Data from the National Assessment of Educational Progress (NAEP) show that achievement gaps persist between black and white students (Vanneman et al. 2009) and between Hispanic and white students (Hemphill, Vanneman, and Rahman 2011), with differences in mathematics achievement growing between ages nine and thirteen.

Work in social psychology suggests that stereotype threat contributes to these patterns of disengagement and growing inequality. As Steele and Aronson (1995, 797) originally explained:

> Whenever African American students perform an explicitly scholastic or intellectual task, they face the threat of confirming or being judged by a negative societal stereotype— a suspicion—about their group's intellectual ability and competence. . . . And the self-threat it causes—through a variety of mechanisms—may interfere with the intellectual functioning of these students, particularly during standardized tests.

Steele and Aronson tested this hypothesis in a series of laboratory experiments. In the prototypical study in this series, they gave African

Figure 1. A Model of Stereotype Threat
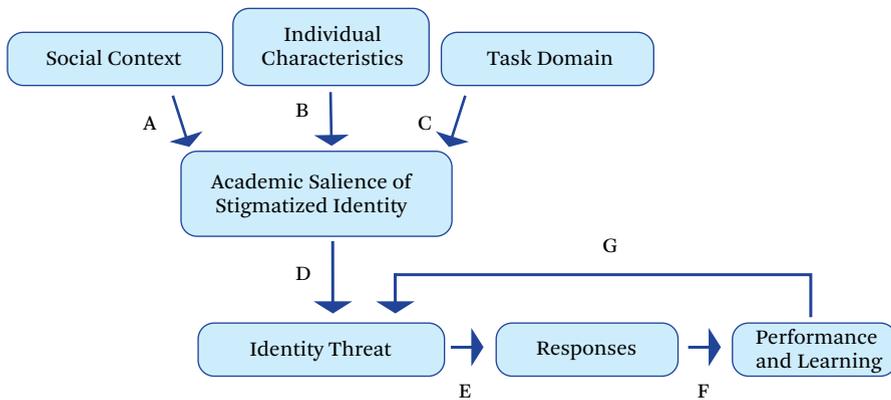
Source: Hanselman et al. 2014.

American and white college students a difficult section of a verbal Graduate Record Examination (GRE). The researchers led half of the participants to believe that the purpose of the test was to measure their intellectual ability, thereby activating the fear among African American students of confirming stereotypes about their race by performing poorly on a cognitive assessment. The others were told that the test was merely a non-evaluative laboratory exercise. Everything else about the situation was identical for the two groups, including the items on the test, the room in which they took the test, the experimenter, and so on. The results were striking: African American students who believed that the test was being used to diagnose their abilities performed significantly worse than African American students in the nondiagnostic group. The difference in the description of the test had no statistically significant effect on the white test-takers: they performed equally well in both conditions.

In the two decades since Steele and Aronson's (1995) identification of stereotype threat, more than 300 independent laboratory studies and a growing number of field studies have replicated their results, testing the phenomenon with, for instance, African American students in numerous academic settings, women and mathematics, and Latinos during verbal problem-solving. More recent research has provided clear evidence that stereotype threat effects can and do occur in real-world environments, including classrooms and schools

(Good, Aronson, and Harder 2008; Good, Aronson, and Inzlicht 2003; Good, Rattan, and Dweck 2007; Huguet and Regner 2007; Keller 2002; Keller and Dauenheimer 2003; Kellow and Jones 2005; Roberson et al. 2003). Meta-analyses of this literature suggest that standard measures of ability underestimate the true abilities of black and Latino students by about one-quarter of a standard deviation (Nguyen and Ryan 2008; Walton and Cohen 2003). A meta-analysis of field experiments suggests that the psychological threats that African American and Hispanic students suffer while taking standardized tests cause them to underperform by one-fifth of a standard deviation (Walton and Spencer 2009).

Scholars believe that stereotype threat functions through psychological and contextual factors, both situationally and over time. Figure 1 (reproduced from Hanselman et al. 2014), explains how social context (A), individual characteristics (B), and task domain (C) act as exogenous influences, raising the salience of a student's stigmatized identity in school (D) under particular conditions suggested by A, B, and C. Under those conditions that promote the salience of stigmatized identity, the student feels threats to his or her identity. The physiological and psychological stress responses (E) resulting from identity threat subsequently work to the detriment of the threatened students' academic performance and learning (F). Poor performances on academic tasks or struggles with learning new material

may then cause a recursive process (G) whereby these academic adversities further confirm students' worries about their stigmatized identity, which then reinforce their beliefs about the stigma, thus increasing identity threat.

Though evidence continues to accumulate regarding the specific mechanisms through which stereotype threat depresses academic performance, most researchers agree that physiological and psychological mechanisms such as stress responses, self-monitoring, and self-regulation are at play (Schmader, Johns, and Forbes 2008). In turn, these mechanisms manifest in counterproductive test-taking behaviors, such as selecting incorrect options on exams or changing answers more frequently than nonthreatened students do (Scherbaum et al. 2011). In addition, perceptions of negative stereotypes lead many individuals to engage in activities such as self-handicapping (Smith 2004), challenge avoidance (Good, Aronson, and Inzlicht 2003), and self-suppression (Pronin, Steele, and Ross 2004; Steele 1997).

Although many of the mechanisms of stereotype threat are psychological, contextual factors moderate whether stereotypes will threaten an individual's identity. This suggests that stereotype threat changes as context changes: identity as a person of African American background may hurt one's performance in one context, such as school, but be benign or advantageous in another context, such as a basketball game (Stone, Perry, and Darley 1997). If an organization has an ideology that is not inclusive of stigmatized groups or that gives them negative cues, or if a stereotype related to one's group membership is relevant to an important aspect of an organization, the potential for threat increases (Kray and Shirako 2011; Murphy, Steele, and Gross 2007; Murphy and Taylor 2011; Steele, Spencer, and Aronson 2002). One simple yet key contextual factor that can increase the threat to one's identity is the demographic makeup of an organization, which functions simply by raising the salience of an individual's identity in a threatening environment (Steele, Spencer, and Aronson 2002). Many researchers have found that the effects of stereotype threat are stronger when individuals identifying with stigmatized groups are underrepresented and thought to perform poorly at the tasks of the organization (Inzlicht and Ben-Zeev 2000; Murphy, Steele, and Gross 2007; Purdie-Vaughns et al. 2008; Sekaquaptewa and Thompson 2003).

Recent work has addressed the impact of stereotype threat on ongoing learning as a form of "double jeopardy" that interferes with both short-term performance and long-term knowledge acquisition (Taylor and Walton 2011). Kathryn Boucher and her colleagues (2012) find that the mathematics learning of women is compromised by negative stereotypes about women's math ability. Valerie Jones Taylor and Gregory Walton (2011) find that African American students—but not white students—who study under threatening conditions fare worse on a follow-up assessment conducted under nonthreatening conditions. The implication of these findings is that removing threats during evaluative situations alone is not a sufficient long-term solution when negative stereotypes are pervasive. Short-term underperformance due to stereotype threat might lead students to alter their career or professional aspirations and their sense of belonging in academic domains and contexts (Steele, James, and Barnett 2002). It might also lead students to "protectively disidentify" from academics (Aronson, Fried, and Good 2002; Major et al. 1998; Steele 1997), which in turn could lead to increased learning deficits (Appel and Kronberger 2012). Disengagement from the task or the context in which the task is to be performed can lead to growing disadvantages among negatively stereotyped students and might play a prominent role in the patterns of disengagement and widening achievement gaps found during the secondary school years.

Intervening to Combat Stereotype Threat

As mentioned earlier, several high-profile but small-scale experimental studies have demonstrated the important impacts of brief, well-conceptualized social-psychological interventions on educational outcomes for secondary and postsecondary students (Cohen et al. 2006; Cohen et al. 2009; Sherman 2013). Typically, these interventions target minority students' academic beliefs that might depress their academic performance. In an article published in

Science and reviewed by the What Works Clearinghouse (2010), Geoffrey Cohen and his colleagues (2009) report that brief self-affirmation tasks aimed at affirming students' personal values can reduce the black-white grade point average (GPA) gap by as much as 40 percent, improving African American students' performance over a three-month period and over a two-year follow-up.

Self-affirmation, or values affirmation, interventions administered in schools and classrooms typically consist of written prompts directing students to write about non-academic aspects of their lives that they value. Theory and recent empirical evidence suggest that when students who have doubts about their school abilities reflect on personally important domains beyond academics, they can buffer themselves against negative thoughts, stress responses, self-monitoring, and self-regulation —all of which undermine school performance (Schmader, Johns, and Forbes 2008). Students think broadly about the interests and attributes most important to them, such as friendships, family, athletics, religion, and creativity. Researchers tend to implement interventions just prior to high-stress evaluative school events—like high-stakes tests or other important exams—in order to reduce the effects of stereotype threat on academic outcomes. Ultimately, the interventions help improve students' overall self-image, and it is this enhanced self-image that allows them to demonstrate their full academic potential, unencumbered by threats to their performance.

Self-affirmation writing is a replicable and cost-effective strategy for reducing achievement gaps compared to other far costlier and more intensive school-based interventions. Indeed, the intervention typically consists of only several pieces of paper and can be administered to students in a regular classroom setting, taking approximately fifteen minutes of class time. Though self-affirmation and other similar psychological interventions are rooted in decades of research and theory, their power can be difficult to understand. That "magical" properties are often ascribed to these interventions underscores the misunderstood connections between students' psychological mindsets and their school performance (Yeager and

Walton 2011). Coleman, along with many contemporary educational researchers, might not have considered brief social-psychological interventions a conventional school resource, since most educational treatments involve comprehensive, resource-intensive reforms to curriculum, instruction, and school and classroom organization. However, as few as two fifteen-minute exercises, Cohen and his colleagues (2009) report, have a sustained two-year impact on black students' GPAs of $d = 0.40$. In comparison, a recent review by Mark Lipsey and his colleagues (2012) of the effects of more complex and costlier elementary and middle school interventions reveals typical impacts on achievement test scores ranging from $d = 0.08$ to $d = 0.15$. Though GPAs and test scores are clearly different measures of student performance, recent work suggests that grades and attendance—not test scores—are the middle grade factors most strongly connected with both high school and college success (Allensworth et al. 2014).

How do relatively brief and inexpensive interventions lead to such substantial changes in academic performance? As proximal, relatively "quick wins" accumulate, researchers note that *recursive processes act like chain reactions* to carry forward the initial effects of the intervention (Cohen et al. 2009). As Valerie Purdie-Vaughns and her colleagues (2009) argue, a small improvement early in the year due to the intervention might, for example, give students a little extra confidence, and this confidence might lead to further gains in performance leading to more confidence, in a continuously repeating cycle. Teachers might also play a role by amplifying the effects of the invention via teacher expectancy effects. Prior field-based studies have been conducted using double-blind experiments in which neither teachers nor students knew the experimental condition to which students were randomized; under similar experimental conditions, small early improvements might lead teachers to see students as abler and more worthy of attention and mentoring (Purdie-Vaughns et al. 2009).

Cohen and his colleagues (2009) find that the greatest impacts of self-affirmation come in the later terms of the school year, providing evidence of a beneficial recursive process for

students randomized to the self-affirmation treatment. By enhancing students' feelings of personal worth, the authors argue, the exercises change students' perceptions of bias at school and shift how they interpret their academic successes and failures. These steps particularly protected the study's struggling African American students; instead of feeling discouraged and falling into a pattern of disengagement, it was as though black students received an inoculation against the threat presented by negative stereotypes.

The Madison Writing and Achievement Project

Building on findings from small field-based interventions to alleviate stereotype threat, the Madison (Wisconsin) Writing and Achievement Project dealt with this source of inequality at scale for all beginning seventh-grade students across an entire urban school district. We conducted a student-level randomized trial in which we tested a self-affirmation intervention involving over 1,000 middle school students in all eleven Madison Metropolitan School District (MMSD) middle schools (grades 6–8). The intervention consisted of a sequence of writing exercises that students completed in school over the course of the academic year. Each teacher-administered exercise was designed to be similar to other classroom activities that students might experience. Following Cohen and his colleagues (2006, 2009; Sherman et al. 2013), we randomly assigned one-half of the participating students within each school to complete a self-affirmation writing exercise up to four times over the course of their seventh-grade school year. The exercises were intended to take place prior to two assessments: the Wisconsin Knowledge and Concepts Exam (WKCE) in November and the Measures of Academic Progress (MAP) tests in February and May.

The first-year MWAP outcomes revealed immediate impacts of these brief, cost-effective expressive writing exercises on Latino and African American seventh-graders' test scores and grades (Borman, Grigg, and Hanselman 2015). Howard Bloom and his colleagues (2008) report that the typical student gains 0.23 to 0.30 standard deviations on nationally normed standardized reading and math achievement tests between the spring of sixth grade and the spring of seventh grade. Understood in this context, the overall impacts of self-affirmation —which were typically between $d = 0.13$ and $d = 0.25$ in our MWAP work—actually exceed the effect sizes typically observed for other far more intensive and expensive educational interventions. Given how easily self-affirmation writing can be integrated into everyday classroom practice, self-affirmation through expressive writing appears to be a viable strategy for narrowing achievement gaps between minority students who may suffer from stereotype threat and their white and Asian peers.

Our MWAP evidence from across the eleven schools suggests that these results can be achieved at scale, but only in particular theoretically and practically relevant school contexts. Most pertinent to this paper, the project revealed that school context greatly affects the efficacy of the self-affirmation intervention (Hanselman et al. 2014). By classifying middle schools participating in the experiment as either "high-threat" (majority-white, large black-white achievement gaps) schools or "low-threat" (not majority-white, smaller black-white achievement gaps) schools, our results indicate that the effect of the intervention was large and of considerable consequence when we compared students in the high-threat schools relative to students in the low-threat schools.

STEREOTYPE THREAT IN THE EQUALITY OF EDUCATIONAL OPPORTUNITY STUDY DATA

Given what we now know about stereotype threat and educational inequality, we proceed to the empirical portion of our thought experiment: can we detect evidence of stereotype threat in the Coleman Report data? The original report looked at how racially-ethnically segregated schools might disadvantage minority students, but it did not give as much attention to how academic environments might *harm* minority students by activating social-psychological processes resulting from the salience of race, as stereotype threat theory and evidence predict. There are, however, some exceptions. For instance, Coleman and his col-

leagues (1966) did note that black students who were surveyed tended to report a higher externalized locus of control relative to white students. Also, relatedly, the Coleman Report mentions in a footnote a study in which black and white adults were offered an alternative between a risky situation in which the outcome depended on chance and one in which the outcome, though not necessarily more favorable, was contingent on their own response. "The [black] adults less often chose the alternative contingent on their own behavior, and more often chose the chance alternative, as compared to whites" (Coleman et al. 1966, 320). These findings and their mention in the report may suggest some awareness by Coleman of the possibility that black students attribute their educational and social outcomes to external, racially motivated discrimination and biases over which they have little internal control, and that these experiences can influence the psychological construct of locus of control. However, these brief thoughts, possibly hinting at what would come later in the stereotype threat literature, were at the time not mentioned as much more than asides to be considered. Coleman and his colleagues did not specifically hypothesize about the social or psychological mechanisms through which environment might be affecting black students in mostly white classes.

Today, with a vast literature to draw from, we may be able to take Coleman's aside a bit further. Since the concept and language of stereotype threat did not exist in 1966, there were no items on the EEO questionnaire explicitly tapping this concept. While we cannot detect the phenomenon directly, we can use items from the EEOS surveys to find evidence that is suggestive of stereotype threat. In the literature on stereotype threat summarized earlier (for example, Steele et al. 2002), the theory and evidence suggest that: (1) the phenomenon is stronger for potentially threatened students in contexts where the stereotype is salient for the student (for example, in schools where a student's group identity is noticeably underrepresented, such as a black student in a majority-white classroom); and (2) the phenomenon is stronger when the stereotype is important to the activity of interest (for example, "African

American students do not do well in school"). When these two criteria are met, we would expect potentially threatened individuals to experience stereotype threat.

Based on this prior knowledge, we can create constructs from EEOS survey items that serve as proxies for the relative strength of identity threats by measuring the extent to which each black student senses that he or she is the racial-ethnic minority in his or her classes. As the prior review of the literature suggested, this perception of limited representation of one's group within an academic environment in which the individual is stereotyped to perform poorly tends to induce greater salience of race-ethnicity and its associated identity threats (Inzlicht and Ben-Zeev 2000; Murphy, Steele, and Gross 2007; Purdie-Vaughns et al. 2008; Sekaquaptewa and Thompson 2003) and a stronger perception of organizational discrimination among members of the stigmatized group (Benner and Graham 2011; Hagan, Shedd, and Payne 2005; Seaton and Yip 2009).

Following the work of Paul Hanselman and his colleagues (2014) in constructing what they term "high-threat" and "low-threat" schools, we similarly model the effects of the salience of race in school for black students' cognitive skills and psychic well-being in the EEOS data. High-threat schools can be characterized both by the potential discrimination felt by stereotyped students and by the extent to which stereotyped students report that they attend majority-white schools and classrooms. We observe measures of both sources of threat in the EEOS data, focusing primarily on whether a student's report of being in a majority-white learning environment increases black-white gaps. Psychic losses from stereotype threat would be logical recursive elements related to diminished academic performance. Since stereotype threat researchers theorize that a personally relevant stereotype threatens a student's social identity or self-esteem, we consider whether high-threat environments increase black-white achievement gaps by reducing positive self-image. In the following sections, we describe the variables we construct to accomplish this, as well as our methods and findings.

Data

Equality of Educational Opportunity Study data are maintained by both the National Archives and the Inter-university Consortium for Political and Social Research (ICPSR). The EEOS used a stratified, two-stage probability sample of U.S. public schools, including over 570,000 students from grades 1, 3, 6, 9, and 12, 4,000 principals, and 40,000 teachers. We retrieved ASCII files from the National Archives, which contained U.S. Office of Education school codes, and converted the ASCII files to statistical analysis system (SAS) data sets using code provided by ICPSR.

For this study, we used the ninth-grade student cohort records and the principal and teacher records that corresponded to those students' schools. These records contained 134,030 students within 930 schools. After accounting for students clustered in schools with complete principal and teacher data relevant to this study, as well as complete student data relevant to this study, the final analytic sample consisted of 46,078 students within 218 schools. Although there are considerable data missing in these data files, prior studies have produced final samples of similar size and composition that showed no statistically significant differences on observables compared to the full sample of ninth-grade students (Borman and Dowling 2010; Bowles and Levin 1968). We created both student-level and school-level variables, which replicated many of those created by Borman and Dowling (2010). However, since we are most interested in within-school black-white gaps, we have omitted some variables and added others. Summary statistics for our set of analytic variables are presented in table 1.

Main Variables

To measure *cognitive ability,* our main dependent variable, we used each student's overall score across the four EEOS academic achievement tests: total verbal, nonverbal, reading, and math. Final results did not vary substantively or statistically whether we simply added the subscale scores or averaged across the non-missing subscale scores, so we chose the additive score for better descriptive interpretability. To not only test whether a high-threat context might influence black students psychologically but also include a potential mechanism through which stereotype threat affected student test scores, we created a *positive self-image* variable that measured whether students thought of themselves in a positive light. Student positive self-image was created using a reversed composite score of three variables found in the ninth-grade student questionnaire: (1) If I could change, I would be someone different from myself; (2) I sometimes feel that I just can't learn; (3) People like me don't have much chance to be successful in life. Each item was scored "disagree" = 2, "not sure" = 1, or "agree" = 0. The main test for the presence of an environment that might induce stereotype threat was the interaction between two variables in the EEOS data: (1) identification as black, and (2) a student's perception that he or she was learning in an environment with *majority-white classroom peers*. In the ninth-grade student survey, students were asked, "In your classes last year, how many students were white?" If the student responded with "more than half" or "all," we coded the student as having the perception of being in majority-white-peer classrooms at school. The interaction between these two variables is theoretically similar to the conditions we would expect to see for stereotype threat to be present.

Covariates

We used nine student-level covariates to obtain the *conditional* black-white test score gap: parental education; urbanicity; number of reading materials in the house; number of siblings; two-parent household; number of family resources; student's age; student's gender; and student self-reported prior-year math GPA. Additionally, we used other student-level covariates that might be relevant to black students in majority-white environments: the student's perception of teachers' expectations for his or her academic performance; the student's perception of high social standing of self and friends; the student's report of being in a high, or advanced, English track; and student-reported external locus of control. Rather than the largely unconscious weight of social-psychologically constructed stereotypes, these student covariates may help us account for

Table 1. Descriptive Statistics for Student- and School-Level Variables in the Final Sample

	N	Mean	Standard Deviation
Student-level variables			
Race-ethnicity			
White	31,403	0.65	
Black	13,165	0.27	
Hispanic	2,810	0.06	
Asian	214	0.00	
Native American	665	0.01	
Other	268	0.01	
Parent education			
Less than high school	15,501	0.32	
High school	17,679	0.36	
Some college	7,391	0.15	
BA degree or higher	7,954	0.16	
Urbanicity	16,191	0.33	
Reading materials	48,525	0.97	0.16
Number of siblings	48,525	3.71	2.22
Two-parent household	35,576	0.73	
Family resources	48,252	7.87	1.60
Age	50,821		
Female	24,701	0.51	
Total test score	48,525	95.80	28.44
Positive self-image	48,525	3.75	1.79
Majority white classroom	31,743	0.65	
Black subset threat context			
Majority white classroom	1,604	0.12	
School-level variables			
Percent parents some college	218	0.27	0.40
School type			
Rural	81	0.37	
Suburban	99	0.45	
Urban	38	0.17	
Teacher racial bias	218	13.49	1.93
Majority white school	134	61.19	

Source: EEOS data from the National Archives and the ICPSR.

other more *overt* social (for example, perception of social standing), psychological (such as locus of control), and structural (such as academic tracking) explanations of within-school black-white performance gaps.

The school-level covariates we used that might affect African American students in majority-white environments included average teacher racial bias, majority-white student school population, the percentage of parents at a school who had at least some college-level education, the school setting (rural, suburban, or urban), and the degree of track mobility. At the school level, these covariates account for potentially overt racial-ethnic biases held by school staff (for example, average teacher racial bias), structural challenges to equal opportunity (such as lack of track mobility), and the common contextual features of schools that Coleman and others have theorized may influ-

ence minority students' outcomes (such as the percentage of white students at the school or the educational background of the school's parents).

Analytical Approach

We begin our analyses by investigating black students' perceptions of their academic contexts, which, theoretically, might have made them susceptible to experiencing stereotype threat. We do so using several multilevel models with random intercepts, regressing students' positive self-image on the interaction between a student's identification as black and reporting that he or she had classrooms with peers who were majority-white. Student positive self-image is *z*-scored in these analyses. In model 1, we estimate the raw racial gap of student positive self-image. In model 2, we add the commonly used student-level controls described earlier. Model 3 adds the black-by-majority-white-classroom interaction that serves as our proxy measure for stereotype threat. Model 4 adds the student- and school-level variables that may explain the effect of the interaction.

Next, we look at the relationship between stereotype threat and students' academic achievement outcomes, as measured by the EEOS standardized test. Again, we use multilevel models with random intercepts, and the test score variable is *z*-scored. We employ five models for this outcome: Model 1 is the naive model predicting the black-white test score gap. Model 2 estimates the gap net of commonly used student- and school-level controls. Model 3 adds the black-by-majority-white-classroom interaction. Model 4 adds student-reported positive self-image as a mediator of the effect of stereotype threat on achievement scores, and model 5 adds other student- and school-level variables that might explain the effect of the black-by-majority-white-classroom interaction.

RESULTS

Table 1 displays the descriptive statistics for the final analytic sample. About 65 percent of students in the sample identified as white, 27 percent identified as black, and 8 percent identified with other race or ethnicity categories.

Turning to the variables of interest, we see that 65 percent of ninth-graders reported being in classrooms that were majority-white. However, only 12 percent of black students reported having majority-white classrooms. These lower numbers could be attributed to either between- or within-school segregation, but we are not able to descriptively distinguish those differences with the available data. The average student in the sample scored a 3.75 out of 6.00 for the positive self-image scale (standard deviation = 1.79). The tabulated covariates are consistent in proportion and size with previous studies employing the same items in the EEOS data.

In our first set of analyses, the student-level stereotype threat indicators are modeled as predictors of students' reported self-image (table 2). Model 1 shows that black students on average had unconditional positive self-image scores about a 0.21 standard deviation lower than their white peers. After controlling for student-level covariates (model 2), their reports were only a 0.02 standard deviation lower than white students' reports. Turning to our primary variable of interest, model 3 includes the black-student-by-majority-white-classroom interaction. There is a statistically significant and negative relationship for black students in majority-white classrooms (standard deviation = −0.14), suggesting that, net of controls, when black students indicated that the majority of their classmates were white, their reported belief in themselves and their potential for success in life was depressed. School-level covariates that measure the racial and sociodemographic characteristics of schools and student-level explanatory covariates that measure student perceptions of school context do not account for the negative interaction effect (model 4).

Our second set of analyses examines how stereotype threat relates to black-white differences in test scores (table 3). Model 1 identifies the raw black-white test score gap for ninth-grade students, which is one full standard deviation in size to the detriment of black students. Net of common student-level covariates (model 2), that gap was approximately a −0.43 standard deviation. When adding the black-by-majority-white-classroom interaction (model

Table 2. Multilevel Model Predicting Positive Self-Image (Z-Scored)

	Model 1		Model 2		Model 3		Model 4	
	Estimate	Standard Error	Estimate	Standard Error	Estimate	Standard Error	Estimate	Standard Error
Student-level variables								
Race-ethnicity (reference = white)								
Black	-0.21	(0.01)	-0.02	(0.01)	0.03	(0.02)	0.04	(0.02)
Hispanic	-0.40	(0.02)	-0.21	(0.02)	-0.20	(0.02)	-0.15	(0.02)
Asian	-0.07	(0.06)	-0.06	(0.06)	-0.05	(0.06)	-0.01	(0.06)
Native American	-0.44	(0.04)	-0.20	(0.04)	-0.18	(0.04)	-0.15	(0.04)
Other	-0.32	(0.06)	-0.21	(0.05)	-0.19	(0.05)	-0.17	(0.05)
Majority white classrooms			0.09	(0.01)	0.13	(0.01)	0.09	(0.01)
Black-student-by-majority-white-classrom					-0.14	(0.03)	-0.14	(0.03)
Teacher high expectations							0.06	(0.01)
High social standing							0.11	(0.01)
High English track							0.12	(0.01)
External locus of control							-0.23	(0.00)
Student-level covariates								
Parent education (reference = high school)								
Less than high school			-0.09	(0.01)	-0.09	(0.01)	-0.07	(0.01)
Some college			0.08	(0.01)	0.08	(0.01)	0.03	(0.01)
BA degree or higher			0.11	(0.01)	0.11	(0.01)	0.04	(0.01)
Urbanicity			0.04	(0.01)	0.04	(0.01)	0.02	(0.01)
Reading materials			0.12	(0.03)	0.12	(0.03)	0.11	(0.03)

	Model 1		Model 2		Model 3		Model 4	
Number of siblings			−0.01	(0.00)	−0.01	(0.00)	−0.00	(0.00)
Two-parent household			0.08	(0.01)	0.07	(0.01)	0.06	(0.01)
Family resources			0.03	(0.00)	0.04	(0.00)	0.02	(0.00)
Age			−0.05	(0.00)	−0.05	(0.00)	−0.04	(0.00)
Female			0.00	(0.01)	0.00	(0.01)	0.00	(0.01)
Prior-year math grade (reference = A)								
B			−0.17	(0.01)	−0.16	(0.01)	−0.11	(0.01)
C			−0.36	(0.01)	−0.36	(0.01)	−0.24	(0.01)
D			−0.53	(0.02)	−0.53	(0.02)	−0.37	(0.02)
F			−0.61	(0.03)	−0.60	(0.03)	−0.44	(0.03)
School-level covariates								
Teacher racial bias							−0.02	(0.02)
Majority white school							−0.02	(0.02)
Percent parents with some college							0.01	(0.01)
School type (reference = suburban)								
Rural							−0.01	(0.02)
Urban							0.03	(0.02)
Track mobility							0.00	(0.01)
Student-level intercept	0.32	(0.01)	0.64	(0.07)	0.60	(0.07)	0.41	(0.07)
School-level variation								
Intercept	—	—	−2.49	(0.10)	−2.50	(0.10)	−2.61	(0.10)
Observations	46,078		46,078		46,078		46,078	
Number of groups	—		218		218		218	

Source: EEOS data from the National Archives and the ICPSR.

Table 3. Multilevel Model Predicting Cognitive Ability (Z-Scored)

	Model 1		Model 2		Model 3		Model 4		Model 5	
	Estimate	Standard Error	Estimate	Standard Error	Estimate	Standard Error	Estimate	Standard Error	Estimate	Standard Error
Student-level variables										
Race-ethnicity (reference = white)										
Black	-1.01	(0.01)	-0.43	(0.01)	-0.40	(0.01)	-0.41	(0.01)	-0.39	(0.01)
Hispanic	-0.95	(0.02)	-0.48	(0.02)	-0.47	(0.02)	-0.43	(0.02)	-0.40	(0.01)
Asian	-0.28	(0.06)	-0.16	(0.05)	-0.15	(0.05)	-0.14	(0.05)	-0.12	(0.05)
Native American	-0.71	(0.03)	-0.37	(0.03)	-0.36	(0.03)	-0.33	(0.03)	-0.31	(0.03)
Other	-0.50	(0.05)	-0.29	(0.04)	-0.28	(0.04)	-0.24	(0.04)	-0.23	(0.04)
Majority white classrooms			0.33	(0.01)	0.35	(0.01)	0.33	(0.01)	0.33	(0.01)
Black-student-by-majority-white-classrom					-0.08	(0.02)	-0.05	(0.02)	-0.06	(0.02)
Positive self-image							0.20	(0.00)	0.14	(0.00)
Teacher high expectations									0.07	(0.01)
High social standing									-0.04	(0.01)
High English track									0.23	(0.01)
External locus of control									-0.19	(0.00)
Student-level covariates										
Parent education (reference = high school)										
Less than high school			-0.12	(0.01)	-0.12	(0.01)	-0.10	(0.01)	-0.09	(0.01)
Some college			0.21	(0.01)	0.21	(0.01)	0.19	(0.01)	0.16	(0.01)
BA degree or higher			0.29	(0.01)	0.29	(0.01)	0.27	(0.01)	0.22	(0.01)
Urbanicity			0.10	(0.01)	0.10	(0.01)	0.09	(0.01)	0.08	(0.01)
Reading materials			0.04	(0.02)	0.04	(0.02)	0.02	(0.02)	0.02	(0.02)

	Model 1		Model 2		Model 3		Model 4		Model 5	
Number of siblings			−0.01	(0.00)	−0.01	(0.00)	−0.01	(0.00)	−0.01	(0.00)
Two-parent household			0.07	(0.01)	0.07	(0.01)	0.05	(0.01)	0.05	(0.01)
Family resources			0.06	(0.00)	0.06	(0.00)	0.05	(0.00)	0.04	(0.00)
Age			−0.09	(0.00)	−0.09	(0.00)	−0.08	(0.00)	−0.07	(0.00)
Female			0.07	(0.01)	0.07	(0.01)	0.07	(0.01)	0.06	(0.01)
Prior-year math grade (reference = A)										
B			−0.28	(0.01)	−0.28	(0.01)	−0.24	(0.01)	−0.19	(0.01)
C			−0.54	(0.01)	−0.54	(0.01)	−0.46	(0.01)	−0.37	(0.01)
D			−0.72	(0.01)	−0.72	(0.01)	−0.61	(0.01)	−0.50	(0.01)
F			−0.72	(0.02)	−0.72	(0.02)	−0.59	(0.02)	−0.49	(0.02)
School-level covariates										
Teacher racial bias									0.00	(0.05)
Majority white school									0.14	(0.03)
Percent parents with some college									−0.04	(0.02)
School type (reference = suburban)										
Rural									0.05	(0.03)
Urban									0.08	(0.04)
Track mobility									−0.01	(0.01)
Student-level intercept	0.54	(0.00)	1.09	(0.06)	1.06	(0.06)	0.94	(0.06)	0.07	(0.01)
School-level variation										
Intercept	—	—	−1.30	(0.06)	−1.29	(0.06)	−1.28	(0.06)	−1.47	(0.06)
Observations	46,078		46,078		46,078		46,078		46,078	
Number of groups	218		218		218		218		218	

3), we see that although black students in majority-white classrooms performed better overall than their counterparts in other environments, black-white test score gaps were a 0.08 standard deviation larger in majority-white classrooms than in non-majority-white classrooms. Model 4 demonstrates that student-reported positive self-image explains about 31 percent of the effect of the interaction on test scores. Additional student- and school-level explanatory covariates do not further account for the statistically significant negative interaction effect (model 5).

DISCUSSION

The conclusions about social inequality furnished by the Coleman Report fifty years ago were largely overshadowed by the confounding implications of racial integration in the report. Those results suggested that black students would benefit from attending more integrated schools. However, after the desegregation policies implemented by the Nixon administration resulted in "white flight," Coleman responded by insisting that integration would work only if African American students attended schools that were majority-white. Many studies replicated Coleman's finding that black students do improve their test scores in majority-white schools. But what if Coleman had known about stereotype threat in 1966? After all, in the 1960s majority-white schools would probably have been hostile environments for black students. Stereotype threat theory and empirical evidence predict that African American students will underperform in majority-white academic environments because they are more likely to face discrimination and marginalization, to be more anxious about confirming racial stereotypes, and to think more about racial identity because their race is more salient in those environments. This interpretation of the EEOS results casts the improved performance of black students in majority-white schools in another light— would those same black students have done *even better* on the EEOS test had they not taken the test under the weight of others' perceptions of their ability based on 1960s stereotypes about race?

In our study of the EEOS data, we find that the test score gaps between white and black students were larger and statistically significant when black students reported being in majority-white classrooms, even after accounting for relevant student- and school-level covariates. This interaction effect, serving as a proxy measure for stereotype threat, supports the idea that this form of identity threat could be partly responsible for black students' lower performance, and that race might be more salient at the classroom level than at the school level. Consistent with theory, part of the effect of stereotype threat on test score gaps is explained by black students' reduced positive self-image, as reflected by their agreement with statements suggesting that they were not good learners, that people like them would not succeed in life, and that they would be someone different from themselves if they could change. This lower positive self-identity among black students explains approximately one-third of the effect of the salience of race on black students' test scores when black students were in majority-white classrooms. Other school-level covariates, such as teacher racial bias, majority-white school, the percentage of parents with some college, and school type, and other student-level contextual covariates, including students' reports of their teachers' expectations for their academic performance, their appraisals of their social standing within the school, and their reports of an externalized locus of control, do not further explain the interaction that serves as our proxy measure of stereotype threat. Of course, our results are only suggestive and neither definitively identify stereotype threat as the source of the decreased performance of black students in majority-white environments nor rule out all possible sources of increased test score gaps.

CONCLUSION

Would knowledge of stereotype threat have changed the design, results, or recommendations of the Coleman Report? Possibly, but the politics of desegregation and the more tangible policies it implied would most likely have overshadowed the significance of these social-psychological theories. Surely the prospect that black students would make great gains in majority-white schools would have outweighed

the concern that these students might continue to perform below their ability in majority-white environments owing to the increased salience of racial-ethnic identity and associated stereotypes. As Christopher Jencks and his colleagues noted in 1972, and as Jencks and Meredith Phillips restated in 1998, the small differences in the long-run economic returns of education for black students in the 1960s—due to racism in the labor market—suggest that black students' improved performance on cognitive ability measures would not have substantially improved their adult incomes and occupational attainments compared to their lower-scoring black peers. Still, given the historical accounts of the threatening nature of integrated schools prior to desegregation policies, a knowledge of stereotype threat and the interventions we now know of that could have combated its effects might at the very least have helped create less stressful school experiences and higher-quality academic climates for black students. Improvements in black students' well-being alone would have been reason to implement the brief, low-cost social-psychological interventions of today.

Presently, as in the 1960s, discrimination and segregation pervade the U.S. public school system (Fiel 2013; Orfield and Lee 2007). Although we might not expect schools in 2016 to exhibit as many of the overtly prejudicial characteristics of schools in 1966, stigmatized groups of students are still threatened by discrimination, resulting in inhibited performance in school. Much remains to be learned about how, why, where, under what conditions, and for whom interventions addressing stereotype threat close academic achievement gaps. In school contexts that theoretically and empirically activate the threat—those with a small number of minority students and with large achievement gaps—we have found far greater evidence of impact (Hanselman et al. 2014). From other self-affirmation replications, it is becoming clear that the interventions are likely to have limited success when implemented in high-percentage-minority schools, such as those studied by Thomas Dee (2015) in Philadelphia. These social-psychological theories and interventions highlight important impli-

cations for the study of educational inequality in the schools of both the 1960s and today. What school resources, climate, and demographic makeup can effectively combine to reduce inequality? Social-psychological interventions can change students' mind-sets and unlock minority students' potential to perform in school unencumbered by the stereotypes that might hold them back. But without improved school climates, quality resources, and supportive and inclusive teachers, it is still unlikely that stigmatized minority students will realize their full potential (Purdie-Vaughns et al. 2009).

Researchers are still developing comprehensive understandings of how students' mind-sets and school environments interact and shape learning outcomes, but our work and the work of others clearly demonstrate that stereotype threat explains as much as one-quarter of the black-white achievement gap, and that interventions to buffer students from the harm of stereotype threat can help close that fraction of the gap. That we find empirical evidence of stereotype threat operating in the 1960s suggests that these social-psychological theories and interventions, if known at the time, might have been of interest to Coleman and could have provided some insights into the debates regarding the racial compositions of schools in the years of desegregation that were to follow.

REFERENCES

Alexander, Karl L., Doris R. Entwisle, and Linda Steffel Olson. 2001. "Schools, Achievement, and Inequality: A Seasonal Perspective." *Educational Evaluation and Policy Analysis* 23(2): 171–91.

——. 2007. "Lasting Consequences of the Summer Learning Gap." *American Sociological Review* 72(2): 167–80.

Allensworth, Elaine, Julia Gwynne, Paul Moore, and Marisa de la Torre. 2014. "Looking Forward to High School and College: Middle Grade Indicators of Readiness in Chicago Public Schools." Chicago: University of Chicago Consortium on Chicago School Research.

Allport, Gordon W. 1954. *The Nature of Prejudice.* Cambridge, Mass.: Addison-Wesley.

Anderman, Lynley H. 2003. "Academic and Social Perceptions as Predictors of Change in Middle

School Students' Sense of School Belonging." *Journal of Experimental Education* 72(1): 5–22.

Appel, Markus, and Nicole Kronberger. 2012. "Stereotypes and the Achievement Gap: Stereotype Threat Prior to Test Taking." *Educational Psychology Review* 24(4): 609–35.

Aronson, Joshua, Carrie B. Fried, and Catherine Good. 2002. "Reducing the Effects of Stereotype Threat on African American College Students by Shaping Theories of Intelligence." *Journal of Experimental Social Psychology* 38(2): 113–25.

Aronson, Joshua, and Matthew S. McGlone. 2009. "Stereotype and Social Identity Threat." *Handbook of Prejudice, Stereotyping, and Discrimination,* edited by Todd D. Nelson. New York: Psychology Press.

Benner, Aprile D., and Sandra Graham. 2009. "The Transition to High School as a Developmental Process Among Multiethnic Urban Youth." *Child Development* 80(2): 356–76.

———. 2011. "Latino Adolescents' Experiences of Discrimination Across the First 2 Years of High School: Correlates and Influences on Educational Outcomes." *Child Development* 82(2): 508–19.

Benson, James, and Geoffrey Borman. 2010. "Family, Neighborhood, and School Settings Across Seasons: When Do Socioeconomic Context and Racial Composition Matter for the Reading Achievement Growth of Young Children?" *Teachers College Record* 112(5): 1338–90.

Bloom, Howard S., Carolyn J. Hill, Alison Rebeck Black, and Mark W. Lipsey. 2008. "Performance Trajectories and Performance Gaps as Achievement Effect-Size Benchmarks for Educational Interventions." *Journal of Research on Educational Effectiveness* 1(4): 289–328.

Borman, Geoffrey D., and Maritza Dowling. 2010. "Schools and Inequality: A Multilevel Analysis of Coleman's Equality of Educational Opportunity Data." *Teachers College Record* 112(5): 1–2.

Borman, Geoffrey D., Jeffrey Grigg, and Paul Hanselman. 2015. "An Effort to Close Achievement Gaps at Scale Through Self-affirmation." *Educational Evaluation and Policy Analysis* 38(1): 21–42. doi: 10.3102/0162373715581709.

Boucher, Kathryn L., Robert J. Rydell, Katie J. Van Loo, and Michael T. Rydell. 2012. "Reducing Stereotype Threat in Order to Facilitate Learning." *European Journal of Social Psychology* 42(2): 174–79.

Bowles, Samuel, and Henry M. Levin. 1968. "The Determinants of Scholastic Achievement: An Appraisal of Some Recent Evidence." *Journal of Human Resources* 3(1): 3–24.

Brown, Christia Spears. 2008. "Children's Perceptions of Racial and Ethnic Discrimination: Differences Across Children and Contexts." In *Handbook of Race, Racism, and the Developing Child,* edited by Stephen M. Quintana and Clark McKown. New York: Wiley.

Cohen, Geoffrey L., Julio Garcia, Nancy Apfel, and Allison Master. 2006. "Reducing the Racial Achievement Gap: A Social-Psychological Intervention." *Science* 313(5791): 1307–10. doi: 10.1126/science.1128317.

Cohen, Geoffrey L., Julio Garcia, Valerie Purdie-Vaughns, Nancy Apfel, and Patricia Brzustoski. 2009. "Recursive Processes in Self-affirmation: Intervening to Close the Minority Achievement Gap." *Science* 324(5925): 400–403. doi: 10.1126/science.1170769.

Coleman, James S., Ernest Q. Campbell, Carol J. Hobson, James McPartland, Alexander M. Mood, Frederick D. Weinfeld, and Robert L. York. 1966. *Equality of Educational Opportunity.* Washington: U.S. Department of Health, Education, and Welfare, Office of Education.

Cook, Jonathan E., Valerie Purdie-Vaughns, Julio Garcia, and Geoffrey L. Cohen. 2012. "Chronic Threat and Contingent Belonging: Protective Benefits of Values Affirmation on Identity Development." *Journal of Personality and Social Psychology* 102(3): 479.

Dee, Thomas S. 2015. "Social Identity and Achievement Gaps: Evidence from an Affirmation Intervention." *Journal of Research on Educational Effectiveness* 8(2): 149–68.

Downey, Douglas B., Paul T. von Hippel, and Beckett Broh. 2004. "Are Schools the Great Equalizer? School and Non-school Sources of Inequality in Cognitive Skills." *American Sociological Review* 69(5): 613–35.

Erbring, Lutz, and Alice A. Young. 1979. "Individuals and Social Structure Contextual Effects as Endogenous Feedback." *Sociological Methods and Research* 7(4): 396–430.

Fiel, Jeremy E. 2013. "Decomposing School Resegregation: Social Closure, Racial Imbalance, and Racial Isolation." *American Sociological Review* 78(5): 828–48. doi: 10.1177/0003122413496252.

Firebaugh, Glenn. 1978. "A Rule for Inferring Individual-Level Relationships from Aggregate

Data." *American Sociological Review* 43(4): 557–72.

Fisher, Celia B., Scyatta A. Wallace, and Rose E. Fenton. 2000. "Discrimination Distress During Adolescence." *Journal of Youth and Adolescence* 29(6): 679–95.

Fryer, Roland G., Jr., and Steven D. Levitt. 2004. "Understanding the Black-White Test Score Gap in the First Two Years of School." *Review of Economics and Statistics* 86(2): 447–64.

Good, Catherine, Joshua Aronson, and Jayne Ann Harder. 2008. "Problems in the Pipeline: Stereotype Threat and Women's Achievement in High-Level Math Courses." *Journal of Applied Developmental Psychology* 29(1): 17–28. doi: http://dx.doi.org/10.1016/j.appdev.2007.10.004.

Good, Catherine, Joshua Aronson, and Michael Inzlicht. 2003. "Improving Adolescents' Standardized Test Performance: An Intervention to Reduce the Effects of Stereotype Threat." *Journal of Applied Developmental Psychology* 24(6): 645–62.

Good, Catherine, Aneeta Rattan, and Carol S. Dweck. 2007. "Why Do Women Opt Out? Sense of Belonging and Women's Representation in Mathematics." *Journal of Personality and Social Psychology* 102(4): 700–17.

Hagan, John, Carla Shedd, and Monique R. Payne. 2005. "Race, Ethnicity, and Youth Perceptions of Criminal Injustice." *American Sociological Review* 70(3): 381–407.

Hanselman, Paul, Sarah K. Bruch, Adam Gamoran, and Geoffrey D. Borman. 2014. "Threat in Context: School Moderation of the Impact of Social Identity Threat on Racial/Ethnic Achievement Gaps." *Sociology of Education* 87(2): 106–24. doi: 10.1177/0038040714525970.

Hemphill, F. Cadelle, Alan Vanneman, and Taslima Rahman. 2011. "How Hispanic and White Students in Public Schools Perform in Mathematics and Reading on the National Assessment of Educational Progress." Washington: U.S. Department of Education, National Center for Education Statistics.

Heyns, Barbara. 1978. *Summer Learning and the Effects of Schooling.* New York: Basic Books.

Huguet, Pascal, and Isabelle Regner. 2007. "Stereotype Threat Among Schoolgirls in Quasi-Ordinary Classroom Circumstances." *Journal of Educational Psychology* 99(3): 545.

Inzlicht, Michael, and Talia Ben-Zeev. 2000. "A Threatening Intellectual Environment: Why Females Are Susceptible to Experiencing Problem-Solving Deficits in the Presence of Males." *Psychological Science* 11(5): 365–71.

Jencks, Christopher, and Meredith Phillips. 1998. "America's Next Achievement Test: Closing the Black-White Test Score Gap." *The American Prospect* (September–October): 44–53.

———. 2011. "The Black-White Test Score Gap: An Introduction." In *The Black-White Test Score Gap,* edited by Christopher Jencks and Meredith Phillips. Washington, D.C.: Brookings Institution.

Jencks, Christopher, Marshall Smith, Henry Acland, Mary Jo Bane, David Cohen, Herbert Gintis, Barbara Heyns, and Stephan Michelson. 1972. *Inequality: A Reassessment of the Effect of Family and Schooling in America.* New York: Basic Books.

Keller, Johannes. 2002. "Blatant Stereotype Threat and Women's Math Performance: Self-handicapping as a Strategic Means to Cope with Obtrusive Negative Performance Expectations." *Sex Roles* 47(3-4): 193–98.

Keller, Johannes, and Dirk Dauenheimer. 2003. "Stereotype Threat in the Classroom: Dejection Mediates the Disrupting Threat Effect on Women's Math Performance." *Personality and Social Psychology Bulletin* 29(3): 371–81.

Kellow, J. Thomas, and Brett D. Jones. 2005. "Children's Stereotype Threat in African-American High School Students: An Initial Investigation." *Current Issues in Education* 8(20, July).

Kray, Laura J. J., and Aiwa Shirako. 2011. "Stereotype Threat in Organizations." In *Stereotype Threat: Theory, Process, and Application,* edited by Michael Inzlicht and Toni Schmader. New York: Oxford University Press.

Linn, Robert L., and Kevin G. Welner, eds. 2007. "Race-Conscious Policies for Assigning Students to Schools: Social Science Research and the Supreme Court Cases." Washington, D.C.: National Academy of Education, Committee on Social Science Research Evidence on Racial Diversity in Schools.

Lipsey, Mark W., Kelly Puzio, Cathy Yun, Michael A. Hebert, Kasia Steinka-Fry, Mikel W. Cole, Megan Roberts, Karen S. Anthony, and Matthew D. Busick. 2012. "Translating the Statistical Representation of the Effects of Education Interventions into More Readily Interpretable Forms." NCSER 2013-3000. Washington: U.S. Depart-

ment of Education, National Center for Special Education Research (November).

Losen, Daniel. 2011. "Discipline Policies, Successful Schools, and Racial Justice." Policy brief. Boulder, Colo.: National Education Policy Center (October).

Major, Brenda, Steven Spencer, Toni Schmader, Connie Wolfe, and Jennifer Crocker. 1998. "Coping with Negative Stereotypes About Intellectual Performance: The Role of Psychological Disengagement." *Personality and Social Psychology Bulletin* 24(1): 34–50.

Mayer, Susan E., and Christopher Jencks. 1989. "Growing Up in Poor Neighborhoods: How Much Does It Matter?" *Science* 243(4897): 1441–45.

McKown, Clark, and Rhona S. Weinstein. 2003. "The Development and Consequences of Stereotype Consciousness in Middle Childhood." *Child Development* 74(2): 498–515.

Mickelson, Roslyn Arlin. 2001. "Subverting Swann: First- and Second-Generation Segregation in the Charlotte-Mecklenburg Schools." *American Educational Research Journal* 38(2): 215–52.

Murphy, Mary C., Claude M. Steele, and James J. Gross. 2007. "Signaling Threat: How Situational Cues Affect Women in Math, Science, and Engineering Settings." *Psychological Science* 18(10): 879–85.

Murphy, Mary C., and Valerie Jones Taylor. 2011. "The Role of Situational Cues in Signaling and Maintaining Stereotype Threat." In *Stereotype Threat: Theory, Process, and Application,* edited by Michael Inzlicht and Toni Schmader. New York: Oxford University Press.

Nguyen, Hannah-Hanh D., and Ann Marie Ryan. 2008. "Does Stereotype Threat Affect Test Performance of Minorities and Women? A Meta-analysis of Experimental Evidence." *Journal of Applied Psychology* 93(6): 1314–34.

Oakes, Jeannie. 1995. "Two Cities' Tracking and Within-School Segregation." *Teachers College Record* 96(4): 681–90.

Orfield, Gary, and Chungmei Lee. 2007. "Historic Reversals, Accelerating Resegregation, and the Need for New Integration Strategies." Los Angeles: UCLA, Civil Rights Project/Proyecto Derechos Civiles.

Pronin, Emily, Claude M. Steele, and Lee Ross. 2004. "Identity Bifurcation in Response to Stereotype Threat: Women and Mathematics." *Journal of Experimental Social Psychology* 40(2): 152–68.

Purdie-Vaughns, Valerie, Geoffery L. Cohen, Julio Garcia, Rachel Sumner, Jonathan C. Cook, and Nancy Apfel. 2009. "Improving Minority Academic Performance: How a Values-Affirmation Intervention Works." *Teachers College Record* (September 23).

Purdie-Vaughns, Valerie, Claude M. Steele, Paul G. Davies, Ruth Ditlmann, and Jennifer Randall Crosby. 2008. "Social Identity Contingencies: How Diversity Cues Signal Threat or Safety for African Americans in Mainstream Institutions." *Journal of Personality and Social Psychology* 94(4): 615–30. doi: 10.1037/0022-3514.94.4.615.

Quintana, Stephen M. 1999. "Children's Developmental Understanding of Ethnicity and Race." *Applied and Preventive Psychology* 7(1): 27–45.

Raudenbush, Stephen W., and Anthony S. Bryk. 2002. *Hierarchical Linear Models: Applications and Data Analysis Methods.* Thousand Oaks, Calif.: Sage Publications.

Reardon, Sean F., and Claudia Galindo. 2009. "The Hispanic-White Achievement Gap in Math and Reading in the Elementary Grades." *American Educational Research Journal* 46(3): 853–91. doi: 10.3102/0002831209333184.

Roberson, Loriann, Elizabeth A. Deitch, Arthur P. Brief, and Caryn J. Block. 2003. "Stereotype Threat and Feedback Seeking in the Workplace." *Journal of Vocational Behavior* 62(1): 176–88.

Scherbaum, Charles A., Victoria Blanshetyn, Elizabeth Marshall-Wolp, Elizabeth McCue, and Ross Strauss. 2011. "Examining the Effects of Stereotype Threat on Test-Taking Behaviors." *Social Psychology of Education* 14(3): 361–75.

Schmader, Toni, Michael Johns, and Chad Forbes. 2008. "An Integrated Process Model of Stereotype Threat Effects on Performance." *Psychological Review* 115(2): 336–56.

Seaton, Eleanor K., and Tiffany Yip. 2009. "School and Neighborhood Contexts, Perceptions of Racial Discrimination, and Psychological Well-being Among African American Adolescents." *Journal of Youth and Adolescence* 38(2): 153–63.

Sekaquaptewa, Denise, and Mischa Thompson. 2003. "Solo Status, Stereotype Threat, and Performance Expectancies: Their Effects on Women's Performance." *Journal of Experimental Social Psychology* 39(1): 68–74.

Sherman, David K. 2013. "Self-affirmation: Understanding the Effects." *Social and Personality Psychology Compass* 7(11): 834–45.

Sherman, David K., Kimberly A. Hartson, Kevin R. Binning, Valerie Purdie-Vaughns, Julio Garcia, Suzanne Taborsky-Barba, Sarah Tomassetti, A. David Nussbaum, and Geoffrey L. Cohen. 2013. "Deflecting the Trajectory and Changing the Narrative: How Self-Affirmation Affects Academic Performance and Motivation Under Identity Threat." *Journal of Personality and Social Psychology* 104(4): 591–618.

Shim, S. Serena, Allison M. Ryan, and Carolyn J. Anderson. 2008. "Achievement Goals and Achievement During Early Adolescence: Examining Time-Varying Predictor and Outcome Variables in Growth-Curve Analysis." *Journal of Educational Psychology* 100(3): 655.

Slavin, Robert E. 1985. "Cooperative Learning: Applying Contact Theory in Desegregated Schools." *Journal of Social Issues* 41(3): 45–62.

Smith, Jessi L. 2004. "Understanding the Process of Stereotype Threat: A Review of Mediational Variables and New Performance Goal Directions." *Educational Psychology Review* 16(3): 177–206.

Steele, Claude M. 1997. "A Threat in the Air: How Stereotypes Shape Intellectual Identity and Performance." *American Psychologist* 52(6): 613–29.

Steele, Claude M., and Joshua A. Aronson. 1995. "Stereotype Threat and the Intellectual Test Performance of African Americans." *Journal of Personality and Social Psychology* 69(5): 797–811.

———. 2004. "Stereotype Threat Does Not Live by Steele and Aronson (1995) Alone." *American Psychologist* 59(1): 47–48.

Steele, Jennifer, Jacquelyn B. James, and Rosalind Chait Barnett. 2002. "Learning in a Man's World: Examining the Perceptions of Undergraduate Women in Male-Dominated Academic Areas." *Psychology of Women Quarterly* 26(1): 46–50.

Steele, Claude M., Steven J. Spencer, and Joshua Aronson. 2002. "Contending with Group Image: The Psychology of Stereotype and Social Identity Threat." *Advances in Experimental Social Psychology* 34: 379–440.

Stone, Jeff, W. Perry, and John M Darley. 1997. "'White Men Can't Jump': Evidence for the Perceptual Confirmation of Racial Stereotypes Following a Basketball Game." *Basic and Applied Social Psychology* 19(3): 291–306.

Taylor, Valerie Jones, and Gregory M. Walton. 2011. "Stereotype Threat Undermines Academic Learning." *Personality and Social Psychology Bulletin* 37(8): 1055–67.

Vanneman, Alan, Linda Hamilton, Janet Baldwin Anderson, and Taslima Rahman. 2009. "Achievement Gaps: How Black and White Students in Public Schools Perform in Mathematics and Reading on the National Assessment of Educational Progress: Statistical Analysis Report." NCES 2009-455. Washington: U.S. Department of Education, National Center for Education Statistics.

Walton, Gregory M., and Geoffrey L. Cohen. 2003. "Stereotype Lift." *Journal of Experimental Social Psychology* 39(5): 456–67.

———. 2007. "A Question of Belonging: Race, Social Fit, and Achievement." *Journal of Personality and Social Psychology* 92(1): 82–96.

Walton, Gregory M., and Steven J. Spencer. 2009. "Latent Ability: Grades and Test Scores Systematically Underestimate the Intellectual Ability of Negatively Stereotyped Students." *Psychological Science* 20(9): 1132–39.

What Works Clearinghouse. 2010. "WWC Quick Review of the Article 'Recursive Processes in Self-Affirmation: Intervening to Close the Minority Achievement Gap.'" Available at: http://ies.ed .gov/ncee/wwc/pdf/quick_reviews/selfaffirm _020910.pdf (accessed June 27, 2016).

Yeager, David S., and Gregory M. Walton. 2011. "Social-Psychological Interventions in Education: They're Not Magic." *Review of Educational Research* 81(2): 267–301. doi: 10.3102/00346543 11405999.