

Social Equity Theory and Racial-Ethnic Achievement Gaps

Clark McKown

Rush University Medical Center

In the United States, racial-ethnic differences on tests of school readiness and academic achievement continue. A complete understanding of the origins of racial-ethnic achievement gaps is still lacking. This article describes social equity theory (SET), which proposes that racial-ethnic achievement gaps originate from two kinds of social process, direct and signal influences, that these two kinds of processes operate across developmental contexts, and that the kind of influence and the setting in which they are enacted change with age. Evidence supporting each of SET's key propositions is discussed in the context of a critical review of research on the Black–White achievement gap. Specific developmental hypotheses derived from SET are described, along with proposed standards of evidence for testing those hypotheses.

This article offers an account of the varied social processes that contribute to mean differences in test scores between children from different racial-ethnic groups, spanning preschool to high school (Jencks & Phillips, 1998; Lee, 2002; Lee & Burkam, 2002). In the United States, on measures of school readiness and academic achievement, Asian Americans achieve higher average scores than White students, who in turn achieve higher average scores than their Black and Latino peers (Jencks & Phillips, 1998; Lee, 2002; Reardon & Galindo, 2009). Because it has received a great deal of attention, the Black–White achievement gap is used to illustrate the major points of this article. The broad goal of this article, however, is to propose a model that applies to a variety of racial-ethnic and other achievement gaps.

Racial-ethnic achievement gaps are substantial life-span phenomena. By all accounts, the magnitude of the Black–White achievement gap is considerable, ranging from .5 to 1.0 *SD*, depending on the sample and the measure (Jencks & Phillips, 1998; Lee, 2002; Reardon & Galindo, 2009; Reardon & Robinson, 2007; Vanneman, Hamilton, Anderson, & Rahman, 2009). The Black–White achievement gap affects individuals and the generation to which they belong, beginning in early childhood and spanning

all educational levels (Farkas, 2003). In terms of school readiness, research has consistently demonstrated that prior to school entry, Black students achieve lower average scores than White students (Brooks-Gunn, Klebanov, & Duncan, 1996; Duncan, Brooks-Gunn, & Klebanov, 1994; Lee & Burkam, 2002). Over the course of elementary school, the Black–White achievement gap appears to grow (Farkas, 2003; Fryer & Levitt, 2004, 2005; Phillips, Crouse, & Ralph, 1998).

The Black–White achievement gap is a highly consequential social problem. School readiness and academic achievement are associated with the kinds of jobs and wages people are able to secure. Racial-ethnic achievement gaps that begin at school entry and persist through school completion thus can influence racial-ethnic gaps in socioeconomic status (SES) across the life span (e.g., Levin, 2009; Reardon & Robinson, 2007). In turn, SES is robustly associated with health (Adler, Boyce, Chesney, & Cohen, 1994; Levin, 2009). Furthermore, the health of any democratic society is predicated on the ability of its population to make informed choices at the ballot box. When large segments of the population are inadequately educated, democracy's health is at risk.

As with any social problem, how policy makers, practitioners, and the public formulate the Black–White achievement gap's cause will guide what is done, and what is not done, to solve the problem (Humphreys & Rappaport, 1993; McKown, 2005;

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Correspondence concerning this article should be addressed to Clark McKown, Rush NeuroBehavioral Center, 4711 Golf Road, Suite 1100, Skokie, IL 60076. Electronic mail may be sent to Clark_A_McKown@rush.edu.

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Seidman, 1983). Almost all accounts of racial-ethnic achievement gaps acknowledge the influence of multiple processes in multiple settings (e.g., Boykin, 1986; Garcia-Coll, 1990; Weinstein, 2002; Weinstein & McKown, 1998). Nevertheless, much prior work on the Black–White achievement gap has focused on specific processes operating in a limited range of contexts. For example, some have argued that racial differences in genetic endowment cause the gap (Jensen, 1969; Rushton & Jensen, 2005). Others have focused on the contribution of SES and family factors (Brooks-Gunn, Klebanov, Smith, Duncan, & Lee, 2003), cultural values (Ogbu, 2002; Thernstrom & Thernstrom, 2002), academic stereotypes (Steele & Aronson, 1995), and degree of match between home and school environments (Brice-Heath, 1983; Tharp, 1989).

More focused accounts are sometimes criticized because they do not account for the entire racial-ethnic achievement gap, even though they are often interpreted as doing so. For example, in a critical review, Sackett, Hardison, and Cullen (2004) acknowledged that one social process—stereotype threat—can depress Black students' test scores. However, they strongly questioned common interpretations of the research that stereotype threat is the sole cause of the Black–White test score gap, and that if it were eliminated, the gap would therefore disappear.

That theory and research have developed in a targeted way is understandable—evaluating multifactorial accounts of the gap's origin is challenging. The conceptual challenge is to broaden inquiry without mounting atheoretical “fishing expeditions” that provide few insights. The practical challenge is to muster resources to meaningfully evaluate the combined influences of multiple social processes across key developmental contexts. What is needed is a theory broad and flexible enough to account for varied sources of social influence, yet specific enough to provide a parsimonious account of the achievement gap.

The purpose of this article is to describe social equity theory (SET), a novel account of social processes that together give rise to racial-ethnic achievement gaps. SET provides a heuristic for organizing and integrating research on racial-ethnic achievement gaps. SET is proposed as a theory because: (a) it makes specific commitments about the social processes that are relevant to understanding the achievement gap, (b) it offers a causal explanatory framework to explain the racial-ethnic achievement gap, and (c) it generates specific, falsifiable hypotheses.

SET Defined

SET describes social processes that contribute to racial-ethnic achievement gaps. SET explains mean differences in achievement by members of different racial-ethnic groups. There is, of course, considerable within-group variability in academic readiness and achievement. Within-group and between-group differences in academic readiness and achievement are distinct. SET does not address the causes of individual variability in achievement. Rather, it explains factors that together create between-group differences in school readiness and achievement.

In the context of SET, the term *social processes* refers to transactions between individuals, including verbal and nonverbal communication directed from one person to another. The term *social processes* also refers to communications between individuals and social settings, in which an event or characteristic of the setting—apart from interpersonal interactions—communicates something of social consequence. For example, a poster depicting a civil rights event on a classroom wall may communicate something of social consequence without involving an *interpersonal* communicative transaction.

SET adopts an ecological perspective (Bronfenbrenner, 1977; Kelly, 1987; Spencer, 1999; Weinstein, 2002) to formulate what social processes in what contexts create and maintain racial-ethnic achievement gaps. SET includes four propositions about the origins of racial-ethnic achievement gaps:

1. Two classes of social process influence racial-ethnic achievement gaps. *Direct influences* are social processes that support achievement. Direct influences contribute to the racial-ethnic achievement gap when they are distributed differently to people from different racial-ethnic groups. *Signal influences* are cues that communicate negative expectations about a child's racial-ethnic group. When children from negatively stereotyped groups detect such cues, this can erode achievement.
2. Signal influences depend on children's ability to detect cues signaling a stereotyped expectation, and this ability increases significantly during the elementary grades.
3. Social processes affecting the achievement gap operate across a limited range of key developmental settings, and the relevant settings change lawfully with age.
4. Together, relevant direct and signal influences across developmental contexts account for the achievement gap.

From these propositions, it is possible to develop specific and falsifiable developmental hypotheses about the origins of racial-ethnic achievement gaps. What follows is a review of evidence supporting the existence of direct and signal influences on the achievement gap, their combined influence, and the contexts in which they influence racial-ethnic achievement gaps. The review focuses on research into the Black-White achievement gap. A subsequent section articulates specific hypotheses uniquely derived from SET. The article finishes with proposed standards of evidence to guide future work on SET and its component parts.

Evidence in Support of SET Propositions

Direct Influence on the Achievement Gap

Direct influences, defined. Direct influences are social processes that promote academic achievement similarly for all children in all racial-ethnic groups. SET proposes that direct influences contribute to racial-ethnic achievement gaps when they are systematically and unequally distributed to members of different racial-ethnic groups. Direct influences on racial-ethnic achievement gaps may unfold at home, in school, with peers, and in neighborhoods.

Home. In the home, particularly for young children, parent-child interactions and the relationships within which they take place are important contexts for children's development. A substantial body of research suggests that the characteristics and quality of parent-child interactions influences preacademic and academic outcomes. For example, Baumrind (1966; see also Baumrind & Black, 1967), focusing largely on White middle-class samples, examined the relation between parenting styles and a variety of life outcomes among children. They examined two dimensions of parenting style: supportiveness and demandingness. Supportiveness referred to the level of expressed parental love, nurturance, and responsiveness. Demandingness referred to the clarity of rules and the firmness and fairness of parental discipline practices. They found that when parents provided a combination of high support and high demand—what they called “authoritative” parenting—children had better average academic, social, and emotional outcomes.

There is some evidence that what normative parenting is varies from one racial-ethnic group to the next. Mandara and Murray (2002) found that Baumrind's (1966) parenting styles typology characterized Black parenting, but that Black authoritative

parenting included greater demand and less compromise than White authoritative parenting. In addition, the relation between parenting and academic outcomes can differ for different groups. For example, at least two independent research groups have found that among Black children, the higher the overall neighborhood distress, the more strict parenting is associated with positive academic outcomes (Baldwin, Baldwin, & Cole, 1990; Gonzales, Cauce, Friedman, & Mason, 1996).

Prior research thus suggests that the same parenting practices do not always promote the same academic outcomes for children from different racial-ethnic groups, leaving open the question of whether parenting is a direct influence. The literature cited above suggests that what is *optimal* parenting for the development of academic outcomes may be different for children from different racial-ethnic groups and in different contexts. However, the same research suggests that for children from all racial-ethnic groups, achievement-supporting parenting—in whatever form that takes for the child's racial-ethnic group and context—plays a key role in the development of children's preacademic and academic skills.

For optimal parenting practices to exert a direct influence on the Black-White achievement gap, it must be present at different average levels in Black and White homes. In an important review article, Brooks-Gunn and Markman (2005) reported that there are racial-ethnic differences in parenting practices. They reported that, compared to White parents, Black parents on average engaged less frequent warm and sensitive parenting and more frequent negative and intrusive parenting. It is important to note that effect sizes were small, indicating a high degree of overlap in the distributions of parenting behavior. In addition, they reported differences in the frequency and richness of language exposure and availability of books and other stimulating materials, with Black parents on average engaging in less frequent conversation and having fewer books and other media available.

Parenting is thus associated with preacademic and academic skill development, and optimal parenting is, on average, more available to White children than to Black children. That does not mean that these factors necessarily explain the Black-White achievement gap. It is possible, for example, that parenting and achievement gaps both arise from a third variable, such as Black-White socioeconomic differences. If this were true, in empirical models with SES and parenting as independent variables and academic score as the dependent vari-

able, SES, but not parenting, would be associated with academic outcomes. Existing evidence runs contrary to this conclusion. Examining the ECLS-K data, when Lee and Burkam (2002) controlled for SES, the magnitude of the racial-ethnic school readiness gap was reduced, but not eliminated. Similarly, in secondary analyses of several large data sets, Magnuson and Duncan (2006) found that SES accounts for some, but not all, of the Black-White test score gap among young children. Furthermore, in middle childhood and adolescence, accounting for SES reduces, but does not eliminate the Black-White test score gap (Phillips, Brooks-Gunn, Duncan, Klebanov, & Crane, 1998).

When SES and racial-ethnic differences in parenting practices are accounted for, the size of the school readiness gap is dramatically reduced. For example, two studies found that among preschoolers, maternal warmth and engagement account for much of the Black-White gap that remained when SES was accounted for (Brooks-Gunn et al., 1996, 2003). Another study found that when controlling for SES, all the residual early childhood Black-White reading readiness gap and much of the residual math readiness gap was accounted for by family factors such as the frequency of reading (Lee & Burkam, 2002).

Parenting also helps explain the Black-White achievement gap in older children. For example, Mandara, Varner, Greene, and Richman (2009) examined the relation between parenting practices and the Black-White adolescent achievement gap. They examined multiple parenting practices, such as involving adolescents in decision making, parental monitoring, number of household chores, school orientation, and maternal warmth. They reported that: (a) White parents generally engage in more achievement-promoting practices than Black parents, (b) this difference is largely accounted for by racial-ethnic differences in SES, and (c) accounting for multiple parenting practices that promote achievement explains the entire adolescent achievement gap (Mandara et al., 2009).

In summary, optimal parenting practices: (a) promote preacademic and academic outcomes for all children; (b) are systematically and unequally distributed by racial-ethnic group; (c) are not an artifact of one critical potential confound, SES; and (d) account for much of the achievement gap that remains when SES is accounted for. Taken together, these findings suggest that parenting serves as a direct influence on the Black-White achievement gap.

School. The quality of instruction and the quality of student-teacher relationships may act as direct

influences on racial-ethnic achievement gaps. Each of these school factors affects achievement similarly for students from all racial-ethnic groups. In addition, high-quality instruction and positive student-teacher relationships are more available for White than for Black students.

These direct influences can operate both between and within schools (Hanushek & Rivkin, 2009; Page, Murnane & Willett, 2008). In terms of between-school influences, for example, compared to White students, Black students attend schools in which instructional quality and teacher skill are, on average, lower (Clotfelter, Ladd, & Vigdor, 2004). Similarly, Lee and Burkam (2002) reported that at school entry, children from different racial-ethnic groups benefited from different levels of teacher experience, with African American children being assigned to less experienced teachers than their White and Asian peers. Thus, systematic racial-ethnic differences in the availability of experienced teachers and high-quality instruction between schools may exert a direct influence on the achievement gap.

Within-school processes may also exert a direct influence on the achievement gap. One important within-school process that can contribute to the achievement gap is mean Black-White differences in the quality of instruction. For example, throughout the primary and secondary grades, Black children are more often assigned to lower tracks than their White peers (Entwisle, Alexander, & Olson, 1997; Lucas & Berends, 2002). Children in different tracks are in turn exposed to different quality instruction, with students in higher tracks exposed to interesting and challenging material. Students in lower tracks, in contrast, are exposed to work that is repetitive, uninteresting, and focused on behavioral control (Boykin, 1986; Oakes, 2005; Weinstein, 2002). The quality of curriculum is thus a direct influence because it is associated with academic outcomes and it varies systematically by racial-ethnic group.

Black-White mean differences in the quality of relationships between teachers and students can also contribute to the achievement gap. The level of closeness and caring children and adolescents experience with their teachers influences academic outcomes (Gregory & Weinstein, 2004; Hamre & Pianta, 2005; Weinstein, 2002). On average, White students enjoy closer and more caring relationship with their teachers than Black students. For example, in a study that included 197 preschool and kindergarten teachers, Saft and Pianta (2001) found that White students enjoy less conflict with and

dependency on their teachers than their Black peers. Similarly, in a study that included 607 academically at-risk first graders, teachers reported higher quality relationships with White compared to Black students (Hughes, Gleason, & Zhang, 2005). Others have found that teachers on average expect more of White students than Black students with similar records of achievement (Baron, Tom, & Cooper, 1985; Ferguson, 2008; McKown & Weinstein, 2008). Thus, there is evidence that the quality of teacher-student relationships may be a direct influence on the achievement gap: Those relationships are associated with academic outcomes and are, on average, higher quality for White students than their Black peers.

Educational field trials have provided evidence that equalizing instructional quality can reduce the gap. Success for All, a literacy curriculum that combines intensive focus on phonics and adherence to particular instructional practices, has been shown to reduce the achievement gap. Furthermore, the longer students are exposed to the curriculum, the greater the reduction in the gap (Slavin & Madden, 2001). Similarly, KIPP schools, a small network of charter schools that have extended hours, culturally appropriate instructional practices, individualized mentoring, and structured instruction, have shown promising evidence of promoting racial-ethnic minority achievement (Educational Policy Institute, 2005). These lines of evidence suggest that the quality of instruction is a direct influence on the achievement gap, with differential allocation of instructional quality contributing to Black-White differences in learning and achievement.

In summary, several school-based resources have a critical influence on achievement, including the quality of teachers, curriculum, and teacher-student relationships. There is evidence that White students, on average, benefit from better teachers, more challenging curriculum, and better relationships with teachers than their Black peers with similar records of achievement. Thus, these school factors likely exert a direct influence on the Black-White achievement gap.

Peers. Peer relationships and peer norms may exert a direct influence on the achievement gap. For example, ethnographic research suggests that for Black youth, the stigma associated with academic ambition and its connection with White culture can contribute to Black underachievement (Austen-Smith & Fryer, 2005; Fordham & Ogbu, 1986; Majors & Billson, 1993). Consistent with this formulation, Ferguson (2008) reported survey results suggesting that Black suburban high school students

were more likely than their White peers to report withholding academic effort because of concern about how others might view them. Similarly, Graham (2001) reported that some racial-ethnic minority students value low-performing peers more than high-performing peers. Other studies, however, find less support for the effects of peer culture on the achievement gap (Ainsworth-Darnell & Downey, 1998; Cook & Ludwig, 1998). In contrast to the literatures on the influence of family factors and schooling, less empirical research has examined the influence of peers on the achievement gap. As a result, it remains largely an open question what peer influences most strongly influence achievement at what age, whether those influences are present in different amounts among children from different racial-ethnic groups, and overall, how much peer influences contribute to the achievement gap.

Neighborhood. Neighborhoods may exert a direct influence on the achievement gap. For example, the "collective efficacy" of neighborhoods, defined as the level of community cohesion and social support, may influence a variety of outcomes, including achievement (Sampson, Raudenbush, & Earls, 1997). In communities with strong cohesion, neighbors support one another as they work to achieve a range of goals, including the education of their children. Cook, Herman, Phillips, and Settersten (2002) found that the higher the neighborhood cohesion, the better students performed in school. Furthermore, children from different racial-ethnic groups remain largely segregated from one another within and across neighborhoods (Reardon et al., 2009) that differ in levels of achievement-promoting neighborhood cohesion. It is therefore plausible that neighborhood cohesion would exert a direct influence on the achievement gap. However, further research is necessary before a strong conclusion can be drawn.

Factors outside the realm of direct influences. Many phenomena partially fulfill the definition of a direct influence, but are not direct influences as defined by SET. Many of these factors are critical contexts that may themselves influence the proximal social transactions described by SET. For example, family structure (McLanahan & Percheski, 2008), SES (Yeung & Conley, 2008), and family wealth (Orr, 2003) are associated with achievement. In addition, there are mean racial-ethnic differences in family structure, SES, and family wealth. These phenomena thus embody two characteristics of direct influences: (a) they are associated with achievement, and (b) they systematically differ between racial-ethnic groups.

However, none of these phenomena is a *social process*, defined as a communication between individuals or between individuals and settings. As a result, they do not meet SET's definition of a direct influence. SET is thus narrowly tailored to explain the proximal social processes influencing the achievement gap. At the same time, there is very little doubt that broader contexts play a critical role in shaping the achievement gap. SET conceptualizes social processes as the mechanisms through which broader contexts shape the achievement gap. This conceptualization is consistent with work suggesting, for example, that the relation between SES and developmental outcomes is mediated by more proximal social processes (Brooks-Gunn & Duncan, 1997; Garcia-Coll, 1990; Guo, Brooks-Gunn, & Harris, 1996).

Summary. Social processes at home, at school, in the peer group, and in neighborhoods are associated with academic outcomes. Furthermore, these social processes are distributed unequally to children from different racial-ethnic groups. SET predicts that children from different racial-ethnic groups with similar exposure to these direct influences will achieve more similarly than children who have different exposure to those direct influences. However, SET also predicts that accounting for multiple direct influences will, in general, *reduce, but not eliminate racial-ethnic* differences in achievement. In addition to direct influences, other factors, called signal influences, contribute to the gap. As a result, even a comprehensive account of direct influences would not entirely explain the gap, particularly in late elementary school and beyond.

Signal Influences on the Achievement Gap

Signal influences, defined. Signal influences are social events that signal to members of negatively stereotyped groups that they are devalued because of their group membership (Inzlicht & Ben-Zeev, 2000; Mendoza-Denton, Downey, Purdie, Davis, & Pietrzak, 2002; Steele, 1997; Steele & Aronson, 1995). Signal influences may be overt, such as when a person is told directly that people from his or her group are not capable. Signal influences may also be ambiguous, such as when one person communicates through nonverbal behavior negative feelings toward another. Settings may also propagate signal influences outside of the context of an interpersonal encounter. For example, exposure to material that makes a child's racial-ethnic group membership salient can trigger signal influences with no interpersonal interaction (Ambady, Shih, Kim, & Pittinsky,

2001). When the target of an interpersonal or setting signal is from a stereotyped racial-ethnic group, the target may interpret that signal as a communication that the target is devalued because of his or her racial-ethnic group membership. Such a signal can interfere with performance in a stereotyped domain (Steele & Aronson, 1995). To someone from a nonstereotyped group, the same social events will not be interpreted as devaluing a self-relevant identity.

Signal influences are transactional. They do not exist solely in the mind of stereotyped individuals. Neither do they exist solely in the social setting with which the individual is engaged. Consistent with the definition of stereotype threat (Steele & Aronson, 1995), signal influences occur when an event in a social setting activates a concern in the mind of a stereotyped individual—consciously or not—that he or she may be judged on the basis of the stereotype. This process is distinct from self-stereotyping processes, which are presumed to occur in the mind of the stereotyped individual. It is also distinct from direct influences, although some social processes, described later, can operate as either direct or signal influences.

A paradigmatic example from the stereotype threat literature is that of the standardized testing situation. Although outwardly the same for all children, when testing conditions highlight that a challenging test is diagnostic of ability, members of academically stereotyped groups may become concerned that their performance will be judged in light of a stereotype about their group's intellectual ability, in turn lowering performance (McKown & Strambler, 2009; McKown & Weinstein, 2003; Steele & Aronson, 1995). The same event may communicate different meanings to children, depending on the prevailing cultural stereotype about each child's racial-ethnic group. For children from academically stereotyped racial-ethnic groups, the testing situation may signal the possibility of being devalued, which, in turn, can hamper performance.

Routine signal events. What characteristics of developmental contexts are likely to propagate signal influences on children's achievement, producing racial-ethnic differences in achievement? Experimental evidence has identified several kinds of events that propagate signal influences, including characterizing a test as diagnostic of natural ability (McKown & Strambler, 2009; McKown & Weinstein, 2003, Study 2; Steele & Aronson, 1995, Experiment 1), cuing participants to think about a stereotyped self-relevant identity before completing a task (Ambady et al., 2001), and telling partici-

pants directly that members of their group routinely perform worse on a task than members of other groups (Aronson et al., 1999). More commonplace factors, such as group composition, can create signal influences on academic performance, with minority status itself potentially signaling stereotyped expectations to minority group members (Inzlicht & Ben-Zeev, 2000; Murphy, Steele, & Gross, 2007).

Signal influences have been consistently demonstrated in the lab. It is less clear what events in daily life communicate to children that their intellectual ability is devalued because of their racial-ethnic group. Research on interpersonal expectancy effects suggests that teacher expectations may exert signal influences. In many classrooms, teachers expect more of White and Asian children than Black and Latino children with similar records of achievement (Baron et al., 1985; McKown & Weinstein, 2008; Rubovits & Maehr, 1973). Teacher differential treatment toward children from different racial-ethnic groups can be interpreted by children as a signal that the intellectual ability of their group is devalued. If this were so, the relation between teacher expectations and student achievement would be stronger for children from stereotyped groups than for their nonstereotyped peers. Indeed, the relation between teacher expectations and student achievement is more robust among Black than White students (Jussim, Eccles, & Madon, 1996), with low teacher expectations associated more strongly with negative academic outcomes for Black than White students (McKown & Weinstein, 2002).

It is conceivable that many events and interactions in the daily routine of schools signal to students from stereotyped groups that their intellectual ability is devalued. Those events may affect the extent to which students who are the targets of stereotypes feel that school is fair. Indeed, correlational studies suggest that high levels of perceived unfairness at school are related to higher rates of disciplinary referrals and disruptive behavior, and this effect is particularly strong for Black and Latino students (Gottfredson, 2001; Gregory & Weinstein, 2008; Tyler & Huo, 2000). When children from academically stereotyped racial-ethnic groups believe teachers are unfair, this belief may activate cultural narratives about racial injustice, signaling that they are devalued because of their ethnicity. This may in turn have a negative impact on the academic achievement of children from stereotyped racial-ethnic groups.

Signal influences and interpretive skill. Signal influences specifically and exclusively affect children

from negatively stereotyped groups. Negative stereotypes about the academic ability of Blacks persist (Bobo, 2001), although it is no longer socially acceptable to express those stereotypes directly (Dovidio & Gaertner, 1998). Furthermore, many people who hold overtly egalitarian beliefs nonetheless may hold implicit stereotypes that lead them to appraise and respond to people on the basis of their race or ethnicity (Baron & Banaji, 2006; Gaertner & Dovidio, 1986; McConahay, Hardee, & Batts, 1981). Social norms against racism and the persistence of implicit stereotypes mean that in the contemporary American context, stereotypes are often expressed ambiguously (Gaertner & Dovidio, 1986). For example, a White teacher who is formal and nervous when interacting with a particular Black student may be expressing a formal, socially anxious style. Alternatively, she may feel that Black students are not capable, and her formality and discomfort are expressions of this stereotypic belief (McKown & Strambler, 2009). How the student interprets the origin of the teacher's behavior is critical in determining whether the teacher will propagate a signal influence.

The consequences of ambiguous signal events depend on children's awareness of stereotypes about their group. For ambiguous signals to propagate signal influences, children must know that others might devalue their ability because of their group membership. Equipped with this understanding, children can interpret ambiguous interpersonal behavior as a reflection of racial-ethnic stereotypes. Although these capacities must be present for ambiguous signals to have a negative influence on achievement, with adults and children, prior research suggests that stereotyped individuals do not have to be consciously aware of a signal influence for it to have a negative effect (Steele & Aronson, 1995). Rather, children and adults must be generally aware of self-relevant stereotypes in the performance domain for ambiguous signals to propagate negative performance (McKown & Strambler, 2009; McKown & Weinstein, 2003).

Children's thinking about others, about society, and about race and ethnicity changes dramatically in the first 12 years of life (Hirschfeld, 1996; Killen, Rutland, & Ruck, 2011; Killen & Stangor, 2001; Nesdale & Flessner, 2001; Quintana, 1998; Rutland, Cameron, Milne, & McGeorge, 2005). In turn, how children appraise and interpret social events affects their response to those events (e.g., McKown & Strambler, 2009; Spencer, 1999). By preschool, American children have developed a conception of race (Hirschfeld, 1996). By elementary school,

children use group membership in their judgments about the fairness of social exclusion (Killen, Lee-Kim, McGlothlin, & Stangor, 2002). In this age range, children become aware of the relation between group membership and intergroup liking (Quintana, 1998). Specifically, between the ages of 6 and 10, children become aware that *others* endorse stereotypic beliefs that may devalue their group's intellectual ability (Brown & Bigler, 2005; Brown, Bigler, & Chu, 2010; McKown & Strambler, 2009; McKown & Weinstein, 2003; Quintana, 1998, 2008).

All these lines of evidence suggest that beginning around third grade, and commonly by the end of elementary school, typically developing children have the social knowledge and capacity to interpret events that, on their surface, are ambiguous in terms of whether they reflect biased beliefs or attitudes, as expressions of stereotypes or prejudices. The ability to interpret events as signals about what others believe about a child's group is, in turn, highly consequential.

For example, children's growing stereotype consciousness can affect their response to social and academic events. McKown and Strambler (2008) found that when children were aware of broadly held stereotypes, they were more likely to interpret negative interethnic encounters as reflecting racial animus. Furthermore, children from academically negatively stereotyped racial-ethnic groups (African American and Latino) *who were aware of broadly held cultural stereotypes* performed more poorly on a cognitive task when the task was described as diagnostic of ability than when the same task was described as a problem-solving task. For children from nonstereotyped racial-ethnic groups and for children from stereotyped racial-ethnic groups who were unaware of broadly held stereotypes, the conditions of testing did not affect performance (McKown & Strambler, 2009; McKown & Weinstein, 2003). These findings suggest that when children from stereotyped groups become aware of broadly held stereotypes, signal influences can hamper performance on cognitive and academic tasks.

Randomized field trials of interventions suggest that children and youth can be inoculated against naturally occurring signal influences, further demonstrating their existence and impact. For example, drawing from on motivation theory (Dweck, 1988), Good, Aronson, and Inzlicht (2003) found that teaching middle school girls to believe that intelligence depends on effort and that academic difficulties are situational reduced the effects of stereotype threat on math test performance. Draw-

ing from self-affirmation theory (Steele, 1988), Cohen, Garcia, Apfel, and Master (2006) found when African American students participated in an exercise in which they wrote a paragraph about their values and why those values were important, they showed lower levels of stereotype activation and received higher grades than their African American peers in a control condition. By successfully inoculating children against signal influences outside the lab, these studies indirectly demonstrate the existence of signal influences in naturalistic settings.

Child Factors

The foregoing discussion of direct and signal influences emphasizes social processes and the social settings in which they take place. This raises the question of what role child factors play in causing and maintaining racial-ethnic achievement gaps. There is little doubt that children's individual biological and cognitive characteristics affect their academic outcomes. For example, the better children perform on cognitive tasks such as those represented in IQ tests, the better children do academically (Neisser et al., 1995). Furthermore, how children understand and process information, and therefore what they can learn, changes normatively with age (Piaget, 1972).

It is beyond the scope of this article to review the many ways individual child characteristics and developmental processes contribute to achievement. An underlying premise of SET is that mean racial-ethnic group differences in achievement are the product of social processes that transpire between children and peers, between children and adults, and between children and social settings. Group differences in IQ test scores are also presumed to arise from these same social forces. A corollary premise of SET is that although individual child factors influence within-group variability in achievement, they do not, in general, explain mean racial-ethnic group differences in achievement. There is one important exception: The impact of signal influences depends on children's awareness of broadly held societal stereotypes, which changes predictably with age (McKown & Strambler, 2008; McKown & Weinstein, 2003).

Overlap and Boundaries Between Direct and Signal Influences

Direct and signal influences are distinct mechanisms by which a social event may affect group

differences on the Black–White achievement gap. Some events are clearly and only signal events. For example, the conditions of testing may signal to members of academically stereotyped racial-ethnic groups that their intellectual ability is devalued. Those conditions create unequal outcomes exclusively through their signal properties. Other events are clearly and only direct influences. For example, enrollment in schools that deliver high-quality instruction is an important resource for the development of talent (Hamre & Pianta, 2005; Weinstein, 2002). Higher quality instruction is associated with greater opportunities to learn and achieve. To the extent that children from different racial-ethnic groups are enrolled in different schools with instruction whose quality is systematically different, this will exert an influence on racial-ethnic achievement gaps through a direct influence on learning and achievement. If students are unaware that the allocation of resources is unequal, this form of discrimination will exert only a direct influence on racial-ethnic achievement gaps.

Some social phenomena can contribute to the achievement gap through direct influence, signal influence, or both (McKown, Gregory, & Weinstein, 2010). Research on teacher expectations provides an illustration. Teachers who have higher expectations of students tend to behave more warmly, provide better instruction, and offer greater student autonomy, all of which is associated with greater learning (Brophy & Good, 1970; Weinstein, 2002). In some classrooms, teachers expect more of their White students than they do of their Black students with similar records of achievement (Baron et al., 1985; McKown & Weinstein, 2008). Teacher expectations, allocated in part on the basis of child race, may lead teachers to provide better quality instruction to White students than to Black students with similar records of achievement. This may in turn lead to Black–White differences in achievement. In this case, the differential allocation of instructional quality is a direct influence, with no requirement that children notice the differential treatment for it to contribute to the achievement gap. However, it is also possible that some students, noticing the teacher's differential treatment of children from different racial-ethnic groups, will interpret the teacher's low expectations as reflecting the teacher's belief that some racial-ethnic groups are not capable. If so, this may lead to a signal influence. Teacher expectations may thus exert direct *and* signal influences on the Black–White achievement gap.

Although some experiences can operate as both direct and signal events, the distinction between the

two kinds of influences is nonetheless useful. From a theoretical perspective, distinguishing direct and signal influences provides a heuristic for evaluating two distinct pathways through which events may influence the achievement gap. From an applied perspective, how we understand the mechanisms through which events affect the achievement gap will shape the policies and practices that are deployed to reduce the gap. For example, if teacher expectations are seen as exclusively exerting a direct influence on the gap, then the best prescription for reducing its influence is to equalize teacher behavior that communicates expectations. Attempts to do so have met with mixed results (Gottfredson, Marciniak, Birdseye, & Gottfredson, 1995; Weinstein et al., 1991). In contrast, if teacher expectations are seen as exerting a signal influence, then a prescription might be to inoculate students against the untoward effects of signal influences by, for example, teaching children that achievement is the product of hard work (Good et al., 2003), or having children affirm important positive self-relevant values (Cohen et al., 2006). If, as the evidence suggests, teacher expectations can exert direct and signal influences on the Black–White achievement gap, the focus might include equalizing teacher behavior *and* inoculating students.

Combined Effects of Direct and Signal Influences

SET proposes that multiple social processes operate together within and across key developmental contexts to influence racial-ethnic achievement gaps. Thus, with the goal of identifying the universe of influences on the achievement gap, it is insufficient to account only for direct influences or only for signal influences. It is also generally insufficient to account for direct and signal influences in a single context. SET incorporates the proposition that direct and signal influences can operate in any key developmental context. The specific processes may be similar or different in different contexts. In addition, the proportion of the variance in a group difference resulting from direct and signal influences may be different in each context and in each developmental phase. However, the theory proposes that only by identifying salient direct and signal influences in key developmental contexts and by combining effects across contexts can we come to a full accounting of any racial-ethnic achievement gap.

Each of SET's propositions is supported from the empirical literature. However, the overall proposition that the achievement gap is better accounted for by combining the effects of different social

processes occurring in different key developmental contexts remains largely unexamined. Some researchers have examined the combined association of more than one direct influence on racial-ethnic achievement gaps (e.g., Brooks-Gunn et al., 1996, 2003; Lee & Burkam, 2002). However, no studies have examined multiple signal influences, or the combined effects of direct and signal influences across contexts. SET lends itself to the study of multiple influences across multiple contexts simultaneously. It is conceivable that influences within and across developmental contexts would combine additively or interactively to produce the Black-White achievement gap. How varied forces described by SET combine to produce the gap is an important area for future investigation.

Universe of Influential Developmental Contexts

A key proposition of SET is that social processes that cause and maintain the achievement gap may operate in and across multiple developmental contexts (Bronfenbrenner, 1977; Kelly, 1987; Weinstein, 2002). A context is defined as any setting in which an individual transacts social interactions with important others or in which setting characteristics signal information of social value. Developmental contexts in childhood include family, school, peer network, and neighborhood. During different developmental epochs, the contexts in which social processes influence the achievement gap will change. As children transition to adulthood, new contexts become important, including the workplace and marriage. Within each of these contexts are varied "microsettings," in any one of which, direct or signal influences may unfold. What contexts are the most important focus of inquiry and intervention should be guided by an understanding of the phenomenon of interest, theory, and the weight of evidence.

The earlier review of direct and signal influences suggests that there is good reason to focus on family, school, peers, and neighborhoods. Specifically, the literature suggests that: (a) family factors such as parenting practices influence the achievement gap; (b) some of the achievement gap can be attributed to racial-ethnic differences in the availability of high-quality instruction; (c) signal influences in naturalistic settings, particularly school, contribute to the achievement gap; (d) peers may exert an influence on children's academic achievement; and (e) neighborhood psychological resources influence achievement and may influence the achievement gap. Furthermore, the foregoing literature review suggests that direct and signal influences may

unfold in any one of these developmental settings. One of the most substantial unanswered questions raised by SET is what direct and signal influences operate in what developmental settings at what age to explain the achievement gap.

Developmental Hypotheses Uniquely Derived From SET

SET leads to specific predictions about: (a) the relative influence of direct versus signal influences on the achievement gap at different ages, (b) what developmental contexts are likely to have the greatest influence on the achievement gap at what age, and (c) what set of direct and signal influences in what contexts are sufficient to account for the achievement gap.

Age-Related Differences in the Contribution of Direct and Signal Influences

SET predicts that the relative impact of direct and signal influences will change with age. In preschool through second grade, most children are not yet aware that others endorse stereotypic beliefs (McKown & Strambler, 2009; McKown & Weinstein, 2003; Quintana, 1998, 2008). In those early years, then, only the most overt expression of stereotypes could be interpreted by a child as being self-relevant. Under these developmental constraints, children cannot interpret more ambiguous cues that a child may be judged on the basis of group membership as a devaluation of that group. By third grade, most children have become aware of broadly held cultural stereotypes. Becoming aware of stereotypes is in turn associated with susceptibility to stereotype threat effects induced through test instructions (McKown & Strambler, 2009; McKown & Weinstein, 2003).

SET thus predicts that in preschool through second grade, racial-ethnic differences in test scores are equal to the combination, across key developmental contexts, of direct influences only. Why? Signal influences cannot affect children when they have not yet developed the capacity to detect those signals. As children develop the ability to interpret social cues as reflecting stereotypes, a full explanation of the achievement gap requires accounting for both direct and signal influences. Between third grade and adolescence, most children become aware of broadly held stereotypes. SET thus predicts that the relative impact of direct and signal influences on the Black-White achievement gap will shift from exclusively direct influences through second grade, to a prepon-

derance of direct influences and some signal influences between third and fifth grades, to a more equal balance between direct and signal influences thereafter (see Figure 1).

The empirical literature is generally consistent with this hypothesis. Among preschoolers, accounting for multiple direct influences eliminates or nearly eliminates school readiness and test performance gaps (Brooks-Gunn et al., 2003; Lee & Burkam, 2002). In contrast, with middle school and high school students, controlling for direct influences is insufficient to account entirely for the achievement gap (Duncan & Magnuson, 2005; but see Mandara et al., 2009; Yeung & Pfeiffer, 2009). According to SET, this is because beyond second grade, controlling for direct influences on the Black-White achievement gap does not account for signal influences and thus leaves a residual portion of the gap unexplained. When children develop awareness of broadly held cultural stereotypes, to account for the entire gap requires accounting for both direct and signal influences (McKown & Strambler, 2009; McKown & Weinstein, 2003).

Age-Related Differences in the Contribution of Social Influences Across Contexts

Prior work suggests what settings are most influential in each epoch of a child’s life. In infancy and toddlerhood, children spend most of their time and relational energy with parents and other caregivers. After the transition to elementary school, first teachers, then peers, play increasingly prominent roles in children’s daily social experiences. Late in elemen-

tary school, as they become more independent, children may have more exposure to neighborhood influences. In adolescence, close friendships, peer networks, and romantic partners may become prominent influences, and parents exert less direct influence over their children’s daily lives.

In light of these developmental changes, SET hypothesizes that prior to school entry, only home influences affect the Black-White achievement gap. After school entry and through second grade, social processes at home and at school affect the Black-White achievement gap, with home processes initially contributing more to the gap than school processes. As school becomes more academically focused through fifth grade, social processes in school play an increasing role in contributing to the gap. After second grade, peer relationships move from more transient play to more enduring “chumships.” At this point, peers may begin to contribute to the gap, and this influence will increase in adolescence. In late elementary school, as children become more independent in the community, neighborhood effects on the achievement gap come into play, and grow incrementally through adolescence. This hypothesis is depicted in Figure 2.

Intervention Implications

Developmental hypotheses derived from SET provide the basis for creating a developmentally informed sequence of interventions. Specifically, to reduce the school readiness gap, preschool interventions should promote positive parenting and achievement-supporting home settings. From kindergarten through second grade, in addition to

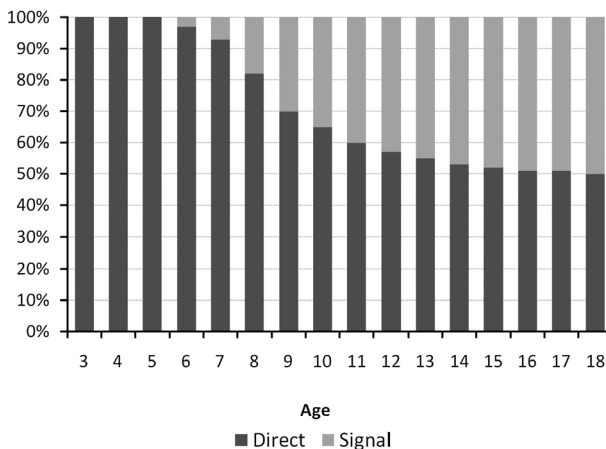


Figure 1. Hypothesized relation between age and the proportion of the achievement gap accounted for by direct and signal influences.

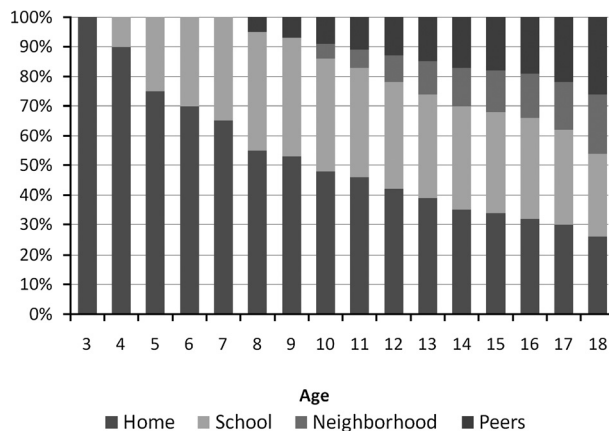


Figure 2. Hypothesized proportion of the achievement gap influenced in different developmental contexts, by age.

family support, interventions should focus on providing strong instruction and positive teacher–child relationships. From third grade on, in addition to parent support and strong academic support, interventions should inoculate children against the effects of signal influences and should endeavor to reduce the overall level of stereotyping at school. From third grade on, interventions should also be implemented to promote positive peer norms for achievement. From fifth grade on, in addition to the aforementioned kinds of support, interventions should increase neighborhood collective efficacy or, if that is not feasible, help children cope with neighborhood influences. SET predicts that if direct and signal influences salient in a particular setting and a developmental epoch are addressed, the Black–White achievement gap would be eliminated.

The Sufficiency of SET

Research on the achievement gap has been marked by a consistent partial accounting for the gap. SET holds promise to be a sufficient explanation for the Black–White achievement gap across developmental epochs. Not all possible developmental processes and theories are incorporated into SET. Furthermore, other social forces not incorporated into SET may contribute to racial-ethnic achievement gaps. As a result, two forms of SET are possible. If developmental phenomena and the full universe of social forces are sufficiently accounted for by SET, a strong form of the theory will withstand empirical scrutiny: Direct and signal influences, combined across key developmental contexts, will explain the entire Black–White achievement gap. If on the other hand, relevant developmental processes or social forces are not integrated into SET, a weak form of the theory may be more reasonable: Direct and signal influences, combined across key developmental contexts, will explain *more* of the achievement gap than current models do, but other forces, not accounted for by SET also contribute to the gap. Whether the strong or weak form of SET is more justified is a matter of empirical inquiry.

Standards of Evidence

Existing evidence supports many of the elements of SET. However, further research is needed to evaluate the theory as a whole. A judicious combination of naturalistic and experimental methods can be used to test the components of SET and the theory in its entirety. Three standards are required, one for

each of the following: (a) evidence of direct influences, (b) evidence of signal influences, and (c) evidence supporting the whole of SET.

Evidence of Direct Influences

The standard of evidence for the presence of a direct influence on the Black–White achievement gap is as follows: If a social process has a direct influence, Black and White children who share similar exposure to the direct influence should achieve more similarly than children with different exposure to the direct influence. Furthermore, the relation between hypothesized direct influences and achievement should be similar for children from all racial-ethnic groups. For example, Black and White children who live in comparably cohesive neighborhoods should achieve more similarly than children who live in neighborhoods that differ in their cohesiveness. In statistical terms, controlling for direct influences should reduce the magnitude of the relation between racial-ethnic group membership and achievement, and there should be no ethnicity by direct influence interaction.

Naturalistic research examining the relation between direct influences and the Black–White achievement gap generally examines whether the magnitude of the relation between child race-ethnicity and achievement is reduced when hypothesized direct influences are included in a statistical model. For example, this method has been used to demonstrate that comparing children with similar home environments accounts for much of the Black–White achievement gap (Brooks-Gunn et al., 1996; Lee & Burkam, 2002). Further research using naturalistic methods will help clarify the nature and magnitude of the combined effect of direct influences on the gap. The benefit of naturalistic studies is that they tend to be more feasible than true experiments. The drawback is that they do not permit strong causal inferences.

True experiments can lead to inferences about the causal impact of direct influences. For example, the New Hope Project, a randomized antipoverty program, found that income supplements, child-care assistance, and health-care benefits to full-time working poor families led to academic, social, and emotional benefits to children, particularly boys (Huston et al., 2001, 2005). Experiments permit stronger inferences about the causal relation between hypothesized direct influences and achievement. Although they are well suited to isolating the causal influence of a single independent variable, true experiments can be costly.

Evidence of Signal Influences

If a setting characteristic has a signal influence on the achievement gap, it should be true that in the presence of the signal, members of stereotyped racial-ethnic groups only will perform more poorly than when the signal is absent. In statistical terms, signal influences will produce an Ethnicity \times Signal Strength interaction. More specifically, the stronger the signal, the more poorly children from stereotyped groups will perform; in contrast, children from nonstereotyped groups will perform similarly regardless of the level of the signal.

As with direct influences, signal influences can be assessed using experimental or naturalistic designs. With regard to experimental studies, a raft of studies on stereotype threat has demonstrated that a variety of events can signal to children and adults from stereotyped groups that their intelligence is devalued, causing reduced performance (Nguyen & Ryan, 2008; Steele & Aronson, 1995; Walton & Spencer, 2009). Naturalistic methods could also be used to examine whether members of stereotyped groups, in the presence of presumed signal events, are more negatively affected than members of nonstereotyped groups. Experimental and naturalistic methods have been used, for example, in studies demonstrating that teachers expect more of White and Asian students than their Black and Latino peers with similar records of achievement (Baron et al., 1985; McKown & Weinstein, 2008) and that the relation between teacher expectations and achievement is stronger for Black students than for White students (Jussim et al., 1996), particularly when teacher expectations are negative (McKown & Weinstein, 2002).

Evidence Supporting SET as a Whole

Evidence supporting the constituent elements of SET does not necessarily support SET as a whole. Many studies presented in this article support the constituent elements of SET by demonstrating that a direct or signal influence accounts for *part of the Black-White achievement gap*. However, no study has totally accounted for the gap at all ages and no intervention or policy solution has totally eliminated it. A full assessment of SET will involve assessing the effect, across developmental contexts and ages, of multiple direct and signal influences. Ideally, such an examination would be undertaken using naturalistic designs *and* field experiments. Doing so would provide a fair test of the theory as a whole and would provide useful information

about comprehensive strategies to reduce educational inequality.

Conclusion

SET is a general, flexible model of social processes that contribute to the American racial-ethnic achievement gaps. SET proposes that racial-ethnic achievement gaps are the result of the combination, across key developmental contexts, of direct and signal influences. A central goal in developing SET is to provide a parsimonious model from which hypotheses can be developed and systematically, programmatically, and empirically tested. Although the review of evidence presented in this article focused on the Black-White achievement gap, SET provides a framework for understanding, examining, and reducing any racial-ethnic achievement gap. Furthermore, SET may prove useful in explaining socioeconomic achievement gaps, and sex differences in science, math, and engineering occupations (Cheryan & Plaut, 2010). SET may also offer a useful heuristic for understanding the origins of inequalities in other domains, such as racial-ethnic differences in disciplinary referrals at school (Gregory, Skiba, & Noguera, 2010) and employment outcomes (Pager & Shepherd, 2008). The accuracy and general applicability of SET to other forms of inequality are empirical questions to be vigorously investigated.

Prior research on the Black-White achievement gap provides support for each of the constituent elements of SET. Skeptics will rightly conclude that support for SET's constituent elements is not the same as support for the theory as a whole. However, there have been no comprehensive assessments of SET as a singular explanation of the Black-White achievement gap. Although it poses methodological challenges, only by conducting such research can we understand the full range of social processes that contribute to this significant social problem. In so doing, we may come to more efficient and effective policies and practices to reduce inequalities that run afoul of core American ideals of fair play.

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